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Concepts, Methodologies, Tools, and Applications



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Preface

The constantly changing landscape of Human Resources Management makes it challenging for experts and practitioners to stay informed of the field's most up-to-date research. That is why Information Science Reference is pleased to offer this three-volume reference collection that will empower students, researchers, and academicians with a strong understanding of critical issues within Human Resources Management by providing both broad and detailed perspectives on cutting-edge theories and developments. This reference is designed to act as a single reference source on conceptual, methodological, technical, and managerial issues, as well as provide insight into emerging trends and future opportunities within the discipline.

Human Resources Management: Concepts, Methodologies, Tools and Applications is organized into eight distinct sections that provide comprehensive coverage of important topics. The sections are: (1) Fundamental Concepts and Theories, (2) Development and Design Methodologies, (3) Tools and Technologies, (4) Utilization and Application, (5) Organizational and Social Implications, (6) Managerial Impact, (7) Critical Issues, and (8) Emerging Trends. The following paragraphs provide a summary of what to expect from this invaluable reference tool.

Section 1, **Fundamental Concepts and Theories**, serves as a foundation for this extensive reference tool by addressing crucial theories essential to the understanding of Human Resources Management. Introducing the book is "*The War for Talent*" by Ricardo Colomo-Palacios *et al.*, a great foundation laying the groundwork for the basic concepts and theories that will be discussed throughout the rest of the book. Another chapter of note in Section 1 is titled "*Strategic Human Resource Management and Organizational Performance*" by P. Kumari and P.C. Bahuguna, which discusses the interesting progress of HRM and organizational performance both. Section 1 concludes, and leads into the following portion of the book with a nice segue chapter, "*Human Resource Development and Technology Integration*," by Jia Wang. Where Section 1 leaves off with fundamental concepts, Section 2 discusses architectures and frameworks in place for Human Resources Management.

Section 2, **Development and Design Methodologies**, presents in-depth coverage of the conceptual design and architecture of Human Resources Management, focusing on aspects including statistical analysis, sales management, recruitment and retention, performance appraisal, and many more. Opening the section is "*HRM Adaptation to Knowledge Management Initiatives*" by José Luis Pineda, Jacobo Ramírez, and Laura Zapata-Cantú. This section is vital for developers and practitioners who want to know how to begin a process of HRM on a fundamental level. Through case studies, this section lays excellent groundwork for later sections that will get into present and future applications for Human Resources Management, including, of note: "*The Competency-Based Human Resource Management Model"* by Susana de Juana-Espinosa and Jorge Valdés Conca, and "*Human Resource Related Problems in Agile and Traditional Software Project Process Models*" by Stefan Koch and Gerhard Turk. The sec-

tion concludes with an excellent work by Dezhi Wu, titled "*Investigating Temporal Structure Usage in Individual Time Management Practices*."

Section 3, **Tools and Technologies**, presents extensive coverage of the various tools and technologies used in the implementation of Human Resources Management. Section 3 begins where Section 2 left off, though this section describes more concrete tools at place in the modeling, planning, and production of Human Resources Management. The first chapter, "*Team Dynamics in Virtual Spaces,*" by Allen Kitchel and Martha C. Yopp, lays a framework for the types of works that can be found in this section, a perfect resource for practitioners looking for new ways to benchmark progress and assess quality in the field. Section 3 is full of excellent chapters like this one, including such titles as "*Sources of Legitimacy for the M-Government Initiatives in Turkey,*" "*Lotus Workforce Management,*" and "*Applicability Assessment of Semantic Web Technologies in Human Resources Domain*" to name a few. Where Section 3 described specific tools and technologies at the disposal of practitioners, Section 4 describes successes, failures, best practices, and different applications of the tools and frameworks discussed in previous sections.

Section 4, **Utilization and Application**, describes how the broad range of Human Resources Management efforts has been utilized and offers insight on and important lessons for their applications and impact. Section 4 includes the widest range of topics because it describes case studies, research, methodologies, frameworks, architectures, theory, analysis, and guides for implementation. Topics range from business process modeling, adequacy, attrition, and outsourcing, to more specific looks at case studies from around the world. The first chapter in the section is titled "*Budding Researchers in the Humanities*," which was written by Vander Viana *et al*. The breadth of topics covered in the chapter is also reflected in the diversity of its authors, from countries all over the globe, including UK, Greece, Australia, Spain, Saudi Arabia, Portugal, New Zealand, USA, and more. Section 4 concludes with an excellent view of a case study in transaction-specific assets, "*Investment in Transaction-Specific Assets and Opportunistic Behavior in a Chinese Supply Chain*" by Barbara Flynn, Yi Liu, Liping Qian, and Xiande Zhao.

Section 5, **Organizational and Social Implications**, includes chapters discussing the organizational and social impact of Human Resources Management. The section opens with "*Transnational Learning and Collaboration in Delivering MBA Programs in Emerging Markets*" by Stephanie Jones. Where Section 4 focused on the broad, many applications of Human Resources Management technology, Section 5 focuses exclusively on how these technologies affect human lives, either through the way they interact with each other, or through how they affect behavioral/workplace situations. Other interesting chapters of note in Section 5 include "*Cross-Cultural Learning and Intercultural Competence*" by Pi-Chi Han and "*Communicating in Multicultural Firms*" by Jakob Lauring and Anders Klitmøller. Section 5 concludes with a fascinating study of a new development in Human Resources Management, in "*Assessment of Web 2.0 Applications Employed by Human Resource Departments in U.S. Cities*."

Section 6, **Managerial Impact**, presents focused coverage of Human Resources Management as it relates to effective uses of knowledge management, motivation, gender equality, talent management, output management, recruiting, and many more utilities. This section serves as a vital resource for developers who want to utilize the latest research to bolster the capabilities and functionalities of their processes. The section begins with "*Managing Professions for Knowledge Management*," a great look into how small firms can utilize benefits previously thought to be reserved to their larger competitors. The 11 chapters in this section offer unmistakable value to managers looking to implement new strategies that work at larger bureaucratic levels. The section concludes with "*Human Capital Management and Optimization*" by Jürgen Mühlbacher. Where Section 6 leaves off, section seven picks up with a focus on some of the more content-theoretical material of this compendium.

Section 7, **Critical Issues**, presents coverage of academic and research perspectives on Human Resources Management tools and applications. The section begins with "*Issues Influencing Electronic Commerce Activities of SMEs*," by Sitki Gözlü and Muammer Zerenler. Other issues covered in detail in Section 7 include human resource development, ethics, psychological contracts, incentives, job responsibilities, organizational culture, and much more. The section concludes with "*'We don't have the Key to the Executive Washroom'*" by Jessica Guth and Fran Wright, a great transitional chapter between Sections 7 and 8 because it examines an important question going into the future of the field. The last chapter manages to show a theoretical look into future and potential technologies, a topic covered in more detail in Section 8.

Section 8, **Emerging Trends**, highlights areas for future research within the field of Human Resources Management, opening with "*Innovations in Technology for Educational Marketing*" by John Rutaisire. Section 8 contains chapters that look at what might happen in the coming years that can extend the already staggering amount of applications for Human Resources Management. Other chapters of note include "*Re-Theorizing Human Resource Management and Human Resource Management in Context*" and "*Key Capabilities, Components, and Evolutionary Trends in Corporate E-Learning Systems*." The final chapter of the book looks at an emerging field within Human Resources Management, in the excellent contribution, "*Anonymous Workblogging and Organizational Coping Strategies*" by Abigail Schoneboom.

Although the primary organization of the contents in this multi-volume work is based on its eight sections, offering a progression of coverage of the important concepts, methodologies, technologies, applications, social issues, and emerging trends, the reader can also identify specific contents by utilizing the extensive indexing system listed at the end of each volume. Furthermore to ensure that the scholar, researcher, and educator have access to the entire contents of this multi volume set as well as additional coverage that could not be included in the print version of this publication, the publisher will provide unlimited multi-user electronic access to the online aggregated database of this collection for the life of the edition, free of charge when a library purchases a print copy. This aggregated database provides far more contents than what can be included in the print version, in addition to continual updates. This unlimited access, coupled with the continuous updates to the database ensures that the most current research is accessible to knowledge seekers.

As a comprehensive collection of research on the latest findings related to using technology to providing various services, *Human Resources Management: Concepts, Methodologies, Tools and Applications*, provides researchers, administrators and all audiences with a complete understanding of the development of applications and concepts in Human Resources Management. Given the vast number of issues concerning usage, failure, success, policies, strategies, and applications of Human Resources Management in countries around the world, *Human Resources Management: Concepts, Methodologies, Tools and Applications* addresses the demand for a resource that encompasses the most pertinent research in technologies being employed to globally bolster the knowledge and applications of Human Resources Management.

Section 1
Fundamental Concepts and Theories

This section serves as a foundation for this exhaustive reference tool by addressing underlying principles essential to the understanding of Human Resources Management. Chapters found within these pages provide an excellent framework in which to position Human Resources Management within the field of information science and technology. Insight regarding the critical incorporation of global measures into Human Resources Management is addressed, while crucial stumbling blocks of this field are explored. With 11 chapters comprising this foundational section, the reader can learn and chose from a compendium of expert research on the elemental theories underscoring the Human Resources Management discipline.

Chapter 1
The War for Talent: Identifying Competences in IT Professionals through Semantics

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ABSTRACT

In current organizations, the importance of knowledge and competence is unquestionable. In Information Technology (IT) companies, which are, by definition, knowledge intensive, this importance is critical. In such organizations, the models of knowledge exploitation include specific processes and elements that drive the production of knowledge aimed at satisfying organizational objectives. However, competence evidence recollection is a highly intensive and time consuming task, which is the key point for this system. SeCEC-IT is a tool based on software artifacts that extracts relevant information using natural language processing techniques. It enables competence evidence detection by deducing competence facts from documents in an automated way. SeCEC-IT includes within its technological components such items as semantic technologies, natural language processing, and human resource communication standards (HR-XML).

INTRODUCTION

The use of IT solutions has become a key issue in many organizations worldwide. Organizations currently use multiple IT/IS solutions to support their activities at all management levels (Trigo, Varajao, & Barroso, 2009). Software costs as a percentage of total computer system costs continue to increase; while associated hardware costs continue to decrease (Huang & Lo, 2006). Software development is a collaborative and knowledge

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intensive process where success depends on the ability to create, share and integrate information (Walz et al., 1993), among other factors. Software development is an intense human capital activity, especially intense in intellectual capital (Sommerville & Rodden, 1996). Although the importance of human factors has been widely recognized as key for software engineering, researchers should put a larger focus on the humans involved in software engineering than what has been done to date (Feldt et al., 2008). However, poor management of human factors in technical projects, and software engineering projects can be considered as technical projects, can hinder the use and effectiveness of technology (Ives & Olsen, 1984).

Individual differences have been identified as one of the paradigms for the research of human factors in software development (Curtis, 2002). IT workers' professional practice must be continually revised and improved in order to adapt workers competences to technical innovations, and their soft skills to evolving markets (Casado-Lumbreras et al., 2009). In this scenario, competence at the individual level is required for the creation of core competence, which is crucial for today's organizations at the structural level (Bassellier, Reich, & Benbasat, 2001). But in spite of this importance, the world is facing an IT professionals shortage. Thus, attracting students in order to shape tomorrow's labor horizon has become a major issue of concern in educational institutions (Garcia-Crespo et al., 2009). According to the analysis by Morello, Kyte, and Gomolsky (2007), many young people see IT as an unattractive career option: it is both hard work and "uncool". Additionally, this negative image is confirmed by the paradox that the strategic contribution of IT is recognized within enterprises, but the status of the IT department is low (Avison, Cuthbertson, & Powell, 1999). The shortage of IT professionals has been pointed out by many authors (e.g., Acharya & Mahanty, 2008; Agarwal & Ferratt, 2002; Mithas & Krishnan, 2008; Wells & Bogumil, 2001). As a consequence of this, the war for talent (Michaels, Handfield-Jones, & Axelrod, 2001) in the IT sector has its battlefield outside and inside the company and the internal recruitment of professionals must be done basing selection requirements against competence evidences. But in spite of the importance of competence evidences and knowledge sharing proficiencies pointed out by Liebowitz (2009), only a small number of companies have access to this data and develop their repository throughout the year.

Given the need of the corporations around the world to get competence evidences in a trusted and automatic way SeCEC-IT is presented in this paper. SeCEC-IT is a tool that based on the work performed by IT professionals in the context of software engineering development projects, extracts relevant information from software artifacts (programs, documents,…) using natural language processing and enables competence evidence detection by deducing competence facts in an automated and semantic way. These competence facts can be transferred to common human resource management tools that can exploit this information using competency management interchange standards so that it can be used for internal recruiting to projects, or to support knowledge management issues.

The remainder of this paper is organized as follows: the relevant literature in the collection of competence evidences is outlined and the main research efforts about semantic technologies are summarized. The architecture for the SeCEC-IT approach is presented along with the description of the implementation of the proof of the concept architecture. Finally, conclusions, implications for HRM, and future work are discussed.

COLLECTING EVIDENCES OF COMPETENCE

Competences and competence management has proved to be an extremely important area of study including fields such as pedagogy, psychology,

and technology. The term "competence" has been applied in reference to many different domains of behavior (Waters & Sroufe, 1983). Anderson and Messick (1974) have catalogued 29 diverse referents ranging from specific skills (fine motor dexterity) to abstract concepts such as consolidation of identity.

According to McClelland (1973), competency is comprehended as the relation between humans and work tasks, that is, the concern is not about knowledge and skills in itself, but what knowledge and skills are required to perform a specific job or task in an efficient way (McClelland, 1973). In a subsequent analysis of the term in the scientific literature, Draganidis and Mentzas (2006) state that a competency must be defined in terms of:

- Category. A group to which homogeneous and/or similar competencies belong;
- Competency. A descriptive name for the specific competency;
- Definition. Statement(s) that explains the basic concept of this competency;
- Demonstrated behavior. Behavior indicators which an individual should demonstrate if the specified competency is possessed.

The competence approach was a major innovation in the human resource development field in the 1990s (Collin & Holden, 1997). McClelland (1987) suggested that competence ought to become the basis for more effectively predicting individual performance in organizations. Moreover, competences can be defined as features related to effective working performance (Boyatzis, 1982). That could be the reason why competence is often used in the sense of performance, however, this is not entirely accurate (Bassellier, Horner Reich, & Benbasat, 2001). Nonetheless, competence is a factor that, coupled with motivation, effort and supporting conditions, may have a direct impact on performance (Schambach, 1994).

In the IT field there are many attempts to adopt and study the competence paradigm in various areas (e.g., Acuña & Juristo, 2004; Colomo-Palacios et al., 2010; Ruano-Mayoral et al., 2010; Trigo et al., 2010; Turley & Bieman, 1995). However, competence evidence collection, in general, and in software development teams, in particular, has received little attention in both theory and practice. In the work of Ruano-Mayoral et al. (2007) an antecedent of the system presented in this paper is presented. This system is a mobile tool to collect and store competence evidences, however, the collection of such evidences is performed manually. Taking this antecedent into account, the main purpose of this paper is to present a tool aimed to detect and classify competence evidences within software development projects through using software artifacts in an automated and semantic way.

SEMANTICS: A NEW PARADIGM ENABLED BY TECHNOLOGY

The information contained in Web pages was originally designed to be human-readable. As the Web grows in both size and complexity, there is an increasing need for automating some of the time consuming tasks related to Web content processing and management.

In this scenario, the Semantic Web can be seen as a vision for the future of the World Wide Web, where the unit of information is the data, instead of the web page as in the traditional Web. Around that vision of a web of data, the W3C consortium has promoted the development of several technologies to describe resources by means of ontologies and rules. The Semantic Web represents a revolution in many senses. The term "Semantic Web" was coined by Berners-Lee, Hendler and Lassila (2001), to describe the evolution from a document-based web towards a new paradigm that includes data and information for computers to manipulate. Ontologies (Fensel, 2002) are the technological

cornerstones of the Semantic Web, because they provide structured vocabularies that describe a formal specification of a shared conceptualization. Ontologies were developed in the field of Artificial Intelligence to facilitate knowledge sharing and reuse (Fensel et al., 2001). Ontologies provide a common vocabulary for a domain and define, with different levels of formality, the meaning of the terms contained, and the relations between them. Knowledge in ontologies is mainly formalized using five kinds of components: classes, relations, functions, axioms, and instances (Gruber, 1993). The theory which supports the use of ontologies is a formal theory within which not only definitions but also a supporting framework of axioms is included (Smith, 2003).

Taking full advantage of ontologies, the Semantic Web provides a complementary vision as a knowledge management environment (Warren, 2006) that, in many cases has expanded, and replaced, previous knowledge and information management archetypes (Davies, Lytras, & Sheth, 2007). Thus, the Semantic Web has emerged to be a new and highly promising context for knowledge and data engineering (Vossen, Lytras, & Koudas, 2007). The goals of the Semantic Web initiative include the integration of data from different sources in a machine processable format in order to make them accessible to computer programs and facilitating the use of data in ways that had not been thought of when the data was entered or recorded (Battré, 2008). It is agreed that the semantic enrichment of resources would lead to better search results (Scheir, Lindstaedt, & Ghidini, 2008). In this new scenario, the challenge for the next generation of the Social and Semantic Webs is to find the right match between what is put online, and methods for doing useful reasoning with the data (Gruber, 2008).

There are several works that reflect the importance of semantic technologies and their impact in competence systems and models. Semantic technology has been applied for project management teams construction (Gómez-Berbís et al., 2008); knowledge management for software projects (Colomo-Palacios et al., 2008); technical competence assessment (Colomo-Palacios et al., 2010); knowledge sharing and reuse (Lanzenberger, 2008); assisting the learning process (Naeve, Sicilia, & Lytras, 2008; Collazos & García, 2007); competence development efforts (Dodero et al., 2007); or assisting work assignment (Macris, Papadimitriou, & Vassilacopoulos, 2008); to cite some of the most recent initiatives.

SeCEC-IT: ARCHITECTURE AND CASE STUDY

One of the key elements in the SeCEC-IT picture is capturing competence evidences and enabling internal and established Human Resource Management (HRM) solutions to use them. Due to this potential, the reliability and precision of the competence evidences and their usability will be drastically increased. On the other hand, there is a need to develop a solution that could interconnect with a set of companies. The best tool for this purpose is the HR-XML standard.

The HR-XML Consortium is an independent, nonprofit organization dedicated to the development and promotion of a standard suite of XML specifications to enable e-business and the automation of human resources-related data exchanges. SIDES, one of the recommendations published by the HR-XML Consortium can be seen as a suite of data exchange standards for staffing issues. One of the multiple parts of SIDES is a competence schema designed to fulfill the following requirements (Allen, 2003):

- The competence schema is simple and sufficiently flexible and generalized so that it is useful within a variety of business contexts;
- The schema provides structure to enable competences to be easily compared, ranked, and evaluated;

- The schema is capable of referencing competence taxonomies from which competence descriptions were taken or used;
- The competence schema is relatively simple and compact so that it does not add to the complexity of the process-specific schemas within which it is used.

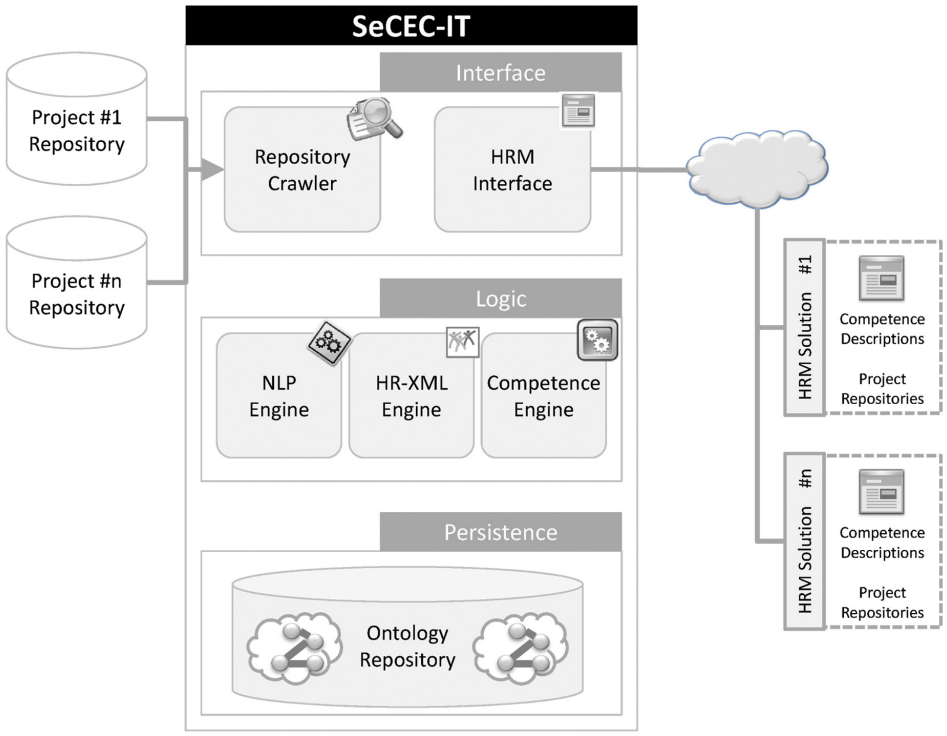
For the purpose of our work, the competence schema allows integration with other Human Resources Management Systems but, to achieve the full capacity of competence analysis that this framework seeks, it is necessary to build an extension of the competence schema to store some extra information about each competence evidence. The extension was used by the authors in the past and can be found in Ruano-Mayoral et al. (2007).

In what follows an explanation of SeCEC-IT will be given showing its architecture and a use case.

ARCHITECTURE

The architecture of SeCEC-IT is based on component groups that interact among themselves, to offer an automatic solution to the problem proposed. The conjunction of these systems permits the correct operation of the whole set of components, and obtaining the necessary data to achieve the desired outcome. Since interoperability is one of the most challenging problems in modern cross-organizational information systems (Mocan et al., 2009), much emphasis is put on interoperability issues, done via web services. The final architectural approach is a tailor-made value-added technological solution. Components might be related to the behavior as specified in the collaboration among those elements, turning those structural and behavioral elements into progressively larger subsystems, and the architectural style that guides this organization. Figure 1 shows how these different subsystems communicate and the

Figure 1. System architecture



flow of exchanged messages, in order to process the final system response. In the following sections the internal working of every element will be detailed.

As mentioned above, the architecture is comprised of three operating layers or subsystems. Firstly, the interface layer is composed by a number of interfaces through which end systems can interact with SeCEC-IT. Secondly, the logic layer encompasses the reasoning, inference, and business logic management functionalities. Finally, the persistence and storage layer is composed by semantic repositories, storing the competence evidence ontology. In the following, we will detail several of the core components in each layer.

- INTERFACE. This layer presents two components, namely HRM Interface and Repository crawler.
  - HRM Interface. This component allows the communication with external HRM solutions using a web service. Three different kinds of data are exchanged:
    - Competence descriptions included in HRM Solutions. These descriptions will feed the crawler that will seek relevant information relative to these descriptions in the set of software artifacts.
    - Instructions of how to locate and reach project repositories (URL).
    - HR-XML formats containing information elaborated by the system that is transmitted to HRM external systems in response to a given query.
  - Repository Crawler. This component, given a project repository, 'crawls' documents and sends them to the NLP engine in search of competence evidences.
- LOGIC. This layer provides cutting-edge functionalities through the following components:
  - NLP engine. Given a (set of) document(s) in a project repository and a set of human resources, NLP seeks for relevant competence evidences, such as participation of a programmer in a requisite extraction process. In this module several well known tools are implemented, including GATE to syntactic annotate noun phrases and JAPE to extract all phrases related to competence evidences. Once a competency evidence is found, the Competence Engine will be responsible of its classification and storage.
  - HR-XML Engine. This component constructs a valid HR-XML document from a query by reading data in the persistence layer, and returns this document to the interface layer, in order to be delivered to the external system.
  - Competence Engine. Is responsible for dealing with the competence ontology and stores information of competency evidences in the persistence layer. It hides competence complexity to other components of the system.
- PERSISTENCE. Finally, the persistence layer stores the knowledge about the competence evidences. On the one hand, the Competence ontology defines the relevant characteristics of each competence. All this information is used to describe competences suitable for our system (technical competence). This ontology has been defined using the Ontology Web Language (OWL) (Bechhofer et al., 2004). The storage and ontology reasoning has been developed based on the Jena framework.

On the other hand, the competence evidences and their location relative to their project repositories are also stored in a database. Both the competence ontology schema and its populated instances are stored in the KAON2 ontology repository. KAON2 is an infrastructure for managing OWL-DL ontologies. In the case of SeCEC-IT, Jena is the backbone technology that relies on a MySQL database. Jena is a framework for building Semantic Web applications that provides a programmatic environment for RDF, RDFS and OWL, SPARQL and includes a rule-based inference engine.

About implementation and internals, SeCEC-IT is a Web based application build under Java EE (by using Java Enterprise Edition 5 SDK). Business logic design was done using MagicDraw. This tool enables Model Driven Architecture (MDA) architecture and automatic code generation by using AndroMDA.

The Java-based tool RACER is also implemented. RACER reasoning engine and the Jena framework are crucial for the business logic manager layer, the former for the reasoning and the latter for the RDF Management and SPARQL Querying. Lastly, JAXB is used for XML handle (in order to communicate with others) and JENA 2 for ontology information issues.

USE CASE

To explain the realization of SeCEC-IT in a functional environment, as referred before, a use case is now described.

The software development company SEMDEV would like to implement a new knowledge management and competence management program. The final aim of this program is to assign people to projects basing these decisions in resource availability and competence. Now managers perform project staffing currently just by using availability and through using informal information, but the company owners want to implement a more scientific approach that permits personnel assignation closing the gap between competence and project role.

SEMDEV sends to SeCEC-IT the information needed to start the crawling process. Firstly, the access to current software development projects repositories (giving an external granted access to a PDF and code repository), on the other hand, the set of competences and human resources aimed for SEMDEV. These competences are adapted to SeCEC-IT competence ontology and the crawling process starts. The Repository Crawler component looks for relevant information in the repository and sends relevant information to the NLP Engine. This component extracts relevant competence evidences from documents and sends this information to the Competence Engine. The Competence Engine populates the competence ontology by creating a number of instances for given competences and human resources.

For example, the analysis of a number of software artifacts may imply that the resource RCP is competent in Requirements Engineering, but his results in Software Testing are low according to several comments in their proofs. The Competence Engine will store this information in the Persistence Layer that will be stored in the KAON2 ontology repository. Once all documents are crawled, the system regularly performs an update check in order to find out if there are new versions of documents and, thus, new competence evidences.

Later on, SEMDEV implants a HRM tool (such as Meta4 PeopleNet) to support competence development and management as well as project staffing based on competences. In this new scenario, SEMDEV human resource administrators can ask SeCEC-IT for competence evidences. Let's imagine that more information about competence evidences are needed for RCP. In this case, PeopleNet could ask to SeCEC-IT for this information using the HRM Interface. Once this order is received, the HR-XML engine extracts this information from the Ontology Repository

using SPARQL and forms a correct HR-XML format in order to be sent to PeopleNet using the HRM Interface.

CONCLUSION AND FUTURE WORK

The advent of the information age represents both a challenge and an opportunity for knowledge and competence management. New forms of knowledge extraction and expert location are deeply impacting companies around the world. IT companies are facing a war for talent in which, every project must be scheduled according to the availability of resources and their competences. In this new scenario, counting on with tools to seek competency in work environment can enable a better personnel management that could be a competitive advantage for the company.

SeCEC-IT, following the path of some previous works (Colomo-Palacios et al., 2008; Colomo-Palacios et al., 2010; García-Crespo et al., 2009; Ruano-Mayoral et al., 2007) brings new features to competence management in software development projects: the transformation of plain text to competence evidences in an automatic way. This competence evidences could be used, by means of the interfaces implemented, for staffing and teaming purposes or as a support to performance appraisal.

But SeCEC-IT is not only relevant for IT professionals and managers. Counting on a tool that can derive competency evidences directly from software artifacts could be a competitive advantage for the firm. Moreover, HRM personnel could also benefit from this. Having in mind that sometimes IT workers perform a highly technical work, it's very difficult for HRM departments to infer competency from their work without the assistance of an IT manager a highly IT qualified individual. But, having in mind the lack of available time, it's sometimes difficult for HRM personnel to know the competency levels of IT professionals apart from the yearly assessment. This information could be of great benefit for the corporation and its applications are multiple: improve the person-role fit, detect competency gaps, improve internal recruitment process and perk up professional development and career planning.

Taking into account the possibilities initiated by the current research effort, four separate lines of future research may be considered. In the first place, the integration of certain Web 2.0 contents as a source for competence evidences. In the second place, authors suggest to expand the possibilities of the system to deal with cultural, gender and performance differences. In the third place, integrate the tool into a wider program in which affective factors pointed out by Smith (2010) must be taken into account. Lastly, it is aimed to integrate SeCEC-IT in Computer Aided Software Engineering tools and, in particular, in effort and duration estimation tools for software development projects.

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Chapter 2
East and West, Past and Present:
Rekindle Old Principles for New Management Practices

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ABSTRACT

This paper explores the sayings and stories of the ancient Chinese philosophers Guanzi, Hanfeizi, Xunzi and Yanzi. Their way of ruling the state and managing the people are analysed and discussed in line with thoughts from the mainstream and modern Western management gurus, such as Warren Bennis, Peter Drucker, Mary Parker Follett, Douglas McGregor, Rosabeth Moss Kanter, Elton Mayo, and Jeffrey Pfeffer. Striking similarities call for addressing key issues in human resource management. East and west thinkers across 3000 years are identified. The principles-based ruling and management were found difficult to be taken seriously in ancient times as it is today. However, these principles must be rekindled to protect organisations and the world from mischievous behaviour that has caused much human suffering.

INTRODUCTION

In the time of crisis, it is good to reflect old and new wisdom to guide our path ahead. It is the intention of this paper to reflect the sayings and stories of ancient Chinese sages. These ancient texts are compared with the writings of respected Western management scholars. We find striking similarities in the thoughts and calls for action between ancient eastern and contemporary western thinkers across thousands years. We conclude that if these ancient and modern management thoughts had been put into practice more widely, the world may have had to deal with fewer corporate corruption scandals and dysfunctional state behaviours. Rather, we may have been witnesses to more productive populations, more effective organisations, more ethical governments and a more harmonious en-

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vironment, with a consequent reduction in global human suffering. We note, *en passant*, that many of the ancient sayings to which we refer were directed to the proper way of ruling the state, and often addressed to kings and lords. Nonetheless, the principles contained in these sayings and stories have been passed on through generation after generation and now appear in contemporary Chinese organisational settings. Accordingly, we draw on these sayings in the same way the insights presented in *Il Principe* (*The Prince*) by Niccolò Machiavelli (Skinner & Price, 1988) have been used to inform discussions of various aspects of organisation and management.

Management Principles According to Chinese Sages and Modern Gurus

In discussing ancient Chinese philosophy and thinking, the western management literature tends to focus on the work of Kongzi (Confucius) in *Analects* and Sunzi or Sun Tze in *the Art of War* (focusing on strategy). We do not reflect on Kongzi or Sunzi, whose works have been well dissected in other places. Rather, our focus is on other sages such as Guan zi, Hanfei zi, Xun zi and Yanzi (note: Zi used in ancient Chinese means 'Teacher or Master'), to whom much less attention has been paid. Their thoughts, on inspection, appear to parallel those of such modern management gurus as Warren Bennis (Bennis & Nanus,1985; Bennis & Thomas, 2002), Peter Drucker (1954, 1967), Mary Parker Follett (1994), Shfritz, Ott, and Jang, (2005), Douglas McGregor (1960, 2006), Rosabeth Moss Kanter (1983), Elton Mayo (1933, 1949) and Jeffrey Pfeffer (1998). In this section, we compare passages from each of the selected Chinese sages with mainstream western management thinking.

We first look at what is 'management'?. According to Gomez-Mejia, Barkan, and Cardy (2008), management in all business and human organisation activity is simply the act of getting people together to accomplish desired goals and objectives. So from the surface, management is about managing people. People, human resources are the focus of the management. In another sense, management can also refer to the person or people who perform the act(s) of management. Therefore, both those who manage and is managed are the focus of management, in addition to the functional activities such as planning, organising, staffing, leading or directing, and controlling, which are conducted by a group of one or more people or entities for the purpose of achieving organisational objectives. Follet (1994) asserted that management is the art of getting things done through empowering people not 'power over people' (Kennedy, 2007). Here, we see the importance of people or human resources as compared to the firm's financial and physical resources, and to treat the contribution of individual employees as the key to the organisational success (De Cieri et al., 2008)

Such a view is not dissimilar to that expressed by Guanzi (ca.728-645BC), prime minister to the King of Qi for 40 years in the Spring and Autumn period. Guanzi saw each individual as a drop of water, together forming a great ocean. People, like water, can both easily carry and sink the boat and so must be managed properly. He said to the King of Qi:

The sea does not reject the water, so it can form the ocean. The mountain does not reject the soil and stones, so it can become the high mountain. The wise king does not reject the people, so his country can become a great country. (Guanzi, Xing Shi Jie)

The people will be upset if they are deprived of their interests. They will be happy if they are offered privileges. This is the human nature. The ancient holy kings knew this rule, so they manifested the appearance of offering privileges and concealed the essence of obtaining the interests from the people. (Guanzi, Qing Zhong Yi)

In the last quote we hear echoes of Karen Legge's (1995) criticism of the rhetoric versus the reality of human resource management. The ancient rulers knew about the duality of achieving their own goal of ruling and satisfying the people upon whom their kingdoms were based. It is clearly seen that managing people is at the heart of ruling, and the kings knew well that the people would be willing to work for them, suffer for them, go through dangers and even die for them if the kings met the needs of people and made them happy (Guanzi, *Mu Ming*).

Nevertheless, they were also very clear that 'the best method of winning people's hearts is to benefit the people. The best method of benefiting people is to guide the people in the right direction' (Guanzi, *Wu Fu*). How to guide the people in the right direction? There must be certain rules and regulations – law and decree – or policies and standard industry code of practice *per se* in the modern language, and these must be so consistent that the people can follow without confusion. As Guanzi advised the King of Qi:

If the penalty is strict and impartial, the decree will be implemented and the officials of all ranks will fear the law; if the penalty is not strict and impartial, the decree will not be implemented and the officials of all ranks will neglect their duties. Therefore, the bright king has perceived the key of administrating the people and there is nothing more important than the decree. (Guanzi, Zhong Ling)

It is seen here that Guanzi was very instrumental in advising his king on how to manage his officials. 'The king must examine the officials by the law and decree according to their positions and achievements' (Guanzi, *Jun Chen Shang*). The clear measurement using 'the law and decree' (policies and code of practices at the firm level) is emphasised in judging officials' performance, not their relationship ('*guanxi*') to the King, as often so much mistaken when trying to understand the Chinese culture and their current human resource management practices. A similarly instrumental view in managing officials was expressed by the legalistic ancient guru Hanfeizi (ca. 280-233BC). He advocated consistency in designing and implementing the law and regulation, and appointment of officials according to their abilities and contributions made to the country instead of using the soft side of reasoning, such as debating on trivial matters and trying to get away with responsibilities by flowery wording. Further, rewards and punishment should be executed so that people would be fearful to obey the law and regulations. These views are reflected in the following Hanfeizi maxims:

Appointing officials according to the contribution, the common people will have less talk; appointing officials according to the speech of kind-heartedness and righteousness, the common people will advocate empty talks. (Hanfeizi, Chi Ling)

The superficial contributions according to the regulations of reward are difficult to identify. The mistakes covered up by beautiful reasoning are difficult to discern. Therefore, reward and punishment are likely to be confused by the inconsistent conditions. (Hanfeizi, Zhi Fen)

In contrast to this instrumental view of people management, Yanzi (ca. 590-500BC) took a humanistic approach, when speaking about managing people, as seen in his story-telling illustrated below. Yanzi emphasised treating people with benevolence and advocated the participative approach to encourage, empower and engage people to serve the common purpose of the state ('organisation' *per se* in the context of management), in the same way that Follett (Graham, 1994) and Kanter (1983) have done more latterly. Below we illustrate some key principles of people management in ancient China, which is relevant to today's world.

Principle of Merit-Based Selection

In the process of recruitment and selection, the critical aspect is the prior job analysis and job design that ensures the organisation seek the right people with right skills to do variety of tasks (Compton et al., 2009). This idea of making sure that people are properly fitted to their tasks and jobs was expressed in the conversation between Yanzi and the Lord Jing. The story goes like this:

One day, the Lord Jing asked Yanzi: 'in the ancient times, how did the rulers rule their countries and manage their people?'

Yanzi answered: 'the land or soil has different components, yet nurtures the same plant. It is quite impossible to ask for the same outcome of the plant in such varieties of soil or land. Similarly, people's abilities are different, if you ask them to do the same job, it is impossible that all will do well. Therefore, it would be unwise to ask people to do many tasks. A wise king neither appoints obsequious men close to himself nor selects people likely to fraternise to pursue self interest. He is able to accommodate subordinates' merits and shortcomings and encourage them to work on the things they are good at, not to impose them to do things that they are not capable of doing. These are the basic principles for recruitment and selection (Yanzi, Volume 3, Nei Pian Wen Shang No. 3)

One of the people management practices of successful organisations identified by Pfeffer (1998) is 'selective hiring'. The message is that if the organisation does not recruit and select the right people, compatible with the organisational culture, the whole organisation will collapse. This is reflected again in Yanzi thinking, though not as directly as in Pfeffer's (1998) criticism of the thousands of American companies that boast 'people are our greatest asset' without actively engaging in strategic, selective hiring.

Yanzi, when questioned by the Lord Jing about 'what is the main concern when dealing with state administration?', tactfully replied that 'my key concern is not able to judge what is good and bad'. The Lord Jing persisted: 'then what methods could be used to judge what is good and bad?' Yanzi was thereafter more direct to say: 'carefully choose and select the personnel'. Why? 'Because when people working nearby you are good, then all would be able to work properly according to their abilities in their respective positions. Judging good and bad will be then easier'.

On another occasion, the Lord Jing questioned Yanzi: 'how to choose the good people?' Yanzi answered: 'according to his speech (communication *per se*), his prior actions, his knowledge about how to rule and manage the country. You may first respect these people and get close to them and observe without losing the etiquette between you as a King and them. By this approach, you will get the right and best people. Therefore, a wise King, even though establishing less positions, can get his people to do most work. When you select the men, never look for their superficial beauty outside but check whether they are good at working on the practical matters, and whether they ever say what is unnecessary and do what is unlawful' (Yanzi, Volume 3, Nei Pian Wen Shang No. 3).

It is quite clear that Yanzi knew the importance of setting the selection criteria and used a number of selection techniques, such as observation, assessing past and present work experiences, practical skills and relevant knowledge, and checking references, etc to get the right people (Compton et al., 2009; Stone, 2008). The ancient recruitment and selection approaches were just as "modern" as today's HRM practices.

Principle of Attraction and Retention

The periods of Spring and Autumn and Warring States bred perhaps the most scholars and able men in the Chinese history. Yet each state was still fighting the so-called "war for talent" as we see today when organisations are facing skill shortages. Many kings of the different states enquired about an effective approach to get the best people for the country's service and there was great discussion

on how to become a 'kingdom of choice' as many able men and scholars could freely choose to go wherever they wanted to go (in much the same way as our modern high skilled knowledgeable Generation Y workers are choosing to do).

On one of those occasions, the King of Wu met with Yanzi and asked: 'On what conditions would one consider working for the country? And on what conditions would one consider leaving?' Yanzi answered: 'I have heard that one would work for the country whereby people in that country work according to their positions, regardless whether they are close to or away from the King. High officials are committed and loyal. There are no complaints from the grassroots. Punishments are not harsh. Under these conditions, people would stick to the principle-based king and enjoy work in the peaceful and stable country. On the contrary, if people nearby or far away can not carry out their respective duties, and officials are not loyal with many complaints about piled up administrative files ('workload issues' in the modern setting), together with heavy punitive actions, one should consider leaving the country. Clever men will neither love high pay under cruel rulers nor high position in the disorderly country (Yanzi, Volume 4, Nei Pian Wen Xia No. 4).

Reading this story, there are two points for reflection. One is that the 'kingdom of choice' was not much different from our current discussion of 'employer of choice', whereby people felt happy and satisfied with their work conditions; there was also a strong leadership based on principles instead of cronyism; and less grievance in the workplace (De Cieri et al., 2008).

Second, it was emphasised that 'clever' and 'capable' men would not work for monetary incentive or even for status if the state (or organisation) was neither orderly nor engaged with people or had bad reputation. The idea was very much in line with Elton Mayo's (1933) human relations management theory where the roots of work satisfaction were identified as non-economic and connected to other factors such as people being valued and feeling cohesive within their groups in the society. A similar view was expressed by Xunzi (ca. 298-238BC), 'Even when the ancient virtuous men were in poverty without enough to eat and without proper clothes to wear, they would not accept the improper promotion or the improper salary' (Xunzi, *Da Lue*). If we compare this principle with what have been exhibited in many high-paid CEOs in large corporations nowadays, we see how much they have fallen short according to such measurement!

Principle of Contribution-Based Reward

Kanter (1983) in her book *The Change Masters: Corporate Entrepreneurs at Work*, emphasised that rewards need to link more to contribution than to position or status. This principle was upheld by Yanzi illustrated in another story below.

The Lord Jing happily invited a few subordinates and wanted to reward those he liked. Three persons were rewarded 10,000, five awarded 1,000. When the order of the rewards came to the palace accountant, he refused to pay. The Lord Jing was so angry that he ordered the dismissal of accountant, but the order was not carried out by the official in charge of dismissal. The king was very upset.

Yanzi came to see the Lord Jing who complained to him: 'I am the king of this land; I should be able to grant benefits to someone whom I like and distance myself from someone I dislike. Now I like someone but cannot give benefits and dislike someone, yet cannot distance myself from. This is really out of the steps as a king?'

Yanzi said: 'I have heard if the Lord acts justly, his subordinates will obey but if the Lord goes astray, the subordinates will betray. Now you reward those obsequious officials and order the subordinates to obey, this is what I would call "the king goes out of his normal steps" and loses his principles because he forces his subordinates to do things beyond their duties. The late kings

established the rules of rewarding certain people because by doing so people are encouraged to do good; and set the rules of punishment for the sake of eliminating people to do harm…..People were then rewarded because of the good they did to the country not to the kings themselves, and the kings liked them; they were punished because of the bad they did to the country so the kings disliked them. Therefore, when the rules of likes and dislikes were clarified, many good people emerged and bad people extinguished. The country was in peace, people were united and lived in harmony. On the contrary, when your precedent kings loved those who were submissive to them, rather than the country and hated those who disobeyed them, the rules of likes and dislikes were set based on different principles, then many vicious men appeared and so did virtuous men extinguish. People were homeless and the country was in edge of destruction…' (Yanzi, Volume 1, Nei Pian Jian Shang No. 1).

It is clear that Yanzi's principle of reward was based on people's contribution made to the country not on their position *per se* or how close they were to the king – the idea advocated by Kanter (1983) and others subsequently (De Cieri et al., 2008; Stone, 2008). Similar to one of Pfeffer's (1998) people-management practices, higher than average pay must be justified by how it links to organisational performance. If employees make no contribution to achieve organisational objectives, they should not be rewarded. We have also seen the recent corporate scandal whereby those CEOs were paid more on their position instead of their actual contribution to the firm and the society.

Principle of Participation Management

Participation in decision making and communication between management and workers are two sides of the coin in the concept of participative management. One key insight attached to the Hawthorne experiments by Mayo (1949) was the vital importance of management-worker communication, on the basis of the dramatic increases of productivity when the researchers discussed the changes with workers before they were put into effect. Similarly, Kanter (1983) argued that the key to a corporate renaissance was 'participative management' or empowering and encouraging employees to become a true organisational citizen, fully aware of their rights and responsibilities in the democratic environment. To do so, there must be certain mechanism made available so that individuals can channel and contribute their ideas to (Kanter, 1983). In this regard, Yanzi appears to be at one with Follet (Graham, 1994), Mayo (1933, 1949), and Kanter (1983) who promoted democratic participation, not only in politics and the society, but also in business organisation. Yanzi expressed in the following story how important it is to provide channels for people to air their views freely and to exchange ideas between the King and his men.

This was one of very rare occasions Yanzi put the question to the Lord Jing: 'when you hold the meeting, do you make it orderly and serious as in the dignified or stately manner?' The Lord Jing retorted: 'isn't it good to hold the orderly and serious meeting?' For this, Yanzi replied: 'if you hold every meeting seriously and orderly, your subordinates will dare not speak. If no voice comes from your subordinates, you will not be able to hear good suggestions. If subordinates do not speak, I call this "mute", if the king could not hear the voices, I call this "deaf". The country full of mute and deaf people, what good would they do to the country?

Furthermore, the barn is filled up with small things one by one, and the curtain is knitted by small threads. The majestic Mount Tai is not made of one single stone, but many small stones. Managing the country requires not just one view but many views. There might be a time and it is reasonable to hear the suggestion but not implement it. However, I've never heard anyone refus-

ing to hear different views (Yanzi, Volume 4, Nei Pian Wen Xia No. 4).

Hearing the 'different views' is what Follett called the creative possibilities of conflict, which should be used to work for us not against us (Graham, 1994). Yanzi understood that, to manage a country well, free thinking should be promoted to generate different views. When a country (or an organisation) is represented by only one voice, the days to its doom are numbered. Beenen and Pinto (2009) recently recounted that one of the reasons contributing to the fall of Enron was the autocratic leadership style by its then CEO Jeff Skilling, whose corrupt practices continued for a number of years without being questioned. Employees' views were ignored. In fact those employees who did question the practices were punished by being either fired or transferred to less significant posts in the organisation (Beenen & Pinto, 2009). Long before the fall of the major corporates in the USA in the early 2000s, Warren Bennis stressed the importance for managers and leaders not only to do things right but do the right thing. To Bennis, a good manager/leader must listen to his men and learn from the people he leads (Bennis & Nanus, 1985). How similar thoughts these are to that of Yanzi. It appears, nonetheless that China has even moved quite far away from this principle in terms of their government based on one-party system and most enterprises' decision making is still from the top, instead of the mass.

On another occasion, Yanzi was feeling really sad to see a very eloquent and well-known man named Min zi-wu who was not able to speak properly in front of him, an authoritative figure. Min came from another country to seek employment under Yanzi. Perhaps because of his nervousness, or given his strong accent from another state, he was mumbling, even though Yanzi smiled and showed a friendly face to encourage Min to speak out his views, for Yanzi had already known that Min was the most capable man in his own state. Confronted by such an experience, Yanzi knew that there would be more able men in the country who simply could not overcome the fear of authority to speak freely, and that their valuable views would be buried without notice. Asked by his disciple why he was so sad, Yanzi answered: 'I would rather be Min's student to hear what he said than be in this position of authority. How could I be honoured while losing all ideas and views from these able men who are still living, not to mention those who were already dead?' (Yanzi, Volume 5, Nei Pian Zha Shang No. 5).

Here we see Yanzi not only aware of the importance of hearing different views but also encouraging participation of people from different backgrounds, speaking even with different accents! He appears to have been advocating both participative management and a management that was inclusive of diversity. Yanzi was sufficiently humble to be willing to learn from his subordinates, an attitude of humility in a leader that Bennis and Nanus (1985) summarise in terms of 'the more vulnerable I am to my people, the more I can influence them…' Yanzi's thinking, of the benefits of breaking down the barriers of status, is another precursor of the principle of best people management practices of successful organisations advocated by Pfeffer (1998), whereby 'an egalitarian attitude to status in the organisation' must be promoted.

Principle of Leadership and Ethics

Reading from a selective number of writing and saying by the ancient Chinese sages, as compared with modern western management gurus' thinking, it is found that the key concern of ruling the country and managing the people in ancient times was little different from running modern business organisations, whereby wise kings or managers/leaders must trust and empower followers and effectively share their vision with the people they manage and lead. Warren Bennis stressed the importance of leaders being able to translate their vision into proper words so that their followers can understand and be joined by the emotional

glue of 'trust' that 'binds followers and leaders together' (Bennis & Thomas, 2002). Kanter (1983) also perceived the individual human dimension within the organisations, warned the dangers for organisations to become more 'mean' than 'lean' and stressed the importance of overcoming this by sharing values in the corporation. Peter Drucker (1954) went even further to speak about management as a social art, requiring good communication with, and regard for, the people working in the organisation (Kennedy, 2007).

It appears that ancient and modern management thinkers are agreed that if the people/employees are not doing well, the responsibility is squarely on the shoulders of the leaders/management. As Guanzi said: 'the world is not afraid of having no virtuous and talented officials, but afraid that there is no virtuous king to appoint them; the world is not afraid of having no wealth, but afraid that there is no smart person to manage it' (Guanzi, *Mu Ming*). More latterly, Douglas McGregor (1960) observed that 'there are no bad troops, only bad officers' (Kennedy, 2007). The question remaining is who can be a good manager/officer?

One might remember Socrates' argument that 'good managers of a family would also be good generals' (Shafritz, Ott, & Jang, 2005). Zengzi, one of 72 disciples of Confucius in *Great Learning* shared this view, arguing that 'before being able to rule a state, one needs to manage his own family well'. Differences in the two views lie only in the focus – whilst Socrates spoke about similar managerial *tasks* shared by a household manager and an Athenian army general, ancient Chinese were more concerned about the *personal qualities* of the rulers of the state.

Developing the person qualities as managers and leaders of the organisation has perhaps been less emphasised in the west than in China. Responding to an interview Rosabeth Moss Kanter suggested that future leaders should be 'probably more Confucian than cowboy.' otherwise, 'things could get worse before they get better' (Crainer, 2003). Here Kanter might have referred to developing personal qualities of integrity and responsibility as leaders and managers, at a time when America was facing a number of corporate collapses due to the greed of top managerial teams. Bennis also emphasised the need for an 'integrated self' before leadership qualities can emerge (Bennis & Thomas, 2002). Drucker (1954) being most visionary in his view of management, said two decades earlier before the recent corporate scandals and financial crises that 'contrary to the approach to the study of political and social organisation that has prevailed in the West since Machiavelli, I stressed all along that organisation does not deal with power but with responsibility …the business organisation, as any organisation, is a human, a social, indeed a moral phenomenon. Customer service rather than profits should dominate management thinking.' (Drucker, 1967; Kennedy, 2007). Perhaps if more attention had been paid to these words and saying from both east and west, we might not have seen the fall of companies such as Enron and world.com, or even the economic maelstrom of recent times.

The world was perhaps as much in a state of flux in the Spring and Autumn period as it is today, prompting Shu Xiang, one of Yanzi's students to ask, 'the world is in disorder, violating the law of the universe; kings have gone astray, not act according to the ethical standards. Under such circumstances, if one acts in integrity or keep principles, one may lose people; but if acting unethically to keep people, one may lose principles. Should I keep principles and lose people or should I keep people and forfeit principles?' Yanzi answered: 'I have heard that he who upholds human dignity for those at the lowest position and keeps integrity under the worse circumstances treats people as the foundation of all things. Therefore, if you want to keep people, how could you lose the principles, and if you keep the principles, how could you lose people – in fact, people will flock to you?' (Yanzi, Volume 4, Nei Pian Wen Xia No. 4).

The message is that there need not be conflict between people and principles, or people and performance but, there will be problems if there is a violation of human relations. Commenting in 1973 about Elton Mayo's work, Peter Drucker observed that 'the human relations prescription, though rarely practised, remains the classic formula' (Kennedy, 2007). These ethical views contrast with the current circumstances of the Western economies whereby the interests of a few have been supported by the involuntarily sacrifices of millions of taxpayers, through their government representatives. Similarly, one might also argue that China's three decades of economic reforms can also be understood as benefiting mostly those in positions of power, rather than the masses, even though many were lifted out of poverty (Yuan, 2008).

CONCLUSION

Examining the sayings and stories from the ancient Chinese sages, we have identified a number of philosophies and thinking that are clearly consistent with modern approaches to people management. There is every reason to believe that ancient thoughts about the principle-based leadership and management approaches are still applicable to contemporary organisational practices both in China and elsewhere. Through close examination of the ancient thoughts against some of the writings by the mainstream western management gurus, it is found that the call for recognising and valuing individual contributions to business organisations and the wider society is not dissimilar across 3,000 years of human history. At the same time, it appears to be just as difficult to get modern managers in industrial organisations to implement sound management theories and translate them into practice as it was to get kings to listen to the wise advice of the Chinese ancient sages. However, if we stick to the principle-based management approach, we might be more able to balance the needs of adding value and enhancing organisational performance and the needs of upholding ethical standards and caring for employees and their families and communities, and work for the good of the wider society.

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Chapter 3
The Influence of Information Technology on Organizational Behavior:
Study of Identity Challenges in Virtual Teams

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ABSTRACT

This paper attempts to examine the effects of virtual team dimensions on social identities of its members. A review of the literature shows that the geographically dispersed, culturally diverse as well as temporary dimensions of virtual teams do not match with their stability as members have different ethnic, social, or cultural backgrounds. Sources like culture, place, and time seem to continuously acquire social identities. Due to the importance of social identity, an attempt has been made to examine its influence on organizational variables (i.e. job satisfaction, job involvement, job commitment, and organizational citizenship behavior). Questionnaire-based data have been accomplished from 149 members of 44 teams. The hypothesized relationships among the proposed variables are tested via a structural equation model (SEM). Results show that the geographically disperse and culturally diverse variables are negatively related to the social identity as against those of temporary and organizational variables which are related positively.

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INTRODUCTION

The ever increasing de-centralization and globalization of work processes have caused many organizations to respond to their dynamic environments by introducing virtual teams, in which members are geographically dispersed but coordinate their work via electronic information and communication technologies (Hertel et al., 2005). A virtual team is often consisted of a geographically dispersed, culturally diverse, temporary, electronically communicating work-group (Shin, 2005; Harvey et al., 2004). However, little is known about human resources within these teams, despite the level of research interest and growing of this new work form (Hertel et al., 2005; Lin et al., 2008). In other words, having different human resources challenges, the study of virtual teams with its diverse memberships has become an emerging trend these days.

Team members may have different sexes and racial groups, with different ethnic, social, or cultural backgrounds. Based on the social identity theory, members of a team with heterogeneous characters may find it difficult to integrate their diverse backgrounds, values, and norms and work together (Eckel & Grossman, 2005). Social identity has been defined in many ways; the common element in these definitions is inclusion of group membership as part of one's self-concept (Meyer et al., 2006). However, the virtual teams with geographically dispersed members from different cultures find it difficult to integrate socially.

The social identity involves one as part of a larger whole (Rousseau, 1998; Tajfel, 1978). Since they belong to multiple or collective groups such as an organization, division, and team, employees can form multiple social identities, one or more of which might be prominent at any given time (Meyer et al., 2006).

The present research intends to address the following major questions related to the effects of virtual team on social identity and organizational behavioral variables (satisfaction, job involvement, commitment and organizational citizenship behavior).

1. What are the sources of social identity acquisition and how they affect virtual teams?
2. What is the social identity status in virtual teams?
3. Is there any significant correlation between social identity and organizational behavior variables in virtual team and what is the status of these variables?

Literature review of virtual team and necessary resources for the identity acquisition is given along with the research methodology. Results are discussed with concluding remarks and a brief avenue for future research is highlighted.

DEFINITION OF VIRTUAL TEAMS

Globalization has transformed not only the market structure, rather customers' needs, and technological innovations have made organizations choose a new structure to respond to rapid environmental changes (Harvey et al., 2004; Bauer, 2003; Shin, 2004; Kock, 2008). Virtual organizations are one of the new entities shaped on this basis. The formation of virtual organizations requires information technology and qualified and knowledgeable personnel and leaders (Wickham & Walther, 2007; Kahai, et al., 2007; Hambley et al. 2007; Glückler & Schrott, 2007; Konradt & Hoch, 2007) for inter-organizational group activities (Larser et al., 2002).

The virtual organizations are often defined as the one, constantly interacting with the environment, and whose internal structure is based on virtual teams. In other words, virtual teams constitute the core of virtual organizations (Larser et al., 2002; Lipnack & Stamps, 1997). Researchers have variably defined the virtual organizations and there analysis indicates that the main part of

those definitions is highly analogous, except in some cases (Martins et al., 2004).

As such, a virtual team consists of a group of geographically dispersed people utilizing communication and information technologies in order to perform their organizational tasks (Jong, 2008; Kelley & Sankey, 2008; Martin et al., 2004). Most of the definitions introduce the virtual teams as of having the characteristics of temporal structure, cultural variety, geographical dispersion and electronic communications (Hertela et al., 2005; Shine, 2005; Harvey et al., 2004). In other words, they are considered as the combination of distributed specialties in temporal, geographical and cultural domains. Cosequently, their characteristics can generally be defined in four dimensions of spatial, temporal, cultural and organizational dispersion. *Spatial dispersion* refers to the degree to which the team members' workplaces are dispersed. *Temporal dispersion* dimension is concerned with the degree to which the team members work at different times. *Cultural dispersion* is concerned with the extent to which the team members are constituted from various cultures. *Organizational dispersion* is concerned with the degree to which the team members work between organizational boundaries (in various organizations) (Shin, 2005).

In most of the contemporary organizations, the teams and personnel participate in virtual activities, and organizational processes exist in both the traditional and the virtual forms. Thus, the virtual teams possess different degrees of virtuality depending on the extent to which they use virtual processes to perform their functions. Different definitions apply diverse standard to measure the degree of virtuality. In fact, the degree of virtuality is a function of the magnitude of each of the four factors mentioned above. One of the behavioral dimensions that may be affected by an increase in the team's virtuality as well as a subsequent decrease in face-to-face communications is the identity dimension.

SOCIAL IDENTITY

Individual's self-perception is often shaped by his personal, social and organizational identities. Here the process of perception is a dialectic process between one's own perception and those of others. In other words, the individual's perception is not created in a void, but is affected by the perceptions existing in the group, organization or society (Howard, 2000). Therefore, the theory of social identity is an attempt to explain the interaction between personal perceptions and those of other people (Ashforth & Mael, 1989; Tajfel, 1982; Hogg & Terry, 2000). People's social identity is affected by the groups to which they belong. Possessing organizational and social identity does not mean the individual has no personal identity. In other words, the individual identity refers to ones' personal characteristics and has nothing to do with any particular organization or group; however the organizational identity is defined based on the characteristics of a particular organization. This paper primarily deals with the social identity.

The most famous theoretician of social identity, George Herbert Mead believes that every individual shapes his/her own identity or ego through organizing others' attitudes in the form of an organized social or group attitudes (Mead, 1964). In other words, the image the individual creates or the way he feels about himself, are basically the reflection of other people's attitudes towards him (Jenkins, 2000). The logic of social identity states under what circumstances social contexts cause the organizational identity to gain more significance for the individual. Then, this basis is examined for some important organizational behaviors such as leadership, group's motivation, communications and the organization itself (Haslam, 2001).

Accordingly, the social identity is part of an individual concept originating from the awareness of his membership in a social group (or groups) with having interrelated values and feelings (Turner, 1999). The theory of social identity provides an

implicit framework for the understanding of inter-group relationships. This theory tries to identify and analyze motivational processes related to the structural and ideological characteristics of the social environment (Reicher, 2004; Turner, 1999). During the last two decades, the social identity has been developed and organized as one of the most important theoretical frameworks to study inter-group relationships. At the outset, this theory was developed to explain not only inter-group basis but it successfully proposed explanations for these cases in later stages (Ellemers et al., 1999).

The individual's own image is shaped not merely by factors existing in his inner existence; rather some external social entities also play important role in it. Further, the identity is not something given to the individual beforehand rather it is something created through constant interaction with the world (Giddens, 1991). Part of this interaction may be with organizations as individuals define and identify themselves on the basis of their attachment to an organization or involvement to an occupation (Tajfel & Turner, 1986). In other words, people identify themselves with the organization for which they work (worked or will work), and acquire a psychological feeling of possession (Pierce et al., 2001; Shamir & Kark, 2004). Organizational identity consists of establishment of affective-cognitive ties between the organizational definition and the definition of oneself (Dutton, 1994), and means the integration of the self and the organization (Tyler & Blader, 2000). When one unites his identity with beliefs, goals and activities of an organization, he is said to have acquired organizational identity (Albert et al., 2000; Van Dick et al., 2004). Again, when the individual's identity is united with that of an organization he works for, he becomes more loyal, more studious and more committed (Dessler, 1999).

SOURCES OF SOCIAL IDENTITY ACQUISITION

Given the importance of social identity, critics have attempted to identify sources of identity acquisition. As such, components of place, time and culture have been introduced as the primary sources of identity (Golmohammadi, 2007; Goffman, 1959; Jenkins, 2000):

- **Place**: It is one of the important sources of identity acquisition. The feeling of being distinct has always been an essential component of identity, which requires the existence of more or less permanent and impenetrable boundaries. Place not only can be delimited, but it has some degree of permanency. Through creating social solidarity, place also creates the feeling of belonging to the collectivity. In fact, the ability of place to play this particular role is related to its stability and limitability.
- **Time**: If we consider identity as a system of representation, Time and space constitute the principle parts of this system. All identities are based on a representative space and time, and require the imaginary geography of their own (Hall, 1996). Identity is based on continuity, and continuity is defined based on the time factor and every individual or group bases its identity on a historical memory (Jenkins, 2000).
- **Culture**: Culture is the mental software of human beings (Hofsted, 1997). Undoubtedly, it is the richest, and the most important source of identity (Peterson, 1999). It creates both distinction and solidarity. It creates a particular lifestyle. This differentiation not only paves the way for the creation of identities, but also gives meaning to human existence. Anthropologists, sociologists and many other researchers have defined the culture hence; most of them agree that culture

consists of people's particular ways of life. House et al. (2002) in their Globe Research define the culture an entity consisting of values, beliefs, identities and common interpretations and meanings of significant events, originating from the public experience of the members of a society, and handed down to posterity.

SOCIAL IDENTITY CHALLENGES OF HUMAN RESOURCE IN VIRTUAL TEAMS

Given the structure of virtual teams, a research on characteristics and challenges faced by human resource in such teams becomes significant (Harvey et al., 2004). This is also because the main focus of the current article is to focus on identity structure that poses various challenges to the personnel of virtual teams. The most important challenges in such teams seem to be decreasing or lack of face-to-face interactions. Scheduled meetings, face-to-face interactions help create particular situations of bodily and facial postures, nonverbal messages and social impacts, which do not exist among virtual team members using computer-based technologies for their communication (Harvey et al., 2004). This absence of face-to-face interaction and cooperation could create conflicts (Larser et al., 2002) among virtual team members because of their geographical differences or different perceptions (Shin, 2004). Conflicts caused by the absence of common perceptions and the lack of appropriate socialization disrupt communication and cooperation procedures (Harvey et al., 2004). The dynamic environment of virtual teams forces the members into accepting newcomers without sufficient socialization processes. Thus, socialization processes and understanding the norms in order to mitigate conflicts are disrupted (Haslam, 2001). Given the intense affiliation existing among virtual teams' members, measuring individual and operational efforts of the job will be difficult (Harvey et al., 2004; Lin et al., 2008). The absence of face-to-face interactions also makes the formation of informal norms and regulations, which may be necessary for moderating deviations still more difficult (Harvey et al., 2004).

With regard to the identity concepts, these are believed to be the basic principles in the formation of communications and the requirements of social life (Jenkins, 2000). The identity acquisition requires more or less specific sources, a disruption in each of which would undermine the very foundation of identity acquisition (Goffman, 1959). Since, the structure of identity is based on continuity and differentiation as perceived by individuals (Jenkins, 2000); the formation of a stable identity would be extremely difficult if these requisites are not provided for them through the sources of identity acquisition (Goffman, 1959). As mentioned before, place, time, and culture are the main components of identity acquisition hence; an attempt has been made to investigate each of them in order to assess their ability to create identity under given situations. Some critics however stress on the possibility to define virtual organizations using the four dimensions of space, boundary, time and culture, and to describe their characteristics (Shin, 2004):

- **Place and Space**: This dimension is concerned with the distribution of personnel along various geographical limits. Given the organizational structure, employees while being in different geographical areas are able to communicate with one and another using information technology (Shin, 2004). As such, virtual organizations have wide geographical distributions. Further, the boundary dimension is concerned with the distribution of organizational processes (Shin, 2004). Since, the virtual activities are often established based on intra-organizational processes, it is not so easy to specify organizational boundaries on the basis of such activities (Vakola, 2004).

These two dimensions (space and boundary) in virtual organizations are similar to place and space components in the sources of identity acquisition. Determining more or less permanent boundaries fulfill the need for social solidarity, and contribute to the formation of distinction and continuity (Golmohammadi, 2007). Thanks to the advancement of information technologies, virtual structures have accelerated the process of spatial disintegration, and have increasingly split the living ties of social space with a particular land or place in a way that it is difficult, or sometimes impossible, to determine social boundaries based on geographical and spatial limits (Golmohammadi, 2007).

- **Time dimension**: This is concerned with temporal dispersion, or in other words, with the degree to which the employees can work together simultaneously (Shin, 2004). Geographical dispersion is one of the factors affecting the temporal dimension, causing some changes in the personnel's working hours in virtual organizations (Larser et al., 2002). Given the fact that different geographical areas may have different working hours depending on ground conditions, the issue of simultaneity gains so much significance that the employees have to develop a regular plan to have simultaneous interactions. Another issue related to the temporal dimension is the nature of temporal relationships in virtual organizations. In such organizations, relationships are often short-term, and the passage of time changes the structures of virtual activities (Chudoba, 2005). The function of time in the identity acquisition, according to some is "based on continuity, and continuity is defined based on the temporal dimension. Every individual or group bases its own continuity on memory and history (Jenkins, 2000) in a way that all identities are established and developed in their own symbolic time." The concept of time has been changed in virtual organizations as simultaneous communications have been made available to all people. This will eventually overshadow identity distinction and stability among varieties and variations (Golmohammadi, 2007) in a way that due to the rapidity of changes, the connection between the past and present would be broken, and people would no longer be able to base their own identity structures. Temporary communications make people unable to appropriately develop the feeling of solidarity required for the formation of their identities (Giddens, 1991).
- **Culture**: This dimension deals with the cultural distribution of personnel, as the existing cooperation is based on participation of people with diverse organizational and national cultures (Harvey et al., 2004). By definition, virtual teams have common work no matter may possess different organizational and national cultures (Bauer, 2003). People belonging to different cultures communicate in differently and show different behavioral patterns (Shin, 2004). In other words, cultural diversity contributes to complexity, conflict, confusion and ambiguity in communications, making the task of management very difficult. As a matter of fact, the cultural diversity might decrease the real output of such teams (Adler, 1997). Studies have also indicated that the cultural diversity reduces the degree of integration among members of the team, leading to many difficulties in an organizational setup.

As mentioned before, culture is one of the richest as well as the most important sources of identity acquisition. It creates distinction that paves the way for the development of an identity (Jenkins,

2000). In virtual organizations, cultural components and elements inevitably interact with one another and constitute a harmonious whole (Harvey et al., 2004). Through penetrating boundaries and contributing significantly to cultural interactions, the structure of virtual organizations raises people's awareness of other cultural elements such as norms, values and customs. In fact, this awareness is awareness of the relativity of social and cultural world, which indicates that culture is no longer able to fulfill its peculiar function (in creating distinction and solidarity) appropriately. When the most important traditional source of identity becomes so vulnerable and relative, the people relying on that source would also face a crisis of identity and meaning.

A comparison between the characteristics of virtual organizations and the sources of identity shows the lack of actual identity contents and in such organizations hence; this identity crisis is likely to happen. Based on the above discussion, following research hypotheses are formulated.

H1: *The culture dimension of virtual team in software producing companies is positively related to social identity.*

H2: *The place dimension of virtual team in software producing companies is positively related to social identity.*

H3: *The Time dimension of virtual team in software producing companies is positively related to social identity.*

The main function of identity is to develop a framework for social life (Jenkins, 2000). Any change in identity foundations would cause subsequent changes in organizational concepts. Since personnel constitute the main organizational elements at this point, a question arises as how human resource's output is affected by the identity structure and how does any change in identity foundations would change this output?

Identity is one of man's psychological needs, and is the prerequisite for any form of social life. According to Tojfel, social identity is conceptualized for the individual as his awareness of belonging to a particular social group, and the affective importance of this membership for him (Turner, 1999). In recent years, the social identity theory has been examined in a wide range of researches dealing with organizational behavior. This shows that social identity has close connection with organizational issues (Haslam, 2001). Virtual teams are considered as social environments requiring particular identity structures in order to establish and continue communications (Harvey et al., 2004). Regarding the fact that identity contributes to the formation of relationships and creation of meanings in personal and social life (Jenkins, 2000), it influences the personnel's understanding of other organizational variables. Following sections will be investigating the influence of social identity on job satisfaction, job involvement, organizational commitment and organizational citizenship behavior.

SOCIAL IDENTITY IN VIRTUAL TEAMS AND JOB SATISFACTION

Job satisfaction means the extent to which one likes his job i.e. the individual's assessment of his own job. In other words, does the individual have a positive attitude towards his job factors in general? This assessment includes perceived occupational characteristics, job feelings and the workplace as a whole. Due to wide range of aspects, it can be said that the job satisfaction consists of a series of attitudes. Here, one may be satisfied with a series of his job factors or unsatisfied with another. But in the study of organizational behaviors, all of these factors are investigated under a single category of job satisfaction (Weiss 2002; Locke 1976).

Job satisfaction includes satisfaction with the job itself, payment, promotion, colleagues and management (Weiss, 2002). Many social theories state that an increase in the level of organizational identity can contribute to people's satisfaction with

the organization. People differentiate between the members of their own group and the others and this creates a feeling of satisfaction among them (Haslam, 2001). People's satisfaction increases once they come across an appropriate definition of themselves and their organization. This satisfaction has great significance in groups. They will reduce their interactions and finally leave the group if the members are unsatisfied and pursue their own private interests, while in organizations active in the area information technologies, much importance is attached to human resource (Tidwell, 2005).

Job satisfaction is the outcome of assessing job characteristics. If an individual is unable to develop his organizational identity by means of which to offer a particular definition about himself and his social relationships in that organization, it will make his task difficult to assess the characteristics of his job hence; this may have negative effects on his job satisfaction. Therefore, yet another research hypothesis may be proposed as follows:

H4: *The social identity of virtual team in software producing companies is positively related to job satisfaction of its members.*

SOCIAL IDENTITY IN VIRTUAL TEAMS AND JOB-INVOLVEMENT

Job-involvement shows the degree to which an individual is mentally, cognitively and psychologically occupied with his job and attaches a particular importance to his job (Paullay et al., 1994*)*. In other words, the individual takes pleasure doing it and does not get tired once involved with his job. Indeed, making personnel involved with their jobs is one of the difficult tasks of managers because "self-alienation" and "job-alienation" are among the outcomes of organizational life.

Lodahl and Kenjer (1965) developed a concept of work-involvement to operationalize the Protestant working ethics, in which the value of working is part of the individual's own value. They also differentiated the concepts of "work-involvement" and "job-involvement" where the former is a more general concept, indicating individual's esteem for work and working. But job-involvement is merely concerned with individual's present occupation (Kanungo, 1982). In other words, job-involvement is related to vocational identity and an individual job holder usually identifies himself with it. Such a person does his best to realize the organization's goals (Lawler, 1986; Pfeffer, 1994).

Active participation in groups requires an individual to have feeling of affiliation towards the nature of the job, and appropriately identify himself with the job and actively participate in it. In terms of definition, the function of identity has a close relationship with the development of the concept of job-involvement. Identity enables people to appropriately understand the nature of their jobs, and to formulate the nature of their own personality. Therefore, the study of identity structures and their effect on people's participation in their jobs is crucially important. Thus, the research hypothesis may be stated as follows:

H5: *The social identity of virtual team in software producing companies is positively related to job involvement of its members.*

SOCIAL IDENTITY IN VIRTUAL TEAMS AND ORGANIZATIONAL CITIZENSHIP BEHAVIOR

In primitive schools of management, people used to be assessed through their behaviors expected from personnel in their job specification. In the past, based on vocational behaviors of the personnel or their intra-role performance, they were recognized and awarded by the official system. Today, extra-role behaviors are the focus of attention which is concerned with vocational behaviors outside the realm of personnel's formal

roles, which are optional and usually thankless (Haslam, 2001).

Researchers have categorized the organizational behaviors with different headings i.e. pro-social behaviors (Brief & Motowildo, 1986; Adebayo, 2005), extra-role behaviors spontaneous behaviors (George & Brief, 1992), Pre-contextual work (Borman & Motowildo, 1993), and generally, organizational citizenship behaviors. However, researchers are disagreed over the aspects of organizational citizenship behaviors. Aspects such as helping behaviors, sportsmanship, organizational loyalty, organizational obedience, individual creativity, conscientiousness, personal development, courtesy, civic virtue, altruism, all have been addressed in various studies.

Studies about social identity and organizational citizenship behavior indicate that people with a high degree of commitment toward group work have a greater tendency to participate in the extra-role activities (organizational citizenship behaviors) (Haslam, 2001). When the vocational behavior of some is determined by individual identities, people are more likely to participate in activities promoting their personal status. But when the vocational behavior is determined by social identities, they are more likely to show greater effort to promote group interests (such as helping new employees and performing other thankless jobs). Studies have indicated that organizational identity can promote organizational citizenship behavior (Dutton et al., 1994; Haslam & Powell, 2000; Van Knippenberg, 2000).

Thus it can be said that the social identity and the organizational citizenship behavior help bring solidarity and stability to teams. Therefore, study of the relationship between these two behavioral variables in virtual teams in which the structures of identity acquisition have not been sufficiently developed is crucially important. Therefore, a research hypothesis statement may be stated as follows:

H6: *The social identity of virtual team in software producing companies is positively related to organizational citizenship behavior of its members.*

SOCIAL IDENTITY IN VIRTUAL TEAMS AND ORGANIZATIONAL COMMITMENT

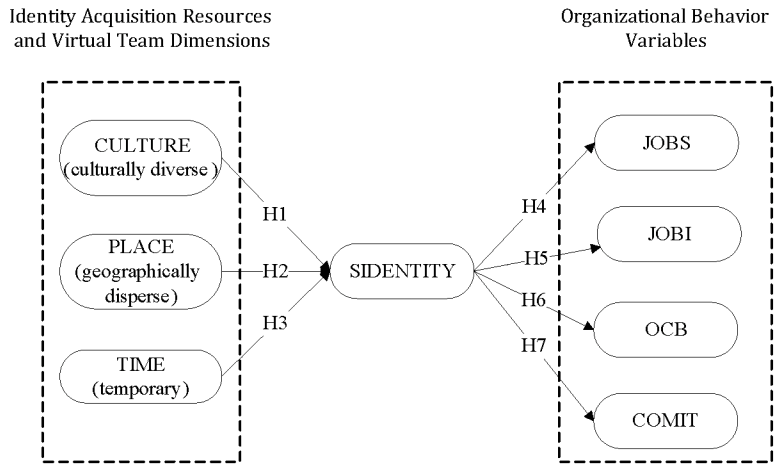
Organizational commitment, as a dependent variable, indicates obligation that forces the individual to remain in the organization and studiously work for the realization of its goals (Meyer & Herscovitch, 2001). In other words, organizational commitment is accompanied by a series of productive and constructive behaviors. An individual with a high organizational commitment remains in the organization and puts considerable effort or even self-sacrifice to realize the organizational goals.

Studies show a strong relationship between the concepts of organizational commitment and identity (Haslam, 2001; Van Knippenberg & Sleebos, 2006; Meyer et al., 2006). They are interrelated and the mere difference between these two concepts is that identity is a reflection of the definition of "self", but commitment is not (Van Knippenberg & Sleebos, 2006; Meyer et al., 2006; Brown, 2000).

The identity and organizational commitment have been the focus of attention in recent studies because of their influence on other behavioral variables. Once people promote their knowledge while belonging to a particular group with specific feelings and values, they actually seek to accept a social identity in such groups. Any change in the sources of identity in virtual teams can influence people's identities. Regarding what has been said so far, a research hypothesis can be stated as follows:

H7: *The social identity of virtual team (Figure 1) in software producing companies is positively related to organizational commitment of its members.*

Figure 1. Research model



METHODOLOGY

The methodology followed in the current study will be discussed in terms of sampling and data collection, measurement instrument, reliability and construct validity of questionnaire as well as data analysis.

SAMPLING AND DATA COLLECTION

Basedion the structured questionnaires from 40 teams, data were collected over a 4-week time frame. These teams which are employed by two software provider companies (System groups, Kishware) work on analyzing, designing and supporting information systems in Iran. These companies were selected for their high-level electronic communication and upgraded services to their customers. Of 85 questionnaires distributed, a total 145 employees completed the questionnaire with a response rate of 82.7%. A complete anonymity was guaranteed to all participants. 62 sample (42.8%) were female and 83 male (57.2%). The average age of respondents was 33 years, 60% of whom possessed bachelor degree while 40% had master.

MEASURES

Responses were measured using the same 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The reliability test was done through Cronbach's coefficient alpha (α). An α value of 0.70 or above indicates a reliable measurement instrument.

- **Satisfaction**: The Brayfield and Rothe (1951) measure of satisfaction was adapted to the parameters of the current study. Specifically, respondents came up with statements variably: "I feel fairly satisfied with [organization's name]," "I find real enjoyment when attending functions at [organization's name]," "I am often displeased when at [organization's name]," and "When I go to [organization's name] I feel right at home." The alpha level was.86.
- **Commitment**: Commitment was assessed through the Meyer and Allen (1984) affective commitment measure. Participants were asked to respond to the statements such as: "I feel emotionally attached to [organization's name]," "[Organization's name] does not deserve my loyalty (R)," and "I would be happy to participate in [or-

ganization's name] for the rest of my life." The alpha coefficient was.85.

- **OCB:** Organization citizenship behavior was assessed by adapting the Podsakoff and MacKenzie (1997) measure. Participants were asked to respond to the following statements: "I help out other [organization's name] member if someone falls behind in his/her works", "I willingly share my expertise with other member of the [organization's name], "I take steps to prevent problems with other [organization's name] member and "I attend and actively participate in [organization's name] meeting." The alpha coefficient was.86.
- **Involvement:** Job-involvement was assessed by adapting the Kanungo (1982) method. Participants were asked to respond to the statements: "The most important things that happen to me involve my present job", "I live, eat and breathe my job", "Most of my interests are centered on my job" and "Most of my personal life goals are job- oriented". The alpha coefficient was.87.
- **Organizational identification:** Haslam's measure of social identification (2001) was adapted for organizational identification. Participants were asked to respond as: "When someone criticizes [organization's name], it feels like a personal insult," "I am very interested in what others think about [organization's name]," "When I talk about [organization's name] with others, I usually say we rather than they," and "[Organization's name] successes are my successes." The alpha level was.84.
- **Culture, Time and place:** The Chudoba et al., (2005) measure of culture, time and place was adapted to the parameters of identity acquisition resources and virtual team dimensions. Specifically, respondents replied the statements: Place ("I work at home during normal business days", "I work while travelling, e.g. at airports or hotels", "I collaborate with people in different sites or geographies", "I collaborate with people you have never met face to face". The alpha level was.87) Culture ("I collaborate with people who speak different native languages or dialects from your own", "I collaborate with people from different cultural backgrounds", "I collaborate with people from different cultural values". The alpha level was.86) and Time ("My work extended days in order to communicate with remote team members", "I collaborate with people in different time zones", "Participate in real-time online discussions, such as chat or instant messaging",. The alpha level was.85).

DATA ANALYSIS

Structural Equation Modeling (SEM) was applied in this study to estimate direct and indirect effects using LISREL 8.5. Assuming the measurement model meets goodness-of-fit criteria, the hypothesized relationships are tested in a SEM.

The comparative fit index (CFI), the non-normed fit index (NNFI), and the root mean square error of approximation (RMSEA) were used to evaluate the model. Values approaching.95 for the CFI and NNFI and less than.05 for the RMSEA are generally considered indicative of acceptable model fit.

RESULTS

A first exploratory step in the analysis is a correlation analysis that includes all independent and dependent variables (Table 1). Each of the variables in model are shown with the expressions i.e. culture with CULTURE, place with PLACE, time with TIME, social identity with SIDENTITY, job satisfaction with JOBS, job involvement with

Table 1. Covariance matrix for constructs

Variable	Mean	SD	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
JOBS (1)	2.53	0.57	1							
JOBI(2)	2.31	0.49	0.331	1						
COMIT(3)	2.56	0.57	0.468	0.337	1					
OCB(4)	3.11	0.41	0.316	0.339	0.656	1				
SIDENTITY(5)	2.01	0.599	0.374	0.416	0.767	0.580	1			
TIME(6)	3.27	00	00	00	00	00	00	1		
PLACE(7)	3.46	00	00	00	00	00	00	00	1	
CULTURE(8)	2.98	00	00	00	00	00	00	0000	0000	1
All coefficient are meaningful at 99% level										

JOBI, job commitment with COMIT and organizational citizenship behaviors with OCB.

The resulting indexes indicated that the measurement model fitted the data well. Figure 2 shows the results of the Structural Equation Modeling (SEM) for the constructs. The overall fit of the proposed structural model was quite satisfactory (e.g. $\chi 2$=343.86, df=367, ρ<0.001, with Root mean square error of approximation (RMSEA) =0.000, Comparative fit index (CFI)= 0.99, Normed fit index (NFI)=0.86, Goodness-of-fit index (GFI)= 0.86, and Adjusted goodness of fit index (AGFI)=0.84). Although $\chi 2$ is a bit large ($\chi 2$=343.86), the value of (Chi-square/degree of freedom) is less than 2 and the GFI and AGFI are close to 0.90. In addition, the RMSEA value is less than 0.05 (RMSEA=0.000). The above figures imply good model fit. Moreover, the ranges of all factor loadings and the measurement errors were acceptable and significant at alpha=0.001, which provided evidence of convergent validity.

RESEARCH FINDINGS

Hypotheses examination:

Using LISREL, seven significant relationships were accomplished such as: culture and social identity, place and social identity, time and social identity, social identity and job satisfaction, social

*Figure 2. Structural Equation Model Results (H1 through H7) $\chi 2$=343.86, ρ<0.001, df=367, RMSEA=0.000, CFI=0.99, NFI=0.86, GFI=0.86, AGFI=0.84. All solid line path coefficients are significant at ρ<0.001****

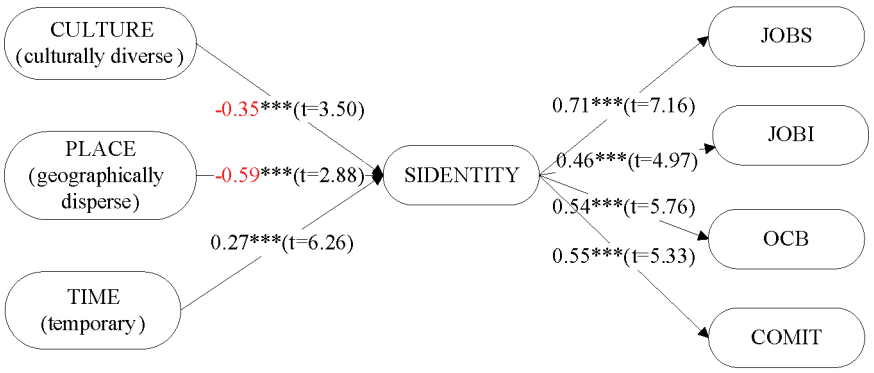


Table 2. Result of hypotheses

Hypotheses		Result
H1	The culture dimension of virtual team is positively related to social identity	Supported
H2	The place dimension of virtual team is positively related to social identity	Supported
H3	The Time dimension of virtual team is positively related to social identity	Not supported
H4	The social identity of virtual team is positively related to job satisfaction of its members	Supported
H5	The social identity of virtual team is positively related to job involvement of its members	Supported
H6	The social identity of virtual team is positively related to organizational citizenship behavior of its members	Supported
H7	The social identity of virtual team is positively related to organizational commitment of its members	Supported

identity and job involvement, social identity and organizational citizenship behavior and social identity and job commitment (Figure 2). Except hypothesis (H3), all other hypotheses (H1, H2, H4, H5, H6 and H7) were supported (Table 2).

DISCUSSION AND CONCLUSION

As Table 1 indicates, an average sample of the social identity is 2.01. Statistical tests show that this average is low and in is critical situation. The test results find that the identity is a challenge for the virtual teams hence; the first hypothesis is approved.

The influence of the information technology in organizations and emergence of virtual teams along with reduction in the sources of identity acquisition have made identity-building and identity-finding difficult with traditional methods. In such scenario, the individuals in such teams cannot establish meaningful and permanent communication with each other. The identity crisis disturbs the social life, and individual or group need to solve the crisis. Rebuilding the identity is one of the factors that should be considered in such situations that can be considered at three levels i.e. ego, ego and group and intergroup.

Virtual teams continue both to weaken the identity acquisition resource and increase the possibility of rebuilding the individuals' identity. It has a dual feature: it has both opportunity and threat for the organization. On the one hand, individual can take pleasure in building virtual identities (such as male organizational identity instead of female organizational identity) which are desirable to him but on the other hand these identities affect the organizational identities. In such a situation, employees may be able to select right combinations, create new world for themselves. It must be noted that manager's attempts to establish and create identities are proper in respect to the situation and objectives of organization that can play an important role in establishing identity. Theoretically, the paper has studied comprehensively all the variables affective on social identity of virtual teams. On the other hand it presents organizational variables affected from such identity that is a suitable guide for managers to control and lead virtual teams.

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Chapter 4
Quality Assurance through Innovation Policy:
The Pedagogical Implications on Engineering Education

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ABSTRACT

A number of countries are focusing on innovation to advance their economies up the value chain. Hence, a large emphasis is given to engineering education as activities that engage scientific development generally originate from the engineering field (Ashford, 2004). A country's innovation policy also determines educational reform as the education sector is a key player, holding holds the intellectual capacity and trained human resources to execute the transformation. In this regard, the engineering profession and accrediting engineering programs have repeatedly called for reform in the engineering education pedagogical approach. Despite debates over the effectiveness of outcome-based education, the prominent teaching methodology has always been attributed to the traditional approach of "chalk and talk" (Mills & Treagust, 2003). This study investigates the critical role of science, technology and innovation to a country's economy. It will also examine the extent to which the educational approach, particularly in the engineering education field, is coherent with the national system of innovation, exposing students with real perspectives for future workplace environment.

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INTRODUCTION

"For developed countries, innovation is the key to growth, prosperity and quality of life."
(Carlson & Wilmot, 2006, p. 274)

Countries around the world are engaged in strategic moves towards building a more innovative and vibrant economies. In this regard, Carlson and Wilmot (2006) proposed that these countries should rely on the innovation led economy which constitutes the creation and delivery of new customer value in the marketplace. Hughes (2005) provided an important warning when discussing the 21st century competitiveness strategy. According to Hughes (2005), the "health" of the economy inevitably shapes the focus and speed of innovation on the whole economy (p. 74). In a similar vein, Ertl et al. (2007) claimed that science, technology and innovation activities have initiated economic and social change to countries around the globe. Even the Americans have identified innovation as "…the single most important factor in determining America's success through the 21st century" (Council on Competitiveness, 2005, p. 7).

According to the United Nations Educational, Scientific and Cultural Organization (UNESCO), innovation is broadly defined to include not just new technologies but new services and new forms of managerial organization (Aylen &Marjoram, 2008). The Organisation for Economic Co-operation and Development (OECD), in addition, defined innovation according to the following four types of innovation; product innovation, process innovation, marketing innovation and organizational innovation (http://www.oecd.org). Despite the ambiguity of the term as it refers to both the process and the result of innovation (European Commission, 1995), the term ***innovation*** has shown a tremendous influence in the academic, societal and political arena worldwide. In lieu with this, UNESCO has outlined three basic assumptions underlying the notion of innovation i.e. innovation involves strategies from the national governments, innovation relates to scientific research, IT infrastructure and patents and innovation as a crucial concept in the economic domain. Carlson and Wilmot (2006) further identified the major roles of government policies, critical infrastructure of a country and cultural determination of its people to help construct an environment which fosters opportunities for innovation. The authors reflected on the Chinese and Indians work culture of 60 to 70 hours per week and the fact that these people are "…full of ideas, enthusiasm and energy" to "…surpass the United States and the rest of the world" (Carlson & Wilmot, 2006, p. 23).

Hence, Carlson and Wilmot strongly proposed that innovation is integrated into the basic curriculum to promote the culture of innovation. This tallied the recommendations made by the United States' National Council on Competitiveness. The Council argued for the "retooling" of curriculum by creating an "innovation culture" which provides students with exposures on open-ended problems, teamwork and cross-discipline project engagement at all levels from kindergarten to graduate education (Council on Competitiveness, 2005, p. 19). Using some of Carlson's and the National Council on Competitiveness innovative proposals, this paper analysed the extent to which institutions of higher learning contributes to the intellectual capacity and innovative human resource to help advance a country's economy. The following section will discuss the innovation performance of a few selected countries because understanding the relationship between science, technology and innovation is crucial in appreciating the unwavering impacts of these components to the economy.

SCIENCE AND TECHNOLOGY AS INNOVATION INDICATORS

Many countries have engaged in efforts to strengthen their science and technological capacity by fostering innovation to improve their global competitiveness. Technological innovation com-

monly driven by government policies support the national development strategies and drives the industrial growth of a country. What are the innovation indicators of a country? The World Bank (http://www.worldbank.org/) measures of innovation activities include the following; high technology exports (% of manufactured exports and current US$), patent applications (residents and nonresidents), R&D expenditures, R&D researchers, royalty and license fees (payments and receipts), trademark applications (direct resident and nonresident), R&D technicians and the number of scientific and journal articles. According to Arundel (2007), "…R&D indicators were the most widely used and were considered to be the most valuable" (p. 51). Reporting on the dominance of these R&D indicators to the innovation policy making in Europe, Arundel attributed this development to the ongoing power of the linear model of innovation and the structure of innovation support programs which are currently implemented (Arundel, 2007). For the purpose of this paper, only selected indicators by the World Bank will be discussed. Table 1 demonstrates the performance of some developed and developing countries on innovation activities in 2007.

North European countries represented by Sweden, Denmark and Germany are among the countries which R&D expenditure is rather high as compared to the others, with the exception of Japan. Sweden ranks at the top of the list with regards to R&D investment, despite the size of its economy. Likewise, Singapore, Japan, Denmark and Sweden yield more than 5,000 researchers per million people, ten times more than the developing countries' average of 700 researchers per million people. Table 1 also displays the progress made by emerging countries represented

Table 1. Innovation Indicators 2007 (selected countries)

Country	High Technology Exports (% 0f Manufactured Exports) [f]	Patent Applications (residents) [f]	R&D Expenditure (% of GDP)	Researchers in R&D (per million people	Scientific and Journal Articles [c]	Technicians in R&D (per million people)
Australia	11.81	2718 [e]	2.17 [d]	4230.6 [d]	15,957	992.8 [d]
China	28.66	194,579	1.49	1070.9	41,596	n.a.
Denmark	15.57	1634	2.57	5430.8	5040	2005.7 [d]
Germany	13.52	49,240	2.55	3452.7	44,145	1200.3 [d]
India	5.69	5314 [d]	0.80	136.9 [c]	14,608	86.4 [a]
Indonesia	10.64	282 [d]	0.05 [c]	205.3 [b]	205	n.a.
Japan	17.87	330,110	3.45	5572.9	55,471	588.9
Malaysia	39.65	818	0.64 [d]	371.5 [d]	615	43.8 [d]
Philippines	66.27	216	0.12 [c]	80.7 [c]	178	10.5 [c]
Singapore	50.77	793	2.61	6087.9	3609	528.5
Sweden	15.84	2527 [e]	3.68	5214.7	10,012	n.a.
Thailand	25.39	802	0.25 [d]	310.9 [c]	1249	159.5 [c]
United Kingdo	19.26	16,523	1.84	2881.4	45,572	878.5
United Sates	27.12	231,588	2.67	4663.3 [d]	205,320	n.a.

[a] 2000 data, [b] 2001 data, [c] 2005 data, [d] 2006 data, [e] 2007 data, [f] 2008 data

n.a.: data not available

Source: The summary of the data and the above statistics are selected from the World Bank Data and Research Online available at http://data.worldbank.org/topic/science-and-technology Assessed May 2010

by Philippines and Malaysia. These two Asean countries gave much emphasis on high technology exports in the field of manufacturing as compared to the developed countries, excluding Singapore. For example, high technology exports made up 66.27% of Philippines' total manufactured exports, comparative to Australia (11.81%) and Denmark (14.26%) respectively. China ranks third with 194,579 patent applications behind Japan (330,110) and the United States (231,588). China's performance in patent activity is 37 times better compared to India even though both are being regarded as emerging, global economic giants. This vast difference probably reflects their science and technological policy divergence in these largely agricultural economies.

The World Bank data above gave very strong emphasis on R&D-based indicators. As Arundel (2007) argued, many policies mostly lies on "… long-established indicators for R&D" (p. 50). Despite these policies excellence measures on creative activities for innovation, he revealed that some characteristics of innovation in the modern economies are not adequately measured. These include the diffusion of technology, the role of distributed knowledge bases, the increased role of the service sector and the informal innovative activities which are non-R&D based. Until the construct of the new measures are in place, more research should be carried out to identify the indicators that better meet the need of the community and can be internationally compared.

MAJOR CHALLENGES FOR HIGHER LEARNING INSTITUTIONS

The National Innovation agenda of the United States highlighted three critical components in optimizing the entire society for innovation; the human dimension of innovation, the financial dimension of innovation and the physical and policy structures that support innovation (Council on Competitiveness, 2005). It is the first component that higher learning institutions very much responsible; building talent to survive and succeed in the global economy. Kearney (2009) noted four priorities which several countries have adopted vis-à-vis higher education, research and innovation:

1. creating innovative policies in higher education and in science, technology and innovation
2. improving and developing necessary infrastructure
3. continuous effort in training and retaining of highly skilled human resource
4. intensifying investments in research and higher education

These enabling environments promote innovative thinking and creative experimentation and advance national development. However, very little importance is given to innovative approaches to teaching and learning. In preparing skilled human resources, Kearney (2009) claimed that tertiary education has shifted its paradigms to promote "learning by doing" through individual creativity, characterized by employable graduates, groundbreaking research and strong technology transfer.

Despite Kearney's claim, a UNESCO "Expert Workshop on Science and Technology, Innovation and Development" agreed that there is no clear indication of the role of universities in developing local capabilities to innovate in the developing economies. The lack of autonomy of the higher education sector has prevented local training and promoted a brain drain of talented local human resources (Aylen & Marjoram, 2008). The following section will investigate this issue further.

INNOVATION IN ENGINEERING EDUCATION

Innovation is the central theme throughout the curriculum to produce productive and innovative

students in addressing the issue of human resource for the innovation-led economy. Kearney (2009) argued that partnerships among the governments, the economic sector and the research universities are growing rapidly, linking new knowledge to countries' development goals. However, she cautioned that innovation typically takes place outside academic setting and this process warrants further analysis by research experts.

A country's innovation policy also determines the educational reform as the education sector is the key player which holds the intellectual capacity and trained human resource to execute the transformation. Owing to our increased dependence on scientific and technical innovation, engineering has become the major element of advancement in the technological society (National Science Board, 2007). Hence, a large emphasis is given to engineering education as activities that engage scientific development generally originate from the engineering field (Ashford, 2004). In this regard, the engineering profession and the responsible bodies in charge of accrediting engineering programs have repeatedly call for reform in the engineering education pedagogical approach. Hence, the Engineering Criteria 2000 (EC2000) was developed to emphasize on students' learning outcomes, rather than specific curriculum specifications (Prados et al., 2005). Similarly, Steiner (1998) argued that any engineering currriculum that does not address innovation is depriving its students of essential competencies for engineering success in the global marketplace and for career enrichment and advancement.

This has prompted the introduction of the Conceiving, Designing, implementing and Operating (CDIO) initiative which was aimed at reforming the curriculum, pedagogical approaches, and the laboratories (Brodeur & Crawley, 2009). The CDIO approach has been growing in popularity and has been adopted in a number of universities worldwide including Arizona State University, Beijing Jiaotong University, Purdue University, Lancaster University, Taylor's University College, Malaysia and Singapore Polytechnics, to name a few. The CDIO approach consists of twelve 'standards' that are adopted by an educational institution (please refer to Crawley, 2001 for more details on CDIO syllabus). The CDIO initiatives aimed to improve teaching and learning via the following approaches; increasing active and practical learning, emphasizing problem formulation and solutions, exploring the theories of engineering tools and procedures and engaging in innovative methods of collecting feedback (www.cdio.org). Lynch, Seery and Gordon (2007) claimed that CDIO supports project-based learning whereby students are informed of the desired learning outcomes prior to starting any project. Likewise, CDIO also promote curriculum restructuring to include design and build projects and integration of other subjects in interdisciplinary engineering course.

There is no doubt the CDIO initiative is a valuable initiative of a larger effort in transforming the engineering curriculum. However, such curriculum innovation is risky to the whole process of quality assurance in engineering education as it is subjected to "…top-down, bottom-up and push-pull forces" (Eijkman, Kayali & Yeomans, 2009, p. 225). They warned that there are a range of issues surrounding curriculum innovation including that of financial assistance, resistance to change, engineering content and educational structure.

This article does not dispute the advantages of the CDIO initiative, rather proposing another alternative which can be adopted by institutions which face a lot of issues in implementing this innovative curriculum as a wider university strategy. Despite the calls for re-designing of the engineering programs curriculum and the creative introduction of the CDIO initiative there are several critical issues that need to be considered if reformation of the curriculum were to take place. Firstly, this effort takes a long time as it must be planned carefully and funded generously. Secondly, the institutional leader must demonstrate "sustained and sensi-

tive leadership" (Gray & Patil, 2009, p. 305) to facilitate this innovative change in the curriculum. Finally, faculty members must be open to new ideas and prepare to apply new tools in their teaching in order to materialize curriculum innovation. If these do not occur, the CDIO initiative is rather difficult to be implemented in any institutions and may take longer time to come about. In this case, the findings on curricular and instructional change with regards to EC2000 by Prados, Peterson and Lattuca (2005) should not be taken lightly. They revealed that out of 3,000 faculty members who were surveyed from forty participating institutions, approximately 80% claimed that changes in their focal course is influenced by their "own initiative" whereas 28% credited ABET i.e. the EC2000 as a moderate influence on course changes. This implies that instructional strategies applied by instructors are more prominent albeit the strong focus on curriculum reformation in driving curricular change.

REFORMING ENGINEERING EDUCATION VIA PROJECT-BASED ENGINEERING PROGRAMME

Significant changes to the current delivery of engineering education are highly essential in order to prepare students with future workplace environment. Felder, Woods, Stice and Rugarcia (2000) revealed that "…many engineering classes in 1999 are taught in exactly the same way that engineering classes in 1959 were taught" (p. 26). This is a shocking revelation because for the past 40 years, there is not much improvement in the way engineers have been taught. Harris & Cullen (2009) agreed with Felder et al.'s assertion that engineering curricula is still employing the traditional practice of adding content to address the EC2000. These old-fashioned instructional strategies have prompted Mills and Treagust (2003) to argue for more student-centered activities in engineering programs.

This paper proposes that project-based approach (PJBL) be applied as an intervention prior to the introduction of the CDIO initiative in any institutions which have problems in implementing the whole CDIO model. Despite the sheer number of literature that refers to project-based learning as PBL (Gao et al., 2008; Guthrie, 2009), this paper will adopt the term PJBL to differentiate the acronym for problem-based learning (PBL) and project-based learning in order to avoid misunderstandings of both pedagogical approaches. PJBL in itself is an innovative strategy if the implementation fulfills the initial objective of engaging students with real-world projects. Montufar-Chaveznava et al. (2008) claimed that not only PJBL generates good results; it also managed to bring about the agreement between the demands of the industries and university instructions in regards to the skills and abilities of engineering students.

How does PJBL be considered as an innovative approach to teaching and learning? The authors propose PJBL as an innovative approach to the pedagogy of engineering education based on the following reasons:

1. the concept of "project" is common to students (Mills & Treagust, 2003)
2. task and role differentiation expected of students highlights individual uptake (Mills & Treagust, 2003)
3. institutions with funding difficulties might be able to adopt this approach as it can be applied to individual courses, if not throughout the curriculum
4. it can be implemented as small projects by the "Lone Rangers" (Bates, 2000) or interested and enthusiastic instructors, not necessarily the whole faculty
5. it tallies Felder et al.'s (2000) recommendation that to ensure the success of an instructional method, the method must be pertinent to engineering education, falls within the context of typical engineering classrooms,

requires a small amount of practice of the instructor and coherent with current theories of learning

PJBL is a comprehensive approach to classroom teaching that is designed to engage students in the investigation of authentic topic and issues (Gao et al., 2008). In response to the evolving nature of engineering and the development of technology, PJBL is increasingly practiced in institutions of higher learning. Examples include 4th year civil engineering design project with CDIO elements in Shantou University, China and an introductory project design in Chalmers University of Technology, Sweden. However, the application of PJBL varies particularly between lectures, tutorial work and students' self-directed learning, compared with the actual project learning. PJBL also exposes students to constructivist learning which Tam (2000) associated with multi-layer interaction between learners' current knowledge, the social environment and the problem itself. Tam also noted that the constructivist learning process engages students with "good" problems and collaborative work. PJBL is resonant with this constructivist approach as it encourages students to work in groups and solve projects which are meaningful and genuinely complicated. Gao, Demian and Willmot (2008), in addition, associate PJBL to the constructivist approach due to the freedom of choice offered to the students and the independent learning concept that it mooted.

If employed, what are the advantages of PJBL? Stouffer, Russel and Oliva (2004) argued that if PJBL is frequently applied, it can result in increased critical thinking, self direction, comprehension and skill development, self-motivated attitudes and enhanced teamwork awareness. Similarly, Siaw (2002) is in favour of PJBL not only because it encourages self-directed and lifelong learning, but it also fosters the development of critical thinking and problem-solving skills. Angilides (2000) further added the list of benefits of PJBL to include the improvement on students' understanding and retention of knowledge.

Montufar-Chaveznava, Yousuf and Caldelas (2008) observed that PJBL is one of the strategies that can be applied when teaching some engineering topics particularly for basic and advanced engineering subjects. This is because PJBL requires students to associate the theoretical framework offered in basic courses such as biology and mathematics to real application. One innovative way in experimenting with PJBL is to engage with case studies. Case studies are one of the strategies in PJBL implementation. Stouffer et al. (2004) viewed case studies as modeling lessons taught in the classrooms around real projects. They outlined the following benefits of case studies; engaging students with cutting-edge practices and procedures, allowing students to invite case participants into the classroom, promoting students' creativity and exposing students with multiple solutions to a case. In a similar account, Savery (2006) noted that case studies develop higher order thinking skills of the students. "A well-constructed case," he argued, enables students to comprehend the critical aspects of the situation, hence preparing them for future comparable situations (p. 15). He identified a few advantages of case studies namely developing students' critical thinking skills, assisting students in building context-specific vocabulary, encouraging students' understanding of the relationship between case elements and developing students' communication and team working skills.

These instructional methods are by no means perfect in the teaching of engineering education. PJBL and case studies may not be applicable throughout the whole engineering program and may be pertinent to certain courses, to start off. Nevertheless, as we have argued earlier, PJBL is useful as an intervention for curricular change prior to the university-wide implementation of the CDIO initiative. Earlier sections of the paper have discussed the advantages of PJBL and its focus on fostering innovative projects are worth to be attempted by interested faculty members.

CONCLUSION

In order to survive the era of research and innovation, countries need to nurture new talent of diverse, innovative and well-trained human resource. In this regard, higher education institutions have a serious role to play by stimulating creative thinking and innovative skills through the implementation of powerful instructional principles.

This paper has proposed that project-based learning be used to address this situation. Developing realistic students' projects is not an easy task. Likewise, incorporating traditional lectures and assigning closed-ended problems in teaching limits the creativity and innovation of the engineering students. Therefore, engineering educators and higher learning institutions need to employ innovative teaching strategies to overcome this demanding issue. More emphasis on hand-on practical aspects such as PJBL especially with real projects can enhance engineering students' learning and expose them with the creative process of the teaching and learning.

Project-based learning enhances the students' learning outcomes during the project realization and provides better engineering education experience for the engineering students. They gain knowledge and skills as well as develop attitudes and behaviors relevant to their future work scenario. Both case studies and project-based strategies promote active learning and engage students in higher-order thinking as claimed by Savery (2006). Some elements of creativity and innovations are also fostered in the students. Case studies also help learners to understand the important elements of the situation so that they are better prepared for similar situations in their future undertaking.

The challenges for universities are to retain the innovativeness of engineering projects in order to make them more interesting and to reduce the attrition in engineering courses. Universities also face the challenge to immerse students in intellectually stimulating projects, apart from developing realistic students' projects especially for classes with large number of students.

The findings of this study is expected to contribute to the understanding of the type of teaching approaches adapted by higher learning institutions and its contribution to the intellectual capacity and innovative human resource in assisting governments in advancing the economy. Engineering education is at the forefront of this change as engineering is the key to an innovation-led economy.

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Chapter 5
An Exploratory Cross-National Study of Information Sharing and Human Resource Information Systems

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ABSTRACT

Information sharing has recently received considerable academic interest because of the importance knowledge management plays in the creation of sustained competitive advantage for global firms. The interest is attributed to the need for achieving higher levels of worker empowerment and effectiveness. However, the existing research in the area lacks an examination of how national differences impact information sharing activities. This study responds to this need by presenting a structured yet exploratory inquiry into factors impacting information sharing and the adoption of Human Resource Information Systems (HRIS) by examining key national differences. Assessing national differences is extended beyond the examination of national culture by including institutional contexts in the study. Using a 22-country sample from the CRANET database, the study suggests there is a significant and predictable variation in the level of information sharing and HRIS adoption in firms from different countries, and that national differences, including cultural and institutional contexts, have an impact on information sharing. The study also indicates that the level of HRIS adoption is positively associated with information sharing. The authors discuss these findings, their implications for research and practice, and address limitations along with opportunities for future research.

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INTRODUCTION

Understanding national differences is critical as organizations continue to expand operations beyond their home borders. However, the study of information sharing and information technology adoption, two key aspects of managing geographically and culturally diverse workforces, has not been fully addressed from a broad-based international perspective in a single research model. In response to this gap in the existing literature, our study focuses on the relationship between national difference, information sharing, and Human Resource Information Systems (HRIS).

National culture, information sharing, and information technology (IT) adoption have become increasingly important topics in managing organizational members and information (Gibson, Porath, Benson, & Lawler, 2007; Luo & Shenkar, 2006; Pfeffer, 2005). Particularly, information sharing and IT are important themes in global business (Griffith, Cavusgil, & Xu, 2008; Torre & Moxon, 2001). For the past decade there has been an increase in attention to such areas as knowledge management (Foss & Pedersen, 2004), participatory management (Ichniowski & Shaw, 1999), organizational learning (Kang, Morris, & Snell, 2007), and strategic use of IT (Alavi & Leidner, 2001). Studies have consistently recognized that people are an important source of sustained competitive advantage. To effectively execute their duties, workers must be well-informed about internal and external conditions of the organization (Pfeffer, 2005). Thus, information sharing through formal and informal systems facilitates employee learning and results in competitive advantage (Gibson et al., 2007).

Both research and practice indicate that IT plays a large role in knowledge management and organizational learning by making firm-wide sharing of organizational, financial, and operational information possible (Alavi & Leidner, 2001; Haines & Lafleur, 2008). In particular, some (Becker & Huselid, 1998; Chow, 2005) of the literature on human resources recognizes information sharing and IT as vital elements for organizations to develop such capability. Increasingly, the role of what is broadly called as HRIS tends to go beyond "automating" and now is becoming "informing" employees and managers through easy access to organizational knowledge (Hendrickson, 2003; Shani & Tesone, 2010). Previous studies have attempted to examine the impact of IT on the level of information sharing in the contexts of technologies such as communication systems and enterprise systems (Alavi & Leidner, 2001; Davenport, 1998), but there has been little research on HR-related IT in relation with organization-wide information sharing.

In addition, as more firms are "going global" for the acquisition of materials and workers, and in the pursuit of additional sales, there has been a large body of research on the role of national difference in many dimensions of firm activities (Ichniowski & Shaw, 1999; Katz & Townsend, 2000; Kogut & Singh, 1988; Niederman, Boggs, & Kundu, 2002; Tellis, Stremersch, & Yin, 2003). Recently, studies have examined the role of national culture on organizational practices such as information sharing (Chow, Harrison, McKinnon, & Wu, 1999; Shin, Ishman, & Sanders, 2007). Most of these studies have focused on only two or three countries and related differences in information sharing, management styles, and others. In this regard, studies using a large sample of data from multiple countries can further advance our understanding of the impact of national culture on information sharing.

Finally, there have been several studies examining the relationship between national culture and IT adoption and usage (Martinsons, 1994; Straub, 1994). However, limited research exists that focuses on HR-related IT in a national culture framework. Related to studying the variation that national difference causes in organizational practices, a growing number of recent studies (Parboteeah & Cullen, 2003; Tsui, Nifadkar, & Ou, 2007; Tung, 2008) suggest the necessity

of including not only national culture but also institutional contexts when examining national difference.

Our study attempts to respond to the need for a broader inquiry into national difference, information sharing, and HR-related IT (or Human Resource Information Systems, HRIS) adoption. In this study national difference is assessed using two dimensions: National culture and Institutional contexts. First, we provide a brief review of three streams of research: national differences, information sharing, and HRIS. Then, we present a theoretical framework integrating national culture and institutional factors and develop several hypotheses to test the relationships of national difference, information sharing, and HRIS adoption. We assess firm-level data from a 22-country sample from the CRANET database to evaluate the significance of such relationships.

Our analysis indicates there is a significant variation in the level of information sharing and HRIS adoption among different countries and national differences, including institutional contexts such as economy and education. In addition, our research suggests national differences, such as systematic tendency to avoid uncertainty and educational attainment, are powerful predictors for variations in the level of information sharing. We find that a country's economic development is an important predictor for variations in HRIS adoption. That is, countries with higher levels of industrialization and education, and lower levels of uncertainty avoidance, tend to exhibit higher information sharing and HRIS adoption rates. Our analysis also indicates that the adoption of HRIS is positively associated with information sharing. Finally, we discuss these findings, their implications for research and practice, and address limitations of our work along with opportunities for future research.

The contributions of this study are clear. While there has been much research interest in information sharing and IT for HR, studying these two innovative organizational practices simultaneously through a cross-national framework is rare. Most previous studies of information sharing and HRIS have tended to focus on a single organization or, at most, one or two countries. We believe that the major contribution of this study is the development of a theoretical research framework integrating cultural and institutional factors to understand those two important themes in global information management. This framework can be useful to study the adoption of other organizational innovations by firms in different countries. Another major contribution is that this study presents broad cross-national findings from several world regions about the adoption of information sharing and HRIS. This sheds particularly light on the role of national culture and societal institutions for explaining a significant variation of organizational and technological innovations in firms from different countries. The findings of this study suggest that researchers and managers alike should pay keen attention to the influence of a nation's cultural and institutional factors on the adoption and diffusion of information sharing and HRIS. Several avenues of future research emerge from these findings and suggestions.

BACKGROUND LITERATURE

The present study focuses on a relationship between information sharing, HRIS, and cross-national differences. Organizational institutionalism is the guiding theoretical perspective. Through this theoretical lens, organizations "are influenced by their institutional context" (Greenwood, Oliver, Suddaby, & Sahlin, 2008, p. 3). Institutional theory researchers have focused partly on how the context of organizations create "an inexorable push towards homogenization" which leads organizations in a common context (such as the same country) to have similar organizational practices (DiMaggio & Powell, 1983, p. 147). From this perspective, each country tends to have distinctive regulatory, normative and cultural cognitive forces, which

press organizations to be similar within a country and distinct compared to organizations in other countries (Scott, 2008). These institutional forces that influence organizational practices are quite varied, but national culture, economic development, and general educational levels of a country has been a reoccurring focus. This section offers a brief review of related literatures on information sharing, HRIS and national differences, prior to developing hypotheses in the following section.

Information sharing. Information sharing is an innovative organizational practice which leads organizations to increase the amount of the company's internal data and organizational information available to members of the organization for greater productivity and innovativeness. Information sharing has recently received considerable interest in academic research and industry practice. The rising interest is attributed to the trend, at both societal and organizational levels, toward more worker empowerment (Kang et al., 2007), decentralized decision making (Pfeffer, 1998), and organizational IT adoption (Alavi & Leidner, 2001). There have been suggestions as well as empirical findings that greater adoption of information sharing is associated with higher levels of individual learning and organizational performance (Chow et al., 1999). Information sharing practices are now widely adopted in managing strategic alliances and supply chain networks (Lee, 2000; Samaddar, Nargundkar, & Daley, 2006).

Similarly, there has been much attention to the role of information sharing and its influence on organizational performance. For example, Pfeffer (2005) recognized information sharing as an important way of producing and sustaining competitive advantage by organizations over their competitors. From this perspective, it is critical for organizations to inform people of business strategy, financial performance, and other issues and help them in the sense-making process (Ahmad & Schroeder, 2003). Gibson et al. (2007) suggested that the organizational practice of information sharing enhances employees' ability and potential to make more contributions to their units and organizations and is positively related to the firm's financial performance. Information sharing is also considered to be one of the core elements for a high performance work system (Becker & Huselid, 1998). Despite this interest, there has not been much effort in the literature to understand information sharing from an international perspective.

Human Resource Information Systems (HRIS). There are numerous studies on HRIS (DeSanctis, 1986; Haines & Lafleur, 2008; Hendrickson, 2003; Kovach & Cathcart, 1999; Mayfield, Mayfield, & Lunce, 2003; Ngai & Wat, 2006; Teo, Lim, & Fedric, 2007). These studies generally recognize that IT promises such benefits as automation of administrative HR tasks, easy access to employee related data, and fast delivery of a firm's financial and operational data to employees. Several studies offer a review of HRIS, including some general roles and benefits of IT for HR (DeSanctis, 1986; Mayfield et al., 2003). Recently, additional studies (Haines & Lafleur, 2008; Hussain, Wallace, & Cornelius, 2007; Kovach & Cathcart, 1999) have addressed the influence of HRIS on HR tasks. In this vein, some studies (e.g., Hussain et al., 2007; Mayfield et al., 2003; Shani & Tesone, 2010) have even suggested the increasing role of IT in strategic HR areas that goes beyond its traditional role (e.g., automation of administrative HR tasks). Studies show more active roles of HRIS as enabling organizational learning and knowledge management (Mayfield et al., 2003), radical organization change (Tansley, Newell, & Williams, 2001) and transforming the role of HR function within organizations empowering employees through easy access to information (Hendrickson, 2003; Shani & Tesone, 2010).

Generally, studies of HRIS are limited to a single organization or, at most, one country and they lack accessing HRIS through a cross-national perspective. For example, Haines and Lafleur (2008) evaluated the associations between IT us-

age and HR roles and effectiveness. Their study assessed survey-based data from HR executives of the firms in Canada. Tansley et al. (2001) presented an active role of integrated HRIS in the course of business process reengineering. Their case research is based on a single organization in UK. Ngai and Wat (2006) studied perceived benefits and barriers to the implementation of HRIS. They drew a survey data from HRIS consultants and HR managers in Hong Kong. Lastly, Teo et al. (2007) reported the adoption and diffusion of HRIS using survey data from firms in Singapore. One notable exception is the study by Martinsons (1994) that examined HRIS adoption in Hong Kong and Canada. Broader-based research is clearly needed. Recent research by Panayotopoulou, Galanaki, and Papalexandris (2010) and Strohmeier and Kabst (2009) have expanded the more typical single country focus to evaluate IT-assisted human resource management across multiple European countries.

National differences. As business operations become globalized, understanding national differences becomes increasingly important to the effective management of people, communication, and organizational resources. There is wide recognition within country homogeneity and cross-country heterogeneity that many institutional theory-based research efforts have observed (Greenwood et al., 2008). Due to this increasing need in the global business contexts, more studies have adopted cross-cultural or national perspectives on the issues in several business fields (Chow et al., 1999; Gerhart & Fang, 2005; Gooderham, Nordhaug, & Ringdal, 2006; Katz & Townsend, 2000; Myers & Tan, 2002; Pagell, Katz, & Sheu, 2005; Shin et al., 2007; Tsui et al., 2007).

There are various cultural frameworks available for investigating the role of national differences (see Myers & Tan, 2002; Tsui et al., 2007). Among these, Hofstede's work (1980) has been one of the most popular references for cross-national studies (Gallivan & Srite, 2005; Gerhart & Fang, 2005; Kirkman, Lowe, & Gibson, 2006; Leidner & Kayworth, 2006). His framework assesses national culture from four dimensions: uncertainty avoidance, power distance, muscularity, and individualism. A growing number of recent studies view national differences from both cultural values (e.g., individualism) and institutional arrangements (e.g., industrialization). For example, Parboteeah and Cullen (2003) argue that exploring the influence of national difference on such topics as work centrality needs to consider not only national culture but also institutional arrangements such as education, economy, and industrialization. Also, a study by Sundqvist, Frank, and Puumalainen (2005) considered both economic wealth and cultural variables to examine the adoption of wireless communication in different countries.

RELEVANT THEORY

This study is interested in two specific types of organizational innovation—information sharing and HRIS adoption—in international contexts. Therefore, the theoretical background of systematic worker preferences by national origin lies in the literature on national difference. Previous cross-country studies of information management have paid much attention to national culture, but only a limited number of studies, to our best knowledge, have examined societal or national institutions in their cross-country inquiry. "Nation and culture do not completely overlap, that nations differ in many aspects beyond cultural values" (Tsui et al., 2007, p. 462).

For example, the Gooderham et al.'s (1999) research on collaborative management practices investigated patterns of information sharing across several European countries. Understanding nation-based institutional influences include both national culture and other factors (Greenwood et al., 2008; Hofstede & Hofstede, 2005); however, there is no complete listing of what these include. Therefore, we approach national difference by

considering cultural dimensions and other societal institutional factors.

For national culture, we rely on the aforementioned cultural framework developed by Hofstede (Hofstede, 1980; Hofstede & Hofstede, 2005). Hofstede defines culture as "collective programming of the mind" (Hofstede, 1980, p. 13) and presents differences in national level cultures (Hofstede, 1980; Hofstede & Hofstede, 2005). His original framework (1980) includes four dimensions of national culture and we particularly examine two of them: uncertainty avoidance and power distance. Hofstede (Hofstede & Hofstede, 2005) notes that uncertainty avoidance and power distance, among other cultural dimensions, are two most important dimensions for understanding organizations. Similarly, previous studies have pointed out that uncertainty avoidance and power distance, among Hofstede's cultural dimensions, tend to strongly affect management's decisions on organizational innovation (Png, Tan, & Wee, 2001). Katz and Townsend (2000) also note "to understand why managers make decisions affecting the design of organizational infrastructures, uncertainty avoidance and power distance have been suggested as important factors of national culture" (pp. 25-26). In this similar line, numerous studies have shown uncertainty avoidance and power distance as the most important cultural dimensions for understanding information management in global contexts (Agourram & Ingham, 2007; Erumban & de Jong, 2006; Everdingen & Waarts, 2003).

Uncertainty avoidance refers to "the extent to which the members of a culture feel threatened by ambiguous or unknown situations" (Hofstede & Hofstede, 2005, p. 167). "On the cultural level, tendencies toward rigidity and dogmatism, intolerance of different opinions, traditionalism" (Hofstede, 1980, p. 155) are likely to be strongly present in a country with high uncertainty avoidance. High uncertainty avoidance culture tends to avoid any new practices that "may call into question the certainties of today" (Hofstede & Hofstede, 2005, p. 256) and to leave planning, controlling, and decisions to specialists or key members (Hofstede & Hofstede, 2005). Thus, new organizational practices are less likely adopted in a country with high uncertainty avoidance. For example, previous IT adoption studies have demonstrated that high uncertainty avoidance countries are risk averse and less likely to adopt technological innovation (Gaspay, Dardan, & Legorreta, 2008).

Power distance is defined as "the extent to which the less powerful members of institutions and organizations within a country expect and accept that power is distributed *unequally*" (Hofstede & Hofstede, 2005, p. 46, emphasis added). In a country with high power distance, power and authority are concentrated to superiors and subordinates are strongly dependent upon superiors' decisions. Subordinates tend to have "fear to disagree with superiors" (Hofstede, 1980, p. 92) and such unequal distribution of power is not likely to be challenged in a country with high power distance (Hofstede, 1980; Hofstede & Hofstede, 2005). As a result, organizations in such a country are likely to adopt more centralized decision making and top down organizational structure. Also organizational innovations promoting values and practices against the unequal distribution of power are less likely adopted in a country with high power distance.

A nation's institutional environment includes additional forces beyond national culture to understanding organizational practices and managerial actions (Neumayer & Perkins, 2005; Parboteeah & Cullen, 2003). This theoretical frame has been increasingly used in the study of IT adoption (Weerakkody, Dwivedi, & Irani, 2009). "Institutions are multifaceted" (Scott, 2008, p. 48) and national institutions have different elements. The literature recognizes that a nation's institutional contexts include various types of dimensions such as political structures (e.g., government regulations) and economic factors (e.g., level of industrialization), and recognize that decisions

about organizational practices are influenced by these institutional contexts (Scott, 2008). Two institutional contexts—industrialization and education—are particularly important in this study since they have been considered as important factors in numerous institutional studies of organizational and technological innovation adoption (Bagchi, Hart, & Peterson, 2004; Martinez & Williams, 2010; Neumayer & Perkins, 2005; Parboteeah & Cullen, 2003; Tellis et al., 2003; Zhao, Kim, Suh, & Du, 2007).

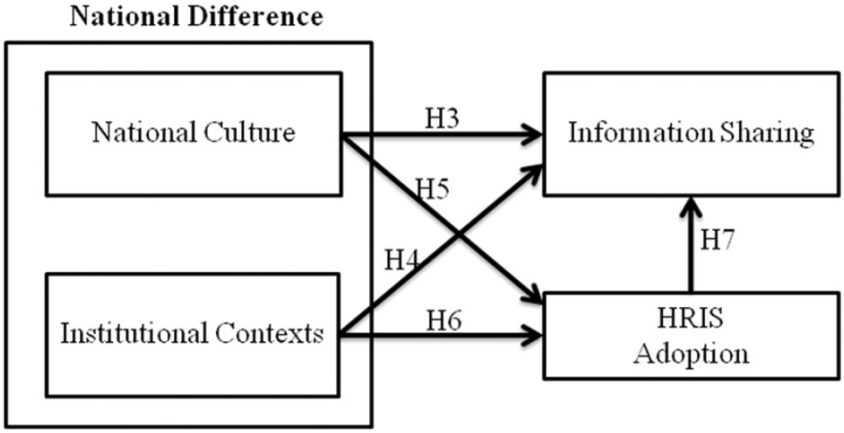
Industrialization is an important element, indicating how developed a particular country is in economic terms. Studies have suggested that industrialization has a great influence on broader aspects of economic decisions and activities (Parboteeah & Cullen, 2003; Zhao et al., 2007). The more industrialized a country is, the more receptive the firms in that country become to new innovative practices and technical standards (Neumayer & Perkins, 2005). Thus, industrialized countries are likely to adopt new technological innovation faster than their counterparts (Bagchi et al., 2004; Martinez & Williams, 2010; Zhao et al., 2007).

In addition, education as "a powerful institution" (Parboteeah & Cullen, 2003, p. 141) is closely linked with the level of innovation capability in different countries. "Education involves the exposure of people to a constant stream of new ideas, which makes them more receptive to innovations" (Tellis et al., 2003, p. 194). Education increases human capital, which serves an important social infrastructure for new practices to be adopted and implemented in firms and countries. Therefore, "firms with better-educated workforces are not only more likely to have knowledge of new organizational practices, but are likely to find it cheaper to implement them" (Neumayer & Perkins, 2005, p. 247). Thus, people with higher levels of education tend to be more receptive to innovations (Tellis et al., 2003) and, likewise, countries with a high level of education are more likely to adopt new practices.

RESEARCH HYPOTHESES

Drawn upon the previous section this section develops several hypotheses about the relationships between national differences, information sharing, and HRIS (Figure 1). The underlying proposition in the research design is that significant variation in the level of information sharing and HRIS adoption in organizations occurs in different countries based on underlying national factors. The research design allows us to assess whether the variation is explained by the differences in national culture (uncertainty avoidance,

Figure 1. Theoretical relationships and research design



power distance) and institutional arrangements (industrialization, education level).

Difference of information sharing. The background literature suggests that national differences matter in technological and organizational innovativeness and proposes why organizations in different countries differ in terms of organizational practices, decision making, and technology adoption. Specifically, Chow (2005) demonstrated that national difference explains the variation in management practices, particularly high-performance work systems, in different countries. Pagell et al. (2005) showed that national difference significantly explains the variation in operations manager's decision-making and behaviors. Neumayer and Perkins (2005) pointed out the variation of the adoption of organizational innovation such as ISO 9000 in different countries based on the nation's institutional contexts. Straub (1994) explained the variation of technology adoption in Japan and the US using Hofstede's culture framework. Other studies (Leidner & Kayworth, 2006; Myers & Tan, 2002; Tsui et al., 2007) offer literature surveys of extant cross-national studies on management and IT.

Some studies are particularly relevant to information sharing in an international context. For example, Chow et al. (1999) reported the variation of information sharing in Taiwan and Australia, attributing such differences to national culture. Shin et al. (2007) demonstrated the influence of culture values on information sharing practices in China. In addition, Ahmad and Schroeder (2003) showed there is a significant variation among business practices, such as information sharing, in different countries. National differences appear to be influencing the degree of innovativeness (Shane, 1995). Considering information sharing as a type of organizational innovation, it is expected that firms in some countries are more likely to adopt information sharing in their business practices than those in other countries. Thus, we propose:

Hypothesis 1a: The level of information sharing within organizations will be significantly different from country to country.

In addition, based on Gooderham et al.'s (1999) research on collaborative HRM practices in Europe we anticipate expected comparative levels of information sharing of some, but not all, countries that we consider. Denmark and Norway were significantly higher than United Kingdom with respect to collaborative HR practices, while Germany, France and Spain were significantly lower than England in the use of these practices. These reflect both cultural and other institutional forces such as high level of unionization and legal mandates to share information with employees in Scandinavia and a relatively stronger institutional granting of strong managerial autonomy to organization in countries such as Spain and United Kingdom. Based on the patterns seen in the Gooderham et al.'s (1999) results, the following hypothesis is proposed:

Hypothesis 1b: The level of information sharing observed in organizations from Scandinavian countries is high compared to all other countries investigated, while Germanic countries, Spain and France will exhibit lower patterns of information sharing and the United Kingdom will have intermediate levels of these practices.

Comparative research by Brewster, Mayrhofer, and Morley (2000) have generally found organizations in south-eastern and central European countries to have less developed HRM practices than northern European countries. This is likely to be partially related to general economic development and weaker traditions of workplace democracy. Based upon this research the following is proposed.

Hypothesis 1c: The level of information sharing observed in organizations from Italy, Greece, Turkey, Slovakia, and Bulgaria will

be lower than that seen in northern European countries.

Differences in HRIS adoption. Today, IT significantly influences organizational design, information sharing, and decision-making. Thus, in addition to information sharing, HRIS is an important dimension for business strategy (Kovach & Cathcart, 1999) in international contexts. National differences matter to information management in international contexts (Agourram & Ingham, 2007; Ein-Dor, Segev, & Orgad, 1993; Katz & Townsend, 2000; Leidner & Kayworth, 2006; Veiga, Floyd, & Dechant, 2001). Previous studies have shown there is a significant variation in the adoption of various types of technological innovation, including e-mail (Straub, 1994), frame relay technology (Png et al., 2001), ERP (Everdingen & Waarts, 2003), wireless technology (Sundqvist et al., 2005), Internet (Zhao et al., 2007), and others (Bagchi et al., 2004; Chai & Pavlou, 2004; Straub, Loch, & Hill, 2001), and this variation has been ascribed to the differences in national culture and other institutional factors that vary across countries. Likewise, it is expected there is a significant variation in the level of HRIS adoption in different countries. Thus, we propose:

Hypothesis 2a: There will be a significant difference in the level of HRIS adoption from country to country.

In addition, we anticipate two specific patterns for the level of HRIS adoption in countries. The first pattern is related to the differences in the level of technology adoption across different geographical regions. Extant studies suggest that countries in North America and Europe have a high level of adoption in a broad range of technologies, compared to other regions (Bagchi et al., 2004; Chinn & Fairlie, 2007; Comin & Hobijn, 2004). This is attributed to the national infrastructure (e.g., free economy, open trade, high expenditure on technology) which is favorable for adopting new technological innovation (Chinn & Fairlie, 2007; Comin & Hobijn, 2004). Comparative research (Tellis et al., 2003; Vicente & Lopez, 2006) also suggests that Scandinavian countries turned out to be faster in adopting new technologies than other European countries. Based on these findings, we propose that there will be a similar pattern observed in HRIS adoption.

Hypothesis 2b: The level of HRIS adoption observed in organizations from Scandinavian countries, USA, and Canada are high compared to all other countries investigated.

The second pattern we anticipate from HRIS adoption is related to Hypothesis 1c, projecting that northern European countries have more developed HRM practices than south-eastern and central European countries. HRIS are deployed to support traditional HRM practices (e.g., HR administrative tasks) (DeSanctis, 1986) and also enable new or transformative HRM practices (e.g., employee empowerment, knowledge management) (Shani & Tesone, 2010; Tafti, Mithas, & Krishnan, 2007). In this vein, countries with more developed HRM practices are likely to be faster in adopting HRIS than countries with less developed HRM practices. Thus, we project that the pattern of differences noted in Hypothesis 1c should be seen in HRIS adoption.

Hypothesis 2c: The level of HRIS adoption observed in organizations from Italy, Greece, Turkey, Slovakia, and Bulgaria will be lower than that seen in northern European countries.

Cultural values and information sharing. As noted earlier, national differences can be considered through cultural values and other institutional arrangements. First, several studies posit that cultural values alone significantly influence management practices of organizations in different countries. For example, Chow et al.

(2005) examined whether cultural values such as individualism and power distance are positively or negatively associated with the level of information sharing and found that the differences in information sharing in Taiwan and Australia "are consistent with the cultural characteristics of Chinese and Anglo-American cultures" (p. 579).

Information sharing is an organizational practice emphasizing employee empowerment, participation (Gibson et al., 2007), and informed decision making by various levels of workers including non-management employees. Thus, it can be considered an innovative organizational practice (Chow et al., 1999) on how organizations communicate with their employees (Black, 2005). Previous studies show there is a relationship between national culture and organizational innovation and practice (Shane, 1995). Some studies predicted that power distance in Hofstede's framework would negatively influence the adoption of worker participation (Black, 2005) and decentralized organizational structure (Katz & Townsend, 2000). Firms in a country with high power distance would be less likely to adopt such an innovative practice which aims to "inform" organizational members through more intra-organizational information flows and potentially leads to greater employee autonomy and participation in decision making because such an innovative practice ("information sharing") is not likely to support the existing structure of social inequality. In addition, information sharing as an organizational innovation would be relatively newer to some countries than to others. People in a country with high levels of uncertainty avoidance are less tolerant of innovative practice (Shane, 1995) since innovation often comes with organizational change whose outcome is unknown in advance. Thus, high uncertainty avoidance would potentially lead organizations to be reluctant to implement information sharing as a new organizational practice.

Hypothesis 3a: Uncertainty avoidance will be negatively associated with the level of information sharing.

Hypothesis 3b: Power distance will be negatively associated with the level of information sharing.

Institutional arrangements & information sharing. In addition to cultural values, other institutional factors are important to consider. According to institutional theory (DiMaggio & Powell, 1991; Scott, 2008), firm-level decisions regarding innovative practices occur in broader institutional contexts. Gooderham et al. (2006) suggested that institutional arrangements influence managerial and organizational practices. The adoption of information sharing as an innovation would be no exception. In the literature there are different types of social institutions in a country (Scott, 2008) and thus different social institutions can be considered as predictors for the variation in the level of information sharing. Previous studies were particularly interested in political, economic, and educational institutions (or institutional arrangements) and demonstrated the influence of those institutional dimensions on organizational practices such as work centrality (Parboteeah & Cullen, 2003) and ISO 9000 (Neumayer & Perkins, 2005).

We examine the relationship that economic and education-related institutional variables have on information sharing. These institutional variables represent the level of country development (Parboteeah & Cullen, 2003). They have been found to be important institutional predictors for the adoption of organizational practices and innovation (Bagchi et al., 2004; Martinez & Williams, 2010; Neumayer & Perkins, 2005; Parboteeah & Cullen, 2003; Tellis et al., 2003; Zhao et al., 2007). Previous studies show that high industrialization and education level are positively related with the adoption of organizational innovation (Neumayer & Perkins, 2005; Parboteeah & Cullen, 2003). In other words, developed countries tend to have

more adopted innovative practices than their less-developed counterparts (Black, 2005; Chow, 2005; Sundqvist et al., 2005). Thus, we propose:

Hypothesis 4a: The level of industrialization will be positively associated with the level of information sharing.

Hypothesis 4b: The level of education accessibility will be positively associated with the level of information sharing.

Cultural values and HRIS adoption. Various studies have shown that cultural values significantly explain IT adoption and usage. Whether this may be the case for HRIS would be an interesting question to answer. Uncertainty avoidance and power distance are two important cultural factors that may predict the adoption of technological innovation (Bagchi et al., 2004; Erumban & de Jong, 2006; Katz & Townsend, 2000). For example, Straub (1994) studied the usage of e-mail and fax in US and Japanese companies and found that US companies use e-mail more extensively than Japanese counterparts. He attributed this variation to uncertainty avoidance in Hofstede's framework. Png et al. (2001) focused on the adoption of telecommunication technology using Hofstede's power distance and uncertainty avoidance. Their study reports that companies in high uncertainty avoidance countries are less likely to adopt the technology. They explained that innovation such as new IT is perceived as an increase of uncertainty and thus organizations in the country with high uncertainty avoidance are less likely to adopt innovations like new technology. Studies have suggested that high uncertainty avoidance is negatively associated with internet diffusion (Zhao et al., 2007) and wireless technology (Sundqvist et al., 2005). Similar to these studies, others also suggest that national culture may facilitate or impede the adoption and diffusion of certain technologies. For example, high power distance would restrict the availability of information and technology to certain groups of people in a society or organization in order to maintain the status quo of power base (Katz & Townsend, 2000). In addition, Everdingen and Waarts (2003) suggested that high uncertainty avoidance and power distance are negatively associated with the adoption of IT innovations like enterprise systems. Innovation itself or technology adoption is likely to be considered as some sort of uncertainty creation. Thus, we propose the following:

Hypothesis 5a: Uncertainty avoidance will be negatively associated with HRIS adoption.

Hypothesis 5b: Power distance will be negatively associated with HRIS adoption.

Institutional Arrangements and HRIS. The rate of technology adoption varies among countries (Erumban & de Jong, 2006; Martinez & Williams, 2010). The examination of institutional contexts has long been an interest in the studies of IT adoption (Avgerou, 2001). Studies have explored the role of nation's institutional arrangements for explaining the variation in the adoption of various technologies (e.g., Internet) (Comin & Hobijn, 2004; Sundqvist et al., 2005; Tellis et al., 2003). Zhao et al. (2007) suggested that organizations in developed countries are more likely to adopt IT than those in developing countries. Particularly, their study shows that a high level of industrialization and national education accessibility is positively related with the adoption of Internet diffusion. Developed countries tend to have higher educational attainment level and better infrastructure. Such conditions enable a high rate of technology adoption (Erumban & de Jong, 2006). Other studies also use national educational level as an important variable in explaining technology adoption variation (Comin & Hobijn, 2004; Stremersch & Tellis, 2002). We propose country-specific institutional factors will help explain differences in the level of HRIS adoption in organizations in different countries as follows:

Hypothesis 6a: The level of industrialization will be positively associated with HRIS adoption.

Hypothesis 6b: The level of education accessibility will be positively associated with HRIS adoption.

HRIS and information sharing. Shin et al. (2007) noted that IT offers an infrastructure for more information sharing in organizations. HRIS are considered as an important part of organizational IT infrastructure supporting extensive information sharing and knowledge management practice (Hendrickson, 2003; Hustad & Munkvold, 2005; Mayfield et al., 2003; Tafti et al., 2007). Since its inception in the 1960s (DeSanctis, 1986) HRIS has co-evolved with human resource practices within organizations, which have also transformed from mainly personnel management (e.g., recruitment, training, bargaining, employee data management, performance evaluation, compensation) to the inclusion of innovative practices (e.g., information sharing, employee participation, profit sharing, knowledge management, organizational learning, worker autonomy) (Tafti et al., 2007). Thus, in addition to their traditional usage of "monitoring" personnel (Tafti et al., 2007) and "automating" administrative HR tasks (Hussain et al., 2007; Niederman, 1999; Shani & Tesone, 2010), there has been a broader role of HRIS as a technological infrastructure for informing employees and increasing their effectiveness (Haines & Lafleur, 2008; Hendrickson, 2003; Kovach & Cathcart, 1999), which is aligned with those strategic and transformational HR practices, such as information sharing and employee empowerment. To respond to this increasing role, the scale of HRIS has also evolved from stand-alone information systems to an integral part of an enterprise IT infrastructure (Bondarouk & Ruel, 2009; Hendrickson, 2003; Hustad & Munkvold, 2005). Thus, we propose:

Hypothesis 7: Technology (HRIS) adoption is positively associated with the level of information sharing.

RESEARCH METHODS

Data

Our study uses data gathered through the Cranfield network on European HR management (CRANET) survey. The CRANET survey, which has been conducted since 1990, includes a large set of firm-level data in human resource practices from over 20 countries. Several previous studies (Beck, Kabst, & Walgenbach, 2009; Brewster, Wood, Brookes, & Ommeren, 2006; Papalexandris & Panayotopoulou, 2004) have used the CRANET survey database. The 2004 survey process was similar to previous CRANET collection procedures (Tragaskis, Mahoney, & Atterbury, 2004). The survey, which focuses on a wide variety of HR practices, was completed in 2004 by senior HR leaders in firms from 32 countries. Beck et al. (2009) report a 17 percent response rate. To evaluate the presence of any bias associated with industry sector and size, Stavrou, Brewster, and Charalambous (2010) compared early and last survey responses from European countries on these measures and did not find evidence of systematic response bias. They report evidence that the CRANET survey process, at least in the case of Europe, results in samples that are "broadly comparable to the EU's employment patterns for organizations with more than 100 employees" (p. 942). Firms from countries with less than 100 responding firms were excluded from this analysis. The details of earlier collection rounds, which are similar to the 2004 administration, are discussed in detail by Brewster, Tregaskis, Hegewisch, and Mayne (1996) and Tragaskis, Mahoney, and Atterbury (2004). Steinmetz, Schwens, Wehner, and Kabst (2011) provide a detailed methodological critique of the CRANET survey process and find many strong points. They note that while efforts to gather a representative sampling of public sector organizations is consistently applied across countries, there is some variance in the sampling frames used by country-based researchers who

are most focused on gathering samples representative of the larger economies of each country. The result is that different country-based samples tend to vary with respect to organizational size and industries represented. For cross-national comparative research, it is ideal for all countries to employ a common sampling frame.

Variables and Measures

Data source and sample. Our analysis includes 22 countries in the CRANET database with a total sample of 6411 firms. The number of companies located in 10 countries (e.g., Hungary, Czech Republic, Philippines, etc.) were not numerous enough (fewer than 100 organizations) for reliable analysis. Firms from those countries were deleted from our analyses. The 22 countries included are: United Kingdom, France, Germany, Sweden, Spain, Denmark, Netherlands, Italy, Norway, Switzerland, Turkey, Finland, Greece, Austria, Belgium, Bulgaria, Australia, New Zealand, Israel, USA, Canada, and Slovakia. These countries represent different world regions and provide a look at information sharing and HRIS practices in companies from a wide range of culture, regulatory, nation and institutional environments.

Information sharing scale. The nine-item scale examines three key areas of internal business activities: Business strategy, financial performance, and organization of work. For each, the survey respondent indicated with yes/no responses whether professional/technical, clerical, and manual employees were each formally briefed about each focus area. A high score (on the 0 to 9 scale) indicates that the organization is engaged in formal information sharing across all non-managerial employee groups on each of these three foci. A single factor solution, using principal components analysis, produced an Eigenvalue of 3.7 with factor loads of.47 or higher. The standardized Alpha reliability coefficient is.81. These items are a subset of those used in the longer collaborative HRM practices scale employed by Gooderham et al. (1999), which used an earlier version of CRANET database. Table 1 presents descriptive statistical information for all variables and the Appendix presents the items that form this scale.

Human resource information system (HRIS) adoption scale. The measure of HRIS adoption uses a single item to access the type of computerized HR information system in the respondent's organization. The three-point scale consisted of: (1) "do not have a computerized HR information system," (2) "primarily independent HR system," and (3) "primarily interfaced/integrated into a wider management information system." As noted earlier, HRIS have changed with the evolving human resource practices encompassing personnel management and other innovative practices such as organizational learning and

Table 1. Descriptive statistics

Scales	Mean	SD	1	2	3	4	5
1. Information Sharing	5.50	2.72					
2. HRIS Adoption	2.1382	.69	.07				
3. Log of Educational Attainment	3.77	.78	.23	-.02			
4. Economic GDP per Person	23134.80	6555.59	.16	.08	.44		
5. Power Distance	39.23	19.43	-.12	-.03	-.44	-.58	
6. Uncertainty Avoidance	53.97	21.41	-.21	.01	-.31	-.50	.43

Notes:

1. Means and standard deviations are calculated with the full sample, n = 6411.
2. The Pearson intercorrelation coefficients are presented in the last five columns. Coefficients above.04 are significant at the $p < .001$.

worker empowerment. Thus, HRIS have evolved from manual or non-IT based record system to independent information systems to, finally, an integral part of firm's enterprise system. These three types (manual, independent, and integrated) of HRIS describe the development stages of HRIS (Hendrickson, 2003; Hustad & Munkvold, 2005; Shani & Tesone, 2010). The HRIS integrated into a wider enterprise information system represents the highest form of HRIS adoption.

National cultural values scales. Our analysis used the most recent country scores for Hofstede's two national culture dimensions: uncertainty avoidance and power distance. These scores are available at www.geert-hofstede.com. The same country scores are also reported in Hofstede and Hofstede (2005).

National economy and education levels. Economic performance, as measured by gross domestic product (GDP) per capita, and educational attainment levels are two key indices of the larger institutional context that firms within a country face. The data for national economic performance (GDP per capita) came from the World Development Indicators (WDI) by the World Bank. Since our study uses the 2004 CRANET survey data, we chose the 2003 WDI data, which is close to the year that the CRANET survey was conducted. The average national education attainment level is measured by an index available from the United Nations. Both skewness and kurtosis problems were present with this scale. We were able to eliminate these distributional problems by using a logarithmic transformation in all of our analyses. Many previous studies using an institutional theory framework have considered these economic and education attainment measures in their analysis (Erumban & de Jong, 2006; Parboteeah & Cullen, 2003; Zhao et al., 2007).

Analysis Procedures

Our analysis combines two statistical tests: ANOVA and regression. We used the ANOVA and the related Tukey Honest Significance Test (Tukey HSD) to assess the simultaneous multiple pairwise comparisons proposed in the first two sets of hypotheses (that there is variation in information sharing and HRIS adoption between countries). Regression analyses were used to assess a positive or negative relationship between predictors (national culture and institutional arrangements) and dependent variables (information sharing and HRIS adoption) predicted by Hypothesis 3 through 7.

RESULTS

Table 2 displays the results of ANOVA and Tukey HSD tests for Hypotheses 1a-1c (the variation in information sharing by country). These sets of hypotheses found some support. There is significant variation in country-based means in information sharing (Hypothesis 1a) over these 22 countries. Table 2 ranks the countries from low to high and presents homogeneous subsets of countries where information sharing levels are not statistically different. For example, such countries as Israel, Turkey, and Greece represent a group with low information sharing while such Scandinavian countries as Denmark, Sweden, and Finland report a high level of information sharing. As anticipated by hypothesis 1b Scandinavian countries have high levels. Finland is statistically higher than all other countries than Sweden (both of those countries are in the subset with the highest means). Similarly, Norway and Denmark, while significantly lower than Finland and have similar information sharing levels compared to their geographic neighbors, are significantly higher than the other countries noted in hypothesis 1b. Specifically, all Scandinavian countries have significantly higher levels than seen in the United Kingdom and the Germanic countries (Germany, Austria, and Switzerland). The only result inconsistent with Hypothesis 1b is that the means of Spain (5.10) and France (5.13) are not significantly lower than the UK

Table 2. ANOVA & Tukey HSD: the variation of information sharing between countries

Country	Homogeneous Subgroups of Country Means										
Israel	3.4133										
Turkey	3.7372	3.7372									
Greece	4.0060	4.0060	4.0060								
USA	4.2140	4.2140	4.2140	4.2140							
Bulgaria		4.2878	4.2878	4.2878	4.2878						
Austria		4.3925	4.3925	4.3925	4.3925						
Slovakia		4.4902	4.4902	4.4902	4.4902						
Italy		4.5357	4.5357	4.5357	4.5357						
Germany			4.7704	4.7704	4.7704	4.7704					
Switzerland				4.9900	4.9900	4.9900					
Spain					5.1000	5.1000	5.1000				
Canada					5.1198	5.1198	5.1198				
France					5.1250	5.1250	5.1250				
Australia					5.1423	5.1423	5.1423				
New Zealand						5.6255	5.6255	5.6255			
United Kingdom							5.9021	5.9021	5.9021		
Belgium								6.0132	6.0132		
Norway								6.2284	6.2284	6.2284	
The Netherlands								6.3727	6.3727	6.3727	
Denmark									6.5483	6.5483	
Sweden										7.0590	7.0590
Finland											7.5350

Notes:

1. The F-value from the one-way ANOVA was 48.336 and is significant at the $p < .001$ level indicating that there variance between country means are significant.

2. The columns present the country-based means. Country means that are in the same column are not significantly different from one another while countries not included in a common homogeneous subgroup are significantly different at the $p < .05$ level based on the Tukey HSD test.

mean of 5.90 as all three countries are in a common homogeneous subset. We also found partial support for Hypothesis 1c. Turkey and Greece means are significantly lower than all Northern European countries, except Austria. While Bulgaria, Slovakia and Italy means are significantly lower than the UK and Scandinavian countries, they are in a common homogeneous subset with Germanic countries and France.

Table 3 displays the results of ANOVA and Tukey HSD tests for Hypotheses 2a-2c (the variation in HRIS adoption by country). There is significant country-based variation in HRIS adoption (Hypothesis 2a) over these 22 countries. Table 3 shows that there are several distinct country groupings in terms of the level of HRIS adoption. For example, such countries as USA, Austria, Denmark, Turkey and Greece represent a group with high HRIS adoption while such countries as New Zealand, Australia, UK, Bulgaria and Sweden have low levels. We found only partial support for Hypothesis 2b. USA (2.41) reports the highest level of HRIS adoption and is significantly higher than the first 12 countries on the Table 3

Table 3. ANOVA & Tukey HSD: The Variation of HRIS adoption between countries

Country	Homogeneous Subgroups of Country Means							
New Zealand	1.8655							
Australia	1.9407	1.9407						
Finland	1.9441	1.9441						
Bulgaria	1.9568	1.9568	1.9568					
Slovakia	2.0314	2.0314	2.0314	2.0314				
United Kingdom	2.0656	2.0656	2.0656	2.0656	2.0656			
Sweden	2.0697	2.0697	2.0697	2.0697	2.0697			
Belgium	2.0877	2.0877	2.0877	2.0877	2.0877	2.0877		
Israel		2.1467	2.1467	2.1467	2.1467	2.1467	2.1467	
Germany		2.1480	2.1480	2.1480	2.1480	2.1480	2.1480	
Norway		2.1624	2.1624	2.1624	2.1624	2.1624	2.1624	
France		2.1691	2.1691	2.1691	2.1691	2.1691	2.1691	
The Netherlands			2.1864	2.1864	2.1864	2.1864	2.1864	2.1864
Canada				2.1980	2.1980	2.1980	2.1980	2.1980
Spain				2.2000	2.2000	2.2000	2.2000	2.2000
Italy				2.2143	2.2143	2.2143	2.2143	2.2143
Switzerland				2.2292	2.2292	2.2292	2.2292	2.2292
Greece				2.2335	2.2335	2.2335	2.2335	2.2335
Turkey					2.2756	2.2756	2.2756	2.2756
Denmark						2.3156	2.3156	2.3156
Austria							2.3208	2.3208
USA								2.4163

Notes:

1. The F-value from the one-way ANOVA was 11.48 and is significant at the $p < .001$ level indicating that there variance between country means are significant.

2. The columns present the country-based means. Country means that are in the same column are not significantly different from one another while countries not included in a common homogeneous subgroup are significantly different at the $p < .05$ level based on the Tukey HSD test.

(i.e., those not included in the homogeneous subgroup in the last column). Canadian organizations (2.19) are also significantly higher than the first four countries list. While this is not a strong result, it was anticipated by 2b. However, the results with Scandinavian countries report, at best, mixed support for hypothesis 2b. The mean for Denmark (2.32) is relatively high and is significantly higher than the first seven countries. However, those including Sweden (2.07) and Finland (1.94) which are both in the lowest homogeneous subgroup are not significantly higher than any other country mean. This result is also inconsistent with hypothesis 2c. Hypothesis 2c is not supported. While Slovakia and Bulgaria are in the lowest homogeneous subgroup, this is not the case for the other countries (Greece, Turkey, and Italy) as they are in the highest homogeneous subgroup, and, contrary to this hypothesis, those three country-based means are significantly higher than a Scandinavian country, Finland.

In addition, there are several countries where firms tended to have contrasting high versus low patterns of information sharing and HRIS adop-

tion, which is consistent with the low intercorrelation of these two variables at the firm level. For example, firms in the USA have relatively high levels of HRIS adoption while having relatively low levels of information sharing. Sweden had the opposite profile.

The regression analyses presented in Table 4 suggest that Hypothesis 3a is supported. That is, there is a negative relationship between uncertainty avoidance and information sharing (β = -.160 and -.165). As predicted, uncertainty avoidance levels seen in an organization's home country is significantly and negatively related to the level of information sharing practiced. However, contrary to Hypothesis 3b, there is a modest, but significant, positive association between power distance and information sharing (β =.048 and.048). While there is a significant negative zero-order correlation (r = -.12) noted in Table 1, this relationship became positive when the inter-correlation with national GDP (-.58) and educational attainment level (-.44) and uncertainty avoidance (.43) is controlled. Thus, contrary to Hypothesis 3b, power distance was not found to have a negative relationship with the use of more information sharing to lower non-managerial levels of the organization. Supplemental stepwise regression analyses found that the inclusion of GDP and uncertainty avoidance after power distance in the regression results in a change from a negative to positive coefficient for power distance.

We hypothesized that a country's economic performance (Hypothesis 4a) and education level (Hypothesis 4b) are positively related to the adoption of information sharing. The regression analysis results indicate that the level of national educational attainment has a positive significant relationship to the level of information sharing in organizations (β =.191 and.195). While the GDP per capita is significantly correlated to information sharing (r =.16), this relationship becomes non-significant (β = -.022/-.012) when its inter-correlation with educational attainment (r =.44) and uncertainty avoidance (r = -.31) is controlled.

The relationship between national culture, namely levels of uncertainty avoidance and power distance, and HRIS adoption (Hypotheses 5a & 5b), was hypothesized to be negative. However, Table 4 analysis shows a positive linear relationship between uncertainty avoidance and HRIS adoption (β =.061), and no relationship between power distance and HRIS adoption (β = -.004). Thus, these two hypotheses are not supported. In addition, we predicted a positive relationship between the level of a country's GDP or industrialization (Hypothesis 6a) and educational attain-

Table 4. Regression analyses

	HRIS Adoption	Information Sharing	Information Sharing
Scales:	β	β	β
Educational Attainment(log)	-.062**	.191***	.195***
Economic GDP per Person	.139***	-.022	-.012
Uncertainty Avoidance	.061***	-.160***	-.165***
Power Distance	-.004	.048**	.048*
HRIS Adoption	---	---	.072***
Adjusted R^2	.013***	.075***	.080***

Note:

1. The first column presents the results for the regression on the HRIS adoption dependent variable.

2. The last two columns represent a two-step analysis using Information Sharing as the dependent variable. In that analysis, the first four variables were entered on the first step. The standardized regression weights (β) for that analysis are presented in the middle column. In the final step, the HRIS adoption variable was added and those results are presented in the third data column.

*p <.05 **p <.01 ***p <.001

ment (Hypothesis 6b) and HRIS adoption. The analysis confirms a positive influence of economic industrialization on HRIS adoption (β =.139), but the relationship between education and HRIS adoption (r =.22) become slightly negative (β = -.062) once the strong inter-correlation between GDP and education (r =.44) was controlled. This is contrary to Hypothesis 6b.

Hypothesis 7 predicted there is a positive relationship between IT availability and information sharing. The simple bi-variate relationship noted in Table 1 between these two scales is positive (r =.08). To address this question more substantially, information sharing was regressed on HRIS adoption after the other four predictors were included in the regression. As shown by columns two and three in Table 4, the addition of HRIS adoption (in column three) resulted in a significant increase in explained variance (ΔR^2 =.05; β =.072) and this supports Hypothesis 7.

DISCUSSION AND IMPLICATIONS

The results of our study clearly indicate significant differences exist in the degree of information sharing and the adoption rate of HRIS among countries. This finding suggests information sharing is an organizational practice that has been adopted with a wide variation among firms in differing countries. The adoption of HRIS as a technological innovation, while perhaps not as varied as the differences seen in information sharing practices, does vary significantly across these countries as well. Overall, it appears that the adoption rate of organizational and technological innovation significantly differs between firms based on home country differences. We attribute this variation to the difference in national culture and institutional arrangements, among other potential factors. This confirms the importance of including national difference in our understanding of the adoption of information sharing and HRIS. In addition, our results suggest management should pay keen attention to the country's culture and institutional factors as they consider adopting new organizational and technological practices and innovations such as information sharing and HRIS.

Our analysis shows that social institutions have a more predictive power than national culture. This finding is similar to some studies, while differing from other studies examining innovation adoption. For example, several studies (Comin & Hobijn, 2004; Gooderham et al., 2006; Martinez & Williams, 2010; Neumayer & Perkins, 2005; Poutsma, Ligthart, & Veersma, 2006; Scott, 2008; Zhao et al., 2007) previously suggested that social institutions like politics, economy, and infrastructure explain why a new practice or innovation is adopted in one country earlier than in other countries. The findings from studies like Zhao et al. (2007) also indicate that the relationship of institutional variables with new practice/innovation adoption is more evident than that of cultural variables.

On the other hand, many studies using the Hofstede framework have shown a significant predictive power of cultural dimensions such as uncertainty avoidance and power distance (Black, 2005; Erumban & de Jong, 2006; Everdingen & Waarts, 2003; Parboteeah & Cullen, 2003; Straub, 1994). According to our study, however, national culture seems to have less explanatory power than what previous studies suggested and what we originally posited. This is particularly true with the power distance measure since our analysis revealed that the influence of power distance on information sharing and IT adoption appears to have marginal impact. This result appears to be quite consistent with Gerhart and Fang's (2005) recent conclusions about the limited explained variance provided by Hofstede's culture dimensions. Also, cultural differences explained more variance in organizational information sharing practices than in HRIS adoption.

However, in the context of technology adoption, previous studies (Png et al., 2001; Zhao et al., 2007) show findings similar to ours. One expla-

nation is that this may be due to the diminishing role of power dimension or "human inequality" (Hofstede, 1980, p. 92) in society as a whole and in many organizations as democratic forms of governance (and management) are more widely adopted in many countries and organizations. Also, the view of culture as "contested, temporal and emergent" (Myers & Tan, 2002, p. 11) and "not static" (Tung, 2008, p. 44) could be relevant to some of our findings. On a related note, the literature on institutional theory has increasingly appreciated that organizations have latitude in how they address the structural press of a country's institutional environment to conform. This is known as the "agency" perspective and is a counter-point to the "structuralist" press for isomorphism often associated with the institutional perspective (Heugens & Lander, 2009; Oliver, 1991).

Unlike power distance, uncertainty avoidance, which is "a basic fact of human life" (Hofstede, 1980, p. 153), has a higher level of explanatory power as shown in our analysis as well as in previous studies (Bagchi et al., 2004; Erumban & de Jong, 2006; Png et al., 2001; Straub, 1994; Zhao et al., 2007). This is because the divergence of uncertainty avoidance among countries appears to be persistent. Thus, it can be expected that information sharing will be continuously adopted as a new organizational practice by more organizations worldwide ("globalization" of new practices or innovations). At the same time, there is still a variation or difference among countries in terms of the way information sharing as a new practice is adapted by each organization ("localization" of new practices or innovations). HRIS is expected to display the similar pattern of adoption and adaption by organizations, as shown in other types of technologies (DeSanctis & Poole, 1994).

In addition, our findings suggest the explanatory power of national culture over HRIS adoption is not strong. This is different from the propositions and findings of previous studies using different types of technological innovation (Bagchi et al., 2004; Erumban & de Jong, 2006; Veiga et al., 2001). We think this suggests that when it comes to explaining the variation of IT adoption, such as HRIS, the influence of national culture and institutional forces are less salient compared to the variation of the information sharing adoption. Information sharing has more direct implications for how employees are treated in an organization and, thus, the institutional press for legitimacy or "doing things the right way" in a given national context will be more salient than is the adoption of technological innovations (e.g., HRIS). Institutional environments may give relatively more latitude to variations in the adoption of these practices. This would be particularly true in the case of relatively less-expensive technologies such as HRIS. Unlike expensive technologies such as enterprise-wide systems (e.g., ERP), whose relationship with Hofstede's cultural dimensions are found to be more significant (Everdingen & Waarts, 2003), information systems for HR require relatively less investment and maintenance and thus they carry relatively fewer risks than other larger-scale enterprise technologies. For this reason, such systems are likely to be more easily adopted and it may take less time for broad diffusion to take place among firms. This said, we think that how a more extensive IT technology, such as an ERP, is implemented and used in an organization will be more likely to confront institutional pressures and constraints about what is the "right way to manage" in a given country.

Contrary to hypothesis 5a, the relationship between uncertainty avoidance and HRIS adoption is found to be positive. This finding is contrary to that of previous studies of technology adoption, such as the Internet (Zhao et al., 2007), ERP (Everdingen & Waarts, 2003), frame relay (a type of IT infrastructure) (Png et al., 2001), e-commerce (Chai & Pavlou, 2004), and others (Veiga et al., 2001). Agourram and Ingham (2007) found that people from different national cultures perceive the meaning of IT success differently. In this vein, one possible explanation of this result is that organizational decision makers may perceive the

"meaning" of HRIS differently due to different national cultures. High uncertainty societies prefer more planning and control systems (Hofstede, 1980; Hofstede & Hofstede, 2005). Organizations in high uncertainty avoidance cultures may see the use of more planning and control mechanisms (e.g., monitoring employee performance) as a means for uncertainty reduction. HRIS could be seen as means for increasing organizational control and planning capability, which will lead to less uncertainty in managing employees and organizational resources.

The finding of this negative relationship between education and HRIS adoption (6b) is also contrary to previous studies of innovation adoption in international contexts (Martinez & Williams, 2010; Tellis et al., 2003; Zhao et al., 2007) that education makes people more receptive to innovation.

An analysis of comparing Table 3 (the variation of HRIS adoption) and education index scores seems to shed light on two countries: New Zealand and Turkey. New Zealand, the country with the highest education index score, is found to be the lowest in HRIS adoption among all 22 countries in the sample. The opposite is Turkey, the country with the lowest education index in the sample, showing one of the highest in HRIS adoption. It appears that this is ascribed for much of the unexpected positive relationship found regarding 6b. Yet, the finding of 6b needs a more systematic analysis with other institutional dimension (e.g., legal regulations, average age of workforce). For example, the institutional development of a country like Turkey is described as "One of the main forces behind Turkey's economic momentum is the availability of young and educated human capital. More than half of Turkey's population (57 percent) comprises people under the age of 30" (Aycan, 2001, p. 254). Thus, maybe firms in a country with high young educated workforces, despite the low national education level, are more likely to adopt technologies like HRIS. Despite the findings on hypothesis 6b, however, economy-related institutional contexts (GDP) (6a) tend to effectively explain variations in HRIS adoption among countries.

Finally, our analysis also draws attention to the relationship between information sharing and IT. It shows there is a positive relationship between the type of HRIS and the degree of information sharing. That is, organizations with HRIS tend to share more information than those without, and organizations with integrated HRIS share more information than those with standalone HRIS. At the micro level this finding would justify a continuing investment in communication and repository technologies by organizations and an increasing IT-enabled organizational change effort for organizational learning and knowledge management (Alavi & Leidner, 2001). At the global level, this may also suggest the presence of a potentially reciprocal relationship between technological innovation and organization/institutional practices. New organizational practices like information sharing influence and are often enabled by the adoption of informational technological innovations like HRIS.

The practical implications of our study are clear: Managers should understand the cultural context and other national institutional factors impacting organizations when initiating or expanding information systems in unfamiliar locations. This is especially relevant when strategic alliances involve information sharing among partner organizations in widely disparate locations. The result of not considering the factors examined in our study could result in lost investments and inter-organizational discord.

LIMITATIONS AND FUTURE RESEARCH

Understanding information sharing and IT adoption simultaneously from an international perspective is rare in the literature. This paper has aimed at responding to this need by surveying a broad

range of multi-disciplinary studies, developing relevant hypotheses, and analyzing organizations from 22 different countries. This study, however, is not without limitations.

First, we have not identified an exhaustive listing of other factors beyond uncertainty avoidance, power distance, economy, and education. While these are prominent factors in the literature, future studies can find additional institutional forces to understand country-based differences in practices. The tenets of institutional theory, for example, discuss various types of social institutions at different levels (Scott, 2008). Similarly, recent studies of international business present multi-layered models of culture (Karahanna, Evaristo, & Srite, 2005; Leung, Bhagat, Buchan, Erez, & Gibson, 2005) and cultural frameworks (Hampden-Turner & Trompenaars, 1998) other than those proposed by Hofstede. In a related vein, industries provide their own institutional press for member organizations for what is considered good practice. Analyzing both industry-specific patterns of practice across different country-based institutional environment will provide a richer interpretation of how organizations confront and manage the sometimes competing mandates from their multi-faceted institutional environments. Even in the case of information sharing, the variance explained in our analyses is not high. Broadening the scope of investigation to include more factors and levels of environment should increase the amount of variance explained and may help to disaggregate and understand the country effects seen in our results. This issue relates directly to the fairly low R^2 effect sizes obtained in our analyses. A more extensive evaluation of the additional institutional factors should provide more explanatory power.

Second, we believe that there are opportunities for future research in the interactions between various levels of culture and institutions and organizations (and potentially individuals). Culture and institutions influence organizational practices and IT innovations but at the same time organizations enact such practices and innovations with the culture and institutions at different levels (DeSanctis & Poole, 1994; Giddens, 1984). For example, around 40% of the organizations in the CRANET database are part of a larger organizational entity. The independence of each of those organizations from those larger entities cannot be determined. Logically, those larger entities provide, in varying degrees, their own set of institutional influences. These are potentially contradictory to the regional and country-based institutional and cultural mandates. These effects were unmeasured and likely limited the effect sizes (R^2) achieved in this study. Organizations can be "viewed as knowledgeable and reflexive, capable of understanding and taking account of everyday situations and routinely monitoring the results of their own and others' actions" (Scott, 2008, p. 77). The result, as discussed earlier in this paper, is expected to be the simultaneous presence of globalization and localization of organizational practices and innovations in countries (and organizations). Future study is necessary to shed light on these potentially dynamic and nonlinear relationships among social structures (e.g., culture, institutions), new organizational practices and IT, and organizations in international contexts. This will be best done with a more intensive study of a few organizations rather than a large survey of many organizations.

Third, another limitation and opportunity for future investigation relates to the data set employed. While our study analyzed a large data set of international HR management practices, the data is largely from Western countries. This limits being able to generalize our findings to non-Western regions, including countries in Asia-Pacific, Africa, and South America. In this regard, future study could apply our proposed research design and testing hypotheses to a data set covering more diverse regions of the world.

Finally, while much of our analysis avoids analyzing independent and dependent variables from a single source, the observed relationship

(hypothesis 7) between information sharing and HRIS adoption come from the same source. As such, it is vulnerable to common method bias. Wright and Gardner (2009) in addressing this potential bias argue that this data gathering process may be biased by the implicit theory of human resource management that respondents have. However, we believe the "yes-no" response choice contained in the CRANET database used in this study, compared to the typical verses Likert-type response scale (see the Appendix), make the responses less subject to the impact of respondents' implicit theory.

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APPENDIX

Information Sharing Scale

Which employee categories are formally briefed about the following issues? (Please tick as many as applicable).

Strategy Financial Performance Organisation of Work

Professional/technical ❑1 ❑1 ❑1
Clerical ❑1 ❑1 ❑1
Manual ❑1 ❑1 ❑1

Note: A tick or check in a box indicates that the row designated groups of employees are formally briefed on the issue noted in the column heading. The information sharing scale is the sum of checks for Professional/technical, clerical and manual employees. A zero sum means that none of these groups are formally briefed on any of the three issues. The highest possible score of nine indicates that all three groups were formally briefed on all three issues.

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Chapter 6
IT Human Resources:
Experts at Talent Management and Critical Partners to the CIO

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ABSTRACT

In this chapter, IT human recourse professionals will find confirmation of the important role that they play in ensuring the creation of a high performance department. They develop, recommend, and then lead the talent management strategy. As leadership needs arise, HR works with IT leadership to assess internal candidates, and if they do not fit, then they can assess and recommend external staffing firms with the appropriate expertise and reach. The human resources/CIO partnership will include leading the effort to develop a position specification, managing the candidates through the interview process, and negotiating an offer that often times must be customized to attract the ideal candidate. Finally, once selected, human resources will manage the on-boarding process to ensure that the recent hire has the support they need and can get up to speed quickly.

INTRODUCTION

The success of an IT organization is dependent upon the quality of its leadership. Leadership quality is assessed by human resources professionals supporting the IT organization, but assessment cannot take place in a vacuum. The human resources professionals need to start with a Talent Strategy. This roadmap will include the Chief Information Officer, the CIO's direct reports and the staff below them, and therefore will need to be customized to fit each level. As this is being developed a clear understanding of the company's culture and, if it exists, the sub-culture within IT must be defined. Without understanding the culture an appropriate fit and assessment of personal characteristics cannot be made. On the other hand,

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while qualifications and experience are critical they are fairly straight forward to assess.

Developing a Talent Strategy

Talent management has been a point of discussion for companies of all sizes and across all industries for many years. Human resource organizations play a critical role, but all managers and business leaders must commit time and resources to the process.

A talent strategy has many components that when tied together create a cycle. To be successful companies must follow the defined path and aggressively support the respective processes. Different points in the cycle emphasize external talent, while others focus on internal talent that may have been recently hired or have been with the company for some time. To begin, the talent management process the organization must have the capacity to target and be attractive to the relevant pools of talent. At the entry level where technical skills are critical this can mean offering an opportunity to work with leading edge technologies, continuous education and training programs, and flexible work hours.

As human resources moves forward with the selection, recruitment and hiring of talent behavioral characteristics and technical skills must be aligned. Next, on boarding is the induction process for new hires. Going forward, to maintain a competitive advantage, organizations must have a talent management strategy that offers continuous learning. Best of breed companies offer not only training but have formal mentoring programs as well. Defining roles that leverage an individual's competencies, communicating a career track and providing performance feedback is known to engage and retain talent. Through promotion and rotation the organization creates a leadership pipeline. Hiring at the technical, manager and Vice President level gives the CIO an external benchmark against the internal team.

Following the identification of future leaders, the talent strategy cycle comes full circle establishing process to secure effective and smooth successions. Finally it is generally accepted that to be successful the talent management strategy must be employee centric. An annual review with a formal 360 evaluation is a tool, but this tool must be part of a broader talent management strategy.

For example, in Compensation Today, Barry MacLean (2009) writes that a Talent Strategy is employee-centric and is focused on recruiting, training, aligning performance, planning for growth and development and identifying high-potential employees, and charting a course for their career growth. However to be comprehensive, measurable, and have impact the Talent Strategy must also include compensation management "which by contrast is all about jobs: what grades or bands they fall into, and what target incentives are associated with varying levels of jobs within the company." To retain and attract the strongest talent, a good Talent Strategy will go beyond the internal comparison of jobs and will include a market valuation of individual employees.

There are many approaches to determining market valuation and some require more resources (e.g., time, money, staff, etc.) than others. For managers and directors, entry level management, job posting and career web sites can provide quick but un-scrubbed data. Recruiting firms (generally contingency) will also have helpful data points and should be willing to offer an opinion based on their current view of the market. Do not look to online resources for data at the senior management level (Vice President and above). If the organization has a relationship with an executive search firm (retainer-based) consultant specializing in IT they will offer an opinion. While this may be at no cost, a fee will be charged for a more detailed study and human resource consulting firms such as Towers Watson & Co. and Hewitt Associates are specialists. Further discussion of market valuation follows in Compensation Management section.

Recruiting

As the Talent Management strategy identifying and recruiting, whether IT HR is assisting with the recruitment of a new CIO or direct reports and their staff, they must take a lead role in defining the selection process, aligning technical skills with behavioral characteristics, understanding and setting expectations, and measuring outcomes; each goes hand in hand to create a recruiting cycle within the talent management cycle. If for example the expectations are for a very tight job specification (narrowly defined qualifications) then, since there are fewer qualified candidates, the search will likely take longer and success can depend on available, affordable, qualified talent – either internal or external. While the position specification outlines day to day responsibilities it should also be the roadmap for the search and represent the ideal candidate however the HR business partner should counsel their IT client that trade-offs will need to be made. Should the ideal candidate not be available an upfront understanding of the trade-offs or flexibility in the position specification will be a time saver. IT recruiters will provide examples of how other companies have approached the market, what they found and the trade-offs they made.

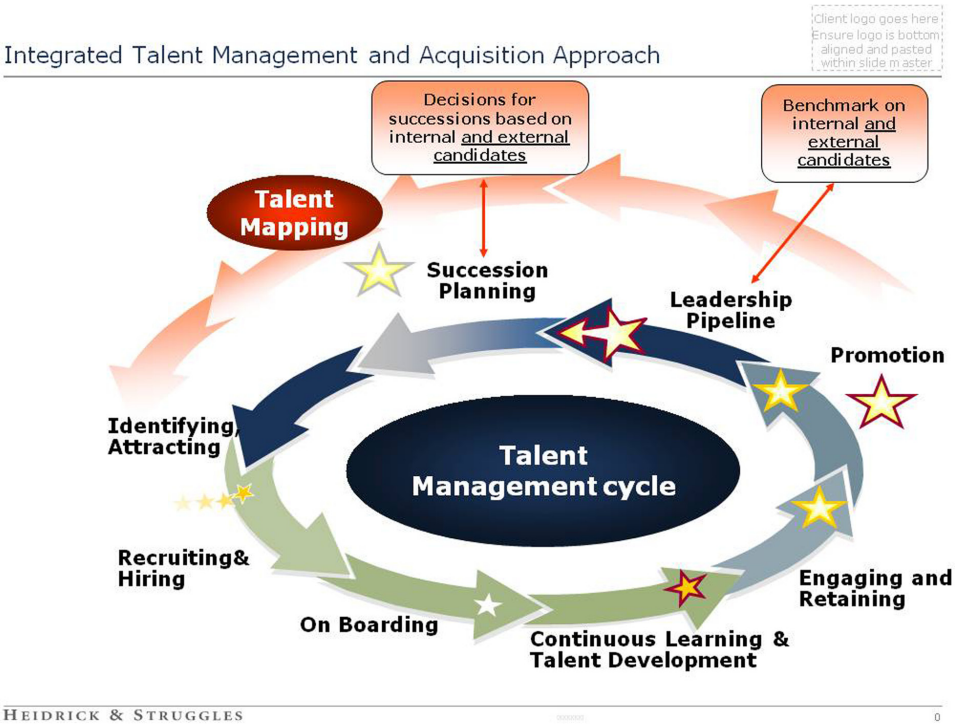
Trade-offs are a natural and therefore expected aspect of the recruiting process. When a media company recently went to market to recruit an applications team leader, the first requirement was for experience in this specific application. The question, is this truly a "must have" or is it an "ideal". In this case it was the later as individual team members were experts in the application and therefore the leader needed to bring process, mentoring and communication skills.

The internal recruiting process should also emphasize the importance of managing the scheduling and handling of candidates as they interview with the company. One person should be the lead on setting up the schedules of the interviewers. It takes someone on the "inside" with access to calendars and support staff to bring several people together on the same day. The recruiter will provide the candidate's availability and work with them on travel when necessary. The interviewers will have the candidate's resume and need to know what position the candidate is coming in for as many organizations have multiple positions to fill. Both candidate and interviewer should be aligned. The company is not viewed well by candidates when there is confusion on their end. Also biographical information on the interviewers should be provided to the candidate in advance. At a minimum a title should be included and where possible the recruiter will use public sources like LinkedIn and Google to gather information as well. Interviews are ideally an hour but can be as short as 30 minutes; so that there can be a more strategic discussion both sides must prepare in advance.

At the end of the hiring process when an insurance company recruiting a Network Manager looked at the length of time it took to close the search and found that it took twice as long as other recruiting projects, drilling deeper they realized that it took weeks to go from identifying the candidate to first round interview. The culprit, the hiring manager's administrative assistant gave the recruiter the contact information for the interviewing team and had the recruiter trying to find time on the interviewer's calendar. Based on the process they did not see this as a priority and dates of availability kept slipping out into the future.

As a best practice many companies split the position requirements up amongst the interviewers. Assessment templates with rankings or areas for comment should be distributed to the interviewers in advance and then feedback gathered quickly. The recruiter will be seeking feedback from the candidate at the end of their interview day and the candidate will be expecting a turnaround of a day or two. Managing the recruiting and interview process gives a company a competitive advantage as candidates are likely interviewing with other companies and this initial exposure is the first

Figure 1. Integrated talent management acquisition approach



impression that will stay with them throughout the process.

Assessment and Alignment

The assessment of an IT professional's qualifications and experience can be rather straight forward especially at lower levels where hands-on technical knowledge is required. This would include education such as degrees and certifications; years of experience; functional experience; prior staff and budget responsibility; and business, or industry knowledge. At the management level business acumen goes beyond budget responsibility to include strategic thinking, analyzing, diagnosing, decisiveness, financial acumen and risk taking.

Some of the softer skills include leadership and management behavioral competencies such as being performance driven. That is, being considered to be a self-starter, assertive, goal oriented as well as having tactical planning and tracking abilities. Responsiveness and follow through are measures of one's customer-centric style and personal characteristics such as values, motivation, personality traits and personal style can be more important than technical qualifications and experience. Finally and equally important soft skills include, team leadership and personal effectiveness. This includes the ability to build relationships, listen and be receptive, collaboration, influencing, motivating, developing talent and self development.

A not-for-profit emphasized this aspect of the position specification when recruiting a new Chief Information Officer. Knowing that the organization had such strong cultural values that they knew the successful candidate could only come from an organization with a mission and shared values. Otherwise the ability to build relationships with other C-level executives was going to be difficult and there was added risk in the transition to the new organization.

Just as an organization would assess technical skills by comparing them to the current technology environment (e.g., platforms, operating systems, applications, etc.), interpersonal style and culture fit will be compared to the organization or department's culture and the hiring manager plus peers and possibly the interpersonal style of direct reports. For some organizations articulating culture may not be as straight forward as identifying technical competency. In terms of identifying different cultures, in one example a company grows through the acquisition of other companies and they are at various stages of integration or choose a strategy not to integrate them at all. The result could be multiple cultures within a company. In another scenario, information technology departments that are working off shore whether captive or not are managing through a diverse set of cultures. Assessing a candidate's fit must take this into consideration as well. Still many other organizations have cultures that they are looking to change and therefore are looking for change-agents. Not only will these individuals come from a different organizational culture they will have a demonstrated track record of driving change. On the business and process side these changes may include a move from a decentralized to a centralized structure; the integration or divesture of businesses, and; globalization. On the technology side change may be a move toward more outsourcing or the reverse; SOA, implementation of ITIL or a move from one CMMi level to another and; common enterprise resource planning. Where organizations have gone wrong is when they expect the new hire to be the driver of change without the support of key leaders. Tenure for this individual will likely be short and is referred to by some as "organ rejection". There are many examples of this more at the top of the house, Chief Information Officer or their direct reports than at lower levels. Driving change within your own information technology department has a greater chance of success as the head of IT has direct control of budgets and people. Since information technology touches all business processes the risk increases when the CIO must drive change on the business side where budgets and people naturally report to the head of the business. Here relationship building and influencing skills are critical success factors.

Compensation Management

A good Talent Strategy includes not only an internal comparison of jobs and an alignment of skills but also market valuations. A decade ago when the Internet bubble was expanding, talent was attracted using equity and salary could be fixed at both the VP and the Manager level. Equity became was variable with Chief Executive Officers taking three to five percent of the outstanding shares and then direct reports to the CEO being offer approximately one to three percent. If the role was Chief Financial Officer and the goal was to go take the company public then having this previous IPO experience would earn the CFO the upper end of the range. As an Internet company the Chief Technology Officer (who may be also managing information technology to run the business) tended to be one of the founders but when the company grew and the role demanded more managerial skills a new CTO could be brought in with both technical and managerial capabilities. Here too the combined skill set would earn the incoming CTO the upper end of the equity percentage range.

In many companies equity was offered not just to vice presidents and managers but to all employees, from the secretaries to programmers. The belief was that this would create a culture of "ownership" resulting in a more committed workforce and had the added affect creating "golden handcuffs" where it would be too expensive for another company to recruit the talent.

It has been almost ten years since the Internet bubble burst and one lasting change in the long term component of a compensation package is a shift from stock options to restricted stock or a

mix of both. Depending on level the number of shares may be fixed. If the finalist candidate is leaving some equity on the table then the candidate will look for an off set. Most companies only consider equity that is to vest in the near-term (perhaps one or two years). Black-Scholes (see e.g. Katz & McCormick, 2005) is not a perfect model but a generally accepted way to value the shares. Attempting to keep the candidate "whole" hiring companies may prefer to offer a cash or stock sign on bonus or again it can be a mix of the two. (Note: sign on bonuses generally include a claw-back term (12 months or less) and are pro-rated.) When working with a recruiter it is important to share the range within which the hiring company must work; this is for base salary, annual bonus and equity. Avoiding surprises on both sides is a key goal. An understanding of the prospective candidate's current compensation is done immediately however a full accounting of their equity may take longer as most candidates need to research this information. Three years of history is ideal and W2s should be requested from the finalist candidate at offer. A break out of bonus structure, individual versus company performance, must also be noted as well as when the bonus is earned and when the bonus is paid. These are generally two different dates and candidates will want a hiring company to take their accrued bonus into consideration when structuring an offer. On base salary it is important to know when the candidate last had or expects a review and therefore salary adjustment.

Other aspects of compensation and benefits that the hiring company may consider when trying to "close" the finalist candidate include, accelerating an annual review so that a salary increase might occur sooner, guaranteeing some or all of the first-year's performance bonus (But first agreeing on deliverables, goals and objectives.), and for information technology professionals technical training, telecommuting, ability to attend conferences or participate on standards boards can carry some weight as well.

For example a media company had no internal candidates for a Vice President role within the information technology group and went to market through a search firm. From a technical perspective the specification was very narrow in that the company was looking for experience with an application that is limited to a small industry. As a small industry there was an equally small candidate population and across the candidate slate base salary ranged from the low $200k to the low $300k range. The company stated a base salary range at the launch of the search and while $300k was beyond that range the company brought those candidates in as well. This gave the hiring manager an opportunity to consider a mix of skills, experience and compensation before making a decision. The finalist's base salary and bonus fit within existing parameters but coming from a private company the internal equity was difficult to value. The CIO worked closely with the information technology group's head of human resources to lay out an equity structure that is easily understood with a value that can be assessed and a plan for future equity. The candidate took a holistic view of the opportunity and accepted.

Always be aware that there are two different base salary figures to keep in mind. One is the current salary and the other is "what it takes" (base salary) to get them to accept the risk of leaving their current company. The first will be within the target range and the second may not. Organizations that recognize the importance of attracting and retaining the best talent will customize an offer or compensation structure to meet the individual's needs. The balance that the hiring manager and human resources professionals need to maintain is parity within the peer group. Of course compensation is only one component. Work environment, potential for career growth and other non-financial factors will be considered by the ideal candidate.

Measuring Outcomes

Measuring outcomes is critical for the success of any human resources organization and this is not simply 'was there or wasn't there a hire.' Other important metrics to track include days to complete the search, number of candidates interviewed, number of days from identification of the candidate until first round interview, and diversity of candidate slate. If internal candidates were considered then they need to have clear feedback as to why they were not selected, the appropriate training and performance management should be put in place to keep them engaged. Financial resources are finite and should be tracked as well. Larger organizations with dedicated internal staffing resources are also maintaining a database of the candidates interviewed. The value-add in the database is when interviewer feedback is captured and stored for future reference. Here again the assessment sheet or template can be saved electronically for future reference. If the candidate was interesting enough to consider for an immediate position there is a good chance that they will be a fit for others positions in the future.

On-Boarding

Once a candidate is hired on-boarding, assimilation and transition support, is critical. New hires have to be introduced to the company and IT department culture, and be informed about their supervisor's management style. Further, pre-hire references should have highlighted areas of development for the individual and support should be provided and progress tracked. The goal is to position everyone for success. A public technology company that did this well began by creating a binder of relevant documentation and providing it to the new hire in advance of the start date. Most candidates must give notice to their current companies but can make time to participate on important conference calls and to review materials. Lastly, organizations operating without an on-boarding program may be losing the opportunity to leverage and secure competencies that the new hire brings to the company.

FUTURE RESEARCH DIRECTIONS

This chapter is a primer for human resource executives supporting information technology organizations as they develop their staffing and talent management capabilities and strategies. Additional research into continuous learning, talent development, retention, promotion and creating a leadership pipeline that provides for better succession planning is warranted. Finally, with many companies growing their internal staffing capabilities a look at the success rates between this model and leveraging external providers would be helpful as both have their pros and cons.

CONCLUSION

The demographics are clear, with the aging population there will be a worker shortage. There may have been a truce in the War for Talent during the recent economic downturn, but combatants on both sides are nearing agreement that the battle has been engaged once again. Combine this with a generally accepted notion that a skills gap remains for entry level workers and that at both middle management and the senior executive level there aren't enough "born leaders" to fill all of the needs and the evidence becomes clear, human resources plays a critical role in the information technology department's talent management value chain. Couple this with a rising demand for a more diverse IT leadership team and human resources should find no shortage of challenges.

One of the lessons learned over the last ten years is that the employees of all companies are easier to identify which of course is the first step in recruiting. It started at the top when companies built their web page and included a list of senior

management. Some companies pushed back on this but they soon found themselves fighting a losing battle as social networking sites like LinkedIn expanded rapidly creating a virtual employee directory with biographical and contact information. Couple this with an end to the "one company for life" expectation and IT Human Resources need to make sure they have a visible talent management approach that includes the complete cycle: continuous learning to engaging and retaining to promotion that creates a leadership pipeline and emphasizes succession planning. If not, human resources will find themselves spending more time on recruiting as employees resign to take what they perceive to be companies offering better career growth opportunities.

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KEY TERMS AND DEFINITIONS

Assessment: Determine the candidate's fit against the position specification requirements.

Chief Information Officer: The most senior executive responsible for information technology in the company.

Company Culture: A description of the company's style.

Position Specification: Describes the requirements for being qualified for a position and the responsibilities of that position.

Recruiting: The process by which a company attracts talent.

Talent Strategy: A comprehensive approach to managing internal talent and attracting external talent.

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Chapter 7
Strategic Human Resource Management and Organizational Performance

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ABSTRACT

The discipline of human resource management has progressed significantly over a period of time. Today it is being considered as the most critical source of competitive advantage to the firm. It has progressed to a strategic business partner. Various approaches and models of strategic human resource management have been developed within the framework of strategic human resource management. Like many theories of organization, none are complete. Rather being right or wrong each approach points to different aspect of the process needed to develop effective strategic human resource functions. The issue of fitting HR practices to business strategy has become increasingly relevant over few years. Therefore in the present study we have made efforts to highlight various issues which are relevant to the strategic HRM in the changing scenario of business environment. The present chapter has been divided into five sections. In the first part, the changes occurring in the business environment and its implications for human resource functionaries have been discussed. In the second section we have highlighted the changing role of human resource management. Historical background of strategic human resource management, its role in addressing the challenges of changing business scenario and determinants of strategic fit have also been presented in the second section. In the third section issues regarding the relationship of strategic human resource management with business performance have been discussed. In the fourth section we have made efforts to bring into notice those emerging future trends which might become key issues for high performance in the organization of new era. At last conclusions have been drawn that what needs to be done on the part of the HR functionaries and the organization itself to enhance the strategic fit between the various HR practices and the overall organizational strategic plan.

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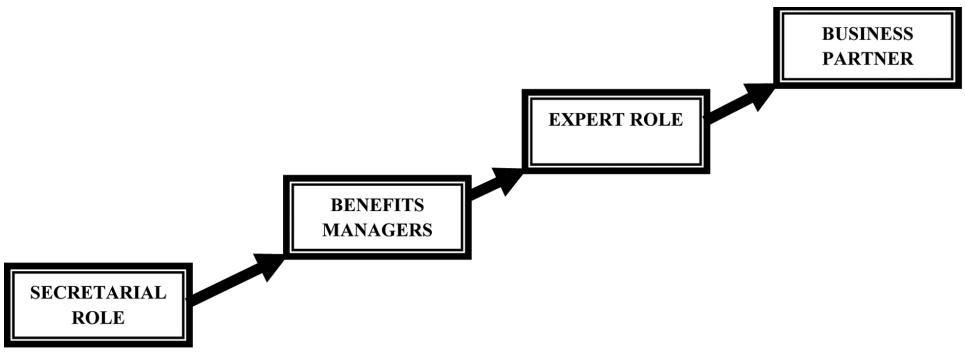
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INTRODUCTION

The industrial revolution in the nineteenth century brought about the automation in the manufacturing process putting the muscle power to the back seat and focusing mainly on production of goods. The focus later on shifted to marketing considerations putting customer satisfaction on the top. The information technology revolution of the twentieth century along with globalization has brought the drastic changes in the working environment i.e. putting people as the most important resource. The importance of human resources can be traced back to ancient Hindu texts such as Kautilya's Arthashastra, which provides the evidence of existence of systematic management of people as early as 320 B.C. (Khanka, 2003). However, the first evidence of origin of human resource management (HRM) practices has its roots in the industrial revolution of the 17th century. The technical advancements during this period created the need for better work methods, productivity and quality. Smith (1776) in his book 'An Enquiry into Nature and Causes of Wealth of Nations' talked about the economic advantages of the division of labour. He proposed that work could be made more efficient through specialisation. From the division of labour he saw three advantages: the development of skills, time saving, and the possibility of using specialised tools. The importance of people in the business performance can be traced from the work of Owen (1825). He argued that money spent on developing people was one of the best investments that management can make. Babbage (1832) examined and expanded upon the division of labour in his work and concluded that it allows a more careful matching of people's skills and physical abilities with specific tasks. Land mark revolution came in the field of people management practices when Taylor (1911) attempted to formalize the processes, methods, workers experiences and tacit skills into objective rules and formulae. The path breaking studies that revolutionized the human resource management practices were conducted from 1927 – 1932 by Mayo and his associates to study the relationship between productivity and the working environment followed by the studies carried out by Barnard (1938), and others. All these studies have identified commitment, communication, employee motivation, leadership and learning as the antecedents of organizational success. The nature, status and role of human resource management have progressively become broader and strategic since the days of industrial revolution (Figure 1).

Today human resource management is not just about hiring and firing people, administering wages and salaries, designing and implementing benefit programmes, and implementing the strategic intentions of the top management, rather it is playing an active role in formulating the business strategies. The advent of the era of globalization and liberalization accompanied by the information technology revolution has transformed the world around us. This has made possible the

Figure 1.



free flow of people, technology, and goods across the globe. Business activities are no more limited and confined to the geographical boundaries of the countries. According to Ulrich and Brockbank (2005) there has been exponential growth in international movements of goods and services. The traditional jobs have become blurred. The economies across the globe are experiencing new order. Globalization is an important factor that influences organizations that compete for customers with high expectations for performance, quality, and low cost. The most pressing competitive issues facing firms are globalisation, embracing new technologies, managing change, developing human capital, responding to the market and optimization of costs. As more and more companies go abroad or operate internationally, the impact on various business functions and in particular on human resource management have become more evident. Effective and strategic human resource management is essential as the international businesses place additional stress on human resource functionaries. Human resources are being viewed as an input, which can provide sustained competitive advantage to the organizations. Over the years, organizations' expectations from their HR champions and departments have changed considerably. The function was and still is expected to ensure that its policies, practices and procedures shape the culture of the organization in a way that is consistent with its values and vision. People management practices need to acknowledge and work within the context and reflect a broader perspective. Human resource policies and practices need to facilitate the work process across time, distance and cultures. The reality today is that most companies consciously or unconsciously experience one or more aspects of international management. Despite the fact that the core principles of human resource management also apply to global human resource management, it presents some unique challenges. Managing people in global settings requires human resource professionals to address broader range of issues such as taxation, exchange rates, compensation plans, dealing with foreign governments and religious groups. Recently terrorism added many anxieties to employees, their families and the employers which further had accentuated the need to manage human resources effectively to gain competitive advantage in the global market place. To achieve this, organizations require an understanding of the factors that can determine the effectiveness of various HR practices and approaches. This is because countries differ along a number of dimensions that influence the attractiveness of investments in each country. These differences determine the economic viability of building an operation in a foreign country and they have a particularly strong impact on HRM in that operation. There are a large number of factors such as culture, economic systems, political systems and the legal framework etc. that affect HRM in global markets. The objectives of the chapter are to highlight

1. The role of human resources as a source of competitive advantage.
2. Strategic role of human resource management in enhancing the organizational performance.
3. Strategic challenges and issues for human resource management to become a strategic business partner.

STRATEGIC HUMAN RESOURCE MANAGEMENT

Role of HR

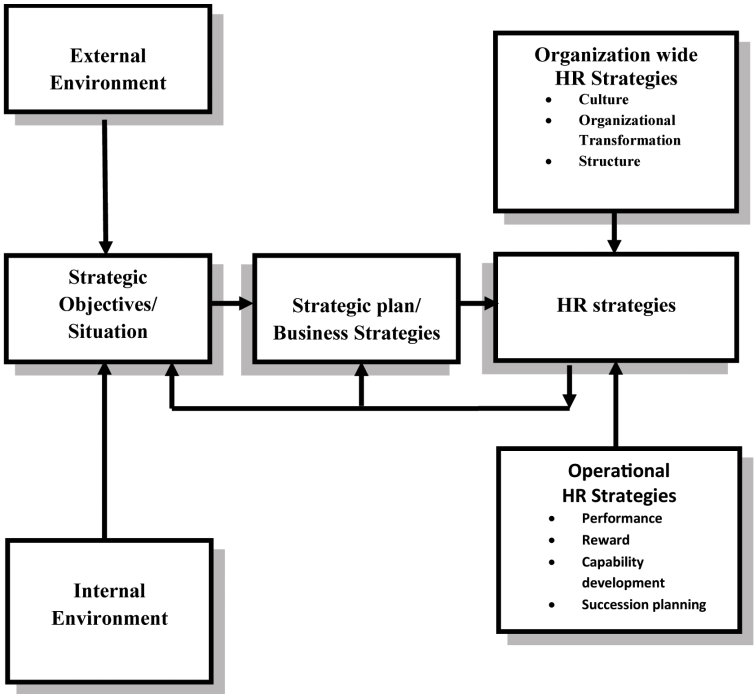
In the seventies and eighties the business function responsible for people was called "The Personnel Management." The responsibility of this function was to employ people, pay them, and fire them. Subsequently the ever increasing competition forced organizations to take the more planned and calculated approach to management as a result

there has been growing interest in the strategic management which further compelled the sub functions of the organizations to redefine their roles in this process. Since human resource management was no exception, it also had to re identify its role. Later efforts were made to integrate it into strategic management process and as a result the function progressed to strategic human resource management. In late eighties and early nineties it was realised that HR function has a much larger role: recruiting the right people, training them, helping the business design jobs and structures, develop compensation packages including benefit plans and serving as a central point of communication for employee health and happiness. In this role, the HR department now became more than a business function: it is a business partner, reaching out to support business processes. The strategic role of HR includes enhancing organizational performance, get involved in corporate planning, decision making on mergers, acquisitions and downsizing, redesigning organizations and work processes and ensuring financial accountability for HR results. In view of the soaring competition and increased expectations of the top management, HRM has certain strategic challenges. The fundamental challenge faced by HR community is to provide a set of services that are in line with the company's strategic plan. HR managers need to support the organizational productivity and performance management efforts and must be involved in designing strategic plans not just executing them.

Strategic HRM and Changing Landscapes of Business Environment

SHRM is considered a relatively new concept, despite its continuous development over the past two decades. Although there is no agreement on a precise definition of SHRM among researchers and academicians, broad consensus has been reached on its basic functions, which involves designing and implementing a set of reliable policies and practices to ensure that the human resource of a firm contributes to the achievement of its business objectives (Schuler and MacMillan, 1984; Baird and Meshoulam, 1988; Jackson and Schuler, 1995). Essentially, SHRM emphasises developing the firm's capacity to respond to the external environmental threats through a better utilization of human resources. Since strategy is the course of action of a business firm to deal with and to meet the challenges of the environment, a human capital reservoir with a wide variety of skills that are complementary to the corporate strategy, is a catalyst for fulfilling the strategic goals through promoting desired behaviour among employees. Strategic human resource Management (SHRM) is a set of human resource strategies designed and implemented to ensure that business objectives are achieved (Baird & Meshoulam, 1988; Delery & Doty, 1996; Huselid, et al., 1997; Jackson & Schuler, 1995). Strategic human resource management (SHRM) is a strategic approach to manage human resources of an organization. It is the linkage between the HRM and strategic goals and objectives to improve business performance and develop organizational culture that foster innovation and flexibility. By combining the HRM function with business strategy, SHRM reflects a more flexible arrangement and utilisation of human resources to achieve the organizational goals, and accordingly help organizations gain a competitive advantage (Wei, 2006). Hendry & Pettigrew (1986) view, SHRM as a logical approach to people management which is based on the organizational philosophy and the strategy wherein people are considered as the strategic resource for creating competitive advantage. The linkage between HR practice and business strategy has been emphasised in studies related to SHRM (Miles and Snow, 1984; Baird & Meshoulam, 1988; Wright and McMahan, 1992; Kazmi and Ahmad, 2001; Devanna et al., 1981; Torrington and Hall, 1995). Strategic view of HRM can be explained as shown in Figure 2.

Figure 2.



Theoretical Foundations of Strategic HRM

A number of theoretical models have been developed for the design and implementation of human resource practices and processes. There are general models named as universalistic, the contingency and configurational (Delery and Doty, 1996) or as best practice and best fit and configurational (Richardson and Thompson, 1999) and particular models namely high performance management, high commitment management and high involvement management. As emphasized by Armstrong and Baron (2004), the best practice approach focuses on adopting a set of universally effective HR practices whereas the best fit focuses on situational factors as there cannot be any universal prescription for HRM policies and practices. The configurational approach is concerned with adopting a set or bundle of HR practices rather than any single HR program or policy. MacDuffie (1995), Richardson and Thompson (1999) concluded that a firm with bundles of HR practices should have a higher level of fit with its corporate strategy. But the problem with this approach is how to decide which bundle of HR practices better suites the organization. High performance working model involves the development of a number of interrelated approaches, which together make an impact on the performance of the firm through its people. The organizational effectiveness is achieved by enhancing the skills and engaging the enthusiasm of the employees (Stevens, 1998). The high commitment management model emphasizes on the importance of enhancing mutual commitment. Walton (1985) and Wood (1996) define high commitment management as a style of management which aims at obtaining a commitment so that behaviour is primarily self regulated rather than controlled. The high commitment management model is concerned with creating high levels of trust within the organizations. The high involvement management model involves treating employees as partners in the enterprise whose interests are

respected and who have a say in the matters related to them. Scholars have identified a clear evidence that high involvement work practices result in superior performance. Which theoretical model is correct and practically possible, probably answer to this question is not simple. Each model points out the different aspects of the process needed for developing SHRM. Best fit is perhaps more useful in developing the HR strategies. Strategic fit refers to the utilisation of human resources to help the organization to achieve its goals. It is the pattern of planned human resource deployments and activities intended to enable the firm to achieve its goal (Wright and McMahan, 1992). Scholars suggest that there are two kinds of fit: straight or horizontal fit and upright or vertical fit. Horizontal fit is the fit among the number of HRM practices and policies. It refers to the alignment among the various HRM practices (Baird & Meshoulam, 1988). The vertical fit refers to the alignment of HRM practices with the strategic management processes of the firm (Schuler & Jackson, 1987). Vertical fit is viewed as a vital step towards attaining the organizational goals through formulating the human resource practices that are aligned with firm's objectives, while horizontal fit is essential when making good use of these resources. The concept of fit can be explained as shown in Figure 3.

The linkage between HR practices and strategy has been studied by various researchers and scholars (Wright and McMahan, 1992; Wright and Snell, 1998). Due to the lack of in depth empirical evidence, it is debated that this linkage is weaker as compared to the relationship ps among internal HR practices. However, from the perspective of the resource based view (RBV) of the firm (Barney, 1986, 1991), researchers advocate that the HR system which is aligned with the firm's strategy is helpful for creating competitive advantage. Resource based model (Barney, 1995) is based on the idea that organizations gain competitive advantage when they possess resources that are valuable, rare and difficult for competitors to imitate. The aim of the RBV is to improve the capability of resources. It can develop strategic capability i.e. achieving strategic fit between resources and opportunities and obtaining added value from the effective deployment of resources (Barney, 2001). Furthermore, the linkage of organizational resources and firm strategy cannot be easily identified and imitated by other firms due to the complexities and causal ambiguity (Barney, 1991; Boxall, 1998). Thus, the integration of human resources with the appropriate strategy can generate a sustained competitive advantage for the firm. A fundamental problem faced by a firm is: how to decide and formulate the bundle or package of human resource prac-

Figure 3.



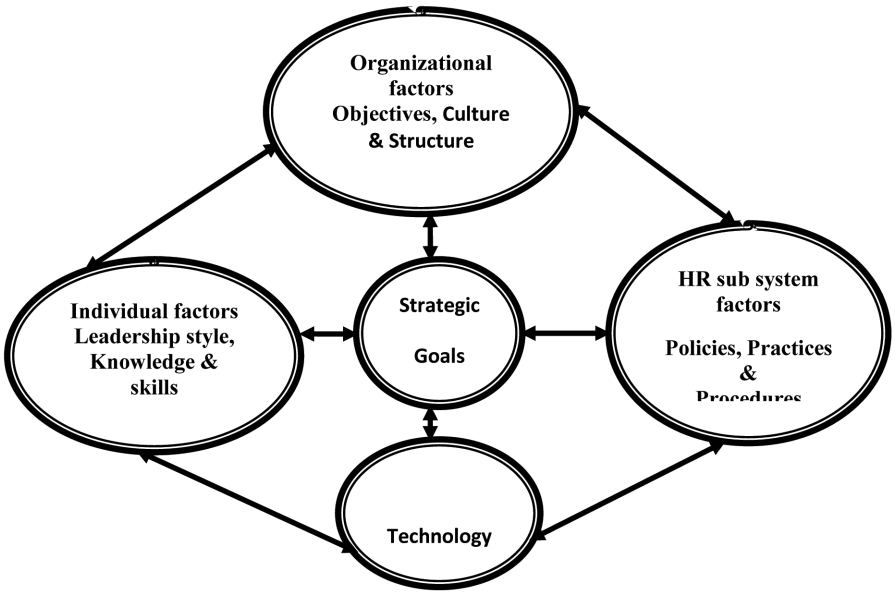
tices necessary for its strategy and overall performance. Now the question is what are the issues or factors influencing the achievement of horizontal fit and vertical fit? Since achieving both kinds of fit is necessary for the performance of the organization, an examination of the relevant determinants of fit is helpful to better understand the nature of SHRM as well as its contribution to organizational performance.

Determinants of Fit

An apparent question here is: How can organizations effectively adopt, implement and make best use of HRM practices for significant firm level outcomes? i.e. how can firms increase the probability that the HRM practices, they adopt and implement will lead to organizational performance. There are a number of factors that influence the congruence among the various human resource practices as well as the alignment between HR practices and the organizational strategic plan. The determinants of fit can further be classified as HR system related factors, individuals related factors and organizational level factors. The system related factors refer to the factors that are related to the HR subsystem – its philosophy, policy and position in the organization. The individuals related factors refer to the personal capabilities or strengths, weaknesses, leadership style, conceptual skills, business orientation etc. of the individuals who are responsible for formulating and implementing the HR strategies. The organizational level factors refer to the overall organizational focus, the organizational objectives, structure and the organizational culture. Bundle or choices of the practices available with the human resource department provide the options to the human resource functionaries to decide upon the best suitable practices. Bhattacharya and Wright (2005) suggested that human resource option could be useful in this regard. Investment (direct and indirect) in human resource development is another important factor that determines the congruence among various HRM practices (Pfeffer and Slancik, 1978). With regard to individual or personal factors, the various researches (Lado and Wilson, 1994; Lado, Boyd and Wright, 1992; Wie and Lau, 2005) suggest that personal factors such as personal capabilities, leadership style, commitment, knowledge and skills are important factors that determine the strategic fit among the various HR practices as well as the business strategic plan. To ensure that HRM plays an important role in achieving the strategic objectives of the organization, the human resource professionals need to have certain competencies. Members of the HR function should have the appropriate competencies to increase the likelihood of effective implementation of HRM practices (Huselid, et al., 1997). The concept of determinants of strategic fit can be explained as shown in Figure 4.

The figure clearly outlines the various factors or determinants of strategic fit that influence the congruence among different HR practices and their alignment with the over all organizational strategic plan. With regard to vertical fit, besides system and individual related factors, the organizational factors also play an important role. The types of strategy, organizational culture, the value system, and the organizational philosophy are important determinant of vertical fit (Schuler and Jackson, 1987). The influence of nature of strategy has been demonstrated by Martell, Gupta and Carroll (1996). Organizational culture and values shape the HRM practices (Wie and Lau, 2005). The strategic fit is also influenced by the economic conditions, structure of the industry, the supply of human resources etc. (Lengnick and Hall, 1998). Truss and Gratton (1994) refer to the external environment as the one that provides opportunities and constraints for HR managers. Sparrow & Pettigrew (1987) identify the external factors like technology, political, social and economic conditions as that influence the HR practices. They also point out that organizational philosophy, culture, structure interact with the external environment in the process of HRM.

Figure 4.



DETERMINANTS OF STRATEGIC FIT

STRATEGIC HRM AND BUSINESS PERFORMANCE

Researchers have evidenced the strong relationship between HRM practices and organizational performance (Huselid, 1995; Pfeffer, 1998). A survey conducted by Guest et al (2000b) revealed that there was a strong association between human resource management and performance of the organization. In consistent with the aforementioned objectives to investigate the key dimensions of strategic human resource management, besides the analysis of the various models of SHRM, a pilot survey was also carried out through an unstructured interview with the executives of Oil and Gas industry. After analyzing the interview findings, we have concluded that strategic human resource management is not just about procuring, developing and retaining the high potential individuals rather it is about creating a system that aligns the organizational strategic plan with the human resource strategies of the organization. In essence it entails creating a strategy centric organization. Coherent and integrated strategic human resource management system is likely to be developed only if the organization recognizes and proceeds with the strategic importance associated with management of people in the organization. Strategic human resource management addresses organization wide issues (cultural priorities, structural priorities and transformational issues) along with the core areas of human resource management. From the discussions, the following issues emerge.

1. There is considerable evidence that HR has the strategic value for the organizations.
2. There is a considerable relationship between strategic HRM practices and employee behaviour.
3. There is a considerable relationship between strategic HRM practices and organizational performance.
4. There is comparatively high degree of strategic fit between HRM practices and the organizational objectives in the high performing firms from those in the low performing firms.

5. Finally, environmental context variables like firm size, technology and union status affect the extent of implementing HRM practices.

Essential elements in developing strategic human resource management and thereby contributing to the organizational performance are:

1. **Transforming the HR functionaries** - Based upon the resource based view of the firm, Huselid, Jackson and Schuler (1997) differentiated traditional HRM activities from strategic HRM activities. In the traditional role, staff members need to be specialist in certain personnel functional activities such as attracting high quality employees, placing them in appropriate positions, training them to work in the firm's specific way, and motivating them to devote more efforts to organizational goals. Strategic fit will be enhanced if the HR staff members and other functionaries are well equipped with the organizational development concept, tools and techniques. They need to share responsibility for performance and profitability, be customer driven, focus on solutions not on activities, be strategic, initiate, and lead.
2. **Restructuring of HR department and enhancing administrative efficiency** – As with many other forms of organizational restructuring, a key issue in designing strategic human resource is to determine which activities should be centralized and which should be decentralized. Companies like Warner – Lambert, Motorola, and Coca cola have created new organization structure to realign the roles. Beer et al, (1984) and Walton (1985) describe a high level of functional flexibility, with the abandonment of potentially rigid job descriptions, a heavy reliance on team structure, structuring work and problem solving are some of the ways for high commitment. Restructuring of HR department and enhancing its administrative efficiency is very essential for effective strategy formulation, strategic fit and strategy implementation.
3. **Integrating HR into strategic planning** – In order to achieve the strategic fit (Horizontal as well as vertical fit) HR must play a role of the partner in the strategic planning or strategy formulation process. Ulrich (1998) is of the view that HR executives should impel and guide serious discussion of how the company should be organized to carry out its strategy. Tyson (1985) discusses HR should integrate their activities closely with top management and ensure that they serve a long term strategic purpose. HR people have the capability to identify business opportunities, to see the broad picture, and to see how their HR role can help to achieve the company's business objectives. The same is also evidenced by Armstrong (2001). One important aspect of integrating the HR with strategic planning is to decide about the role, position and status of the HR executives in comparison to other top executives. The strategic fit will be enhanced when the HR functionaries play a role of a partner in strategic planning process.
4. **Developing partnership with line managers** – It is impossible for HR activities to have a significant impact of HR practices and to enhance the strategic fit if those performing the HR functions do not work closely with line managers. Development of partnership between line managers and HR staff is critical. Lucent Technologies provide a very good example of partnership between HR and line management. To become a business partner the HR managers must learn the firm's business, be more responsive about the needs and direction of the business and demonstrate how critical HR is to the success of the business.
5. Measuring and benchmarking the HRM impact. – In order to make the contribution

to the organizational performance or to enhance the contribution of HR practices to the organizational performance, the HR activities or practices are to be measured in terms of return on investment. Customer reaction approach can also be a useful tool for this purpose. It is very important for HR to carry out a customer (other departments) survey to evaluate the effectiveness of its practices. An example of Kodak is very relevant to mention, it uses a variety of measures and approaches to measure the impact of its HRM practices.

FUTURE TRENDS

The organizations have entered a new era: the emergence of talent management**,** wherein the business is facing a new set of strategic issues that have stemmed out of the changed landscapes of business environment. Shift in the demographic composition of societies, increase in the expectations of people from the business, political and economical instability in certain regions, terrorism, inadequate infrastructure and substandard quality education in the developing countries are some of the critical issues faced by the organizations that have led them into the war for talent. There is a great need for systems and processes that can address the challenges.

Since 1997 when McKinsey coined the term war for talent, it has become a buzz word in the board rooms, among consultants, service and technology providers etc. A survey conducted by Society for Human Resource Management reports that, as many as 53% of the organizations have specific talent management initiatives in place. Out of these companies 76% have talent management on top priority and 85% of human resource functionaries in these companies work in close coordination with top management to implement talent management strategies. Every organization irrespective of the industry is talking about talent management and its contribution in creating high performance work system. Talent management is now being viewed as a key business process and a driver for organizational success. Over a decade since McKinsey initiated the talk on talent management, a lot has been written by the consultants, practiceners and the technology providers without much understanding and clarity about the topic. The term has been defined from different perspectives. All of which give different establishment of meaning to the same set of practices within different organizations. Therefore a need emerges for the future research in the area of talent management. Besides this, the technological advancements such as mobile computing and pervasive computing have also changed the nature of business, as a result new terms like E- Business and pervasive business have emerged. Human resource management being the integral part of business has to embrace such technological advancements if it really wishes to be considered as a strategic business partner. These advancements further open new areas of research such as human centered pervasive computing i.e to make the interactions of human beings and computing devices very natural. The time is not very far when the vision of Mark Weisers will become a reality. Many projects on pervasive computing have already begun. Oxygen at MIT, Aura at Carnegie Mellon, and Endeavour at UC Berkley are some of the examples of recent research work in the area of pervasive computing. Pervasive computing soon may help the organizations to make their human resource practices more efficient so that they have the right talent at the right place at the right time so that everyone performs at their highest standard. There is a great possibility that pervasive computing may help the human resource function to become a pervasive function. Research on the application of pervasive computing in human resource management will help to develop new models of strategic human resource management.

CONCLUSION

On the basis of overwhelming evidences we may conclude that progressive human resource practices improve business performance. Organizations gain competitive advantage when they adopt a strategic and rational approach to people management. The new economic order has provided an opportunity as well a challenge to human resource management and its functionaries to play an important role in achieving the strategic objectives of the organization. They are not required to implement the organizational strategies only but to play an active role in designing and formulating the strategies. For this they need to have a multidisciplinary approach and an understanding of the business goals. HR functionaries have got to play significant role in addressing challenges of fast changing business scenario as well as enhancing the strategic fit between the HR practices and organizational strategic plan. Taking the strategic approach to human resource management involves making the function of managing the human assets the most important priority in the organizations and integrating all human resource policies and procedures with the company strategy.

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KEY TERMS AND DEFINITIONS

Competitive Advantage: An edge that a firm enjoys or has over another firm. It is an inimitable or incomparable ability of the organization that creates the value and distinguishes it from the competitors.

Human Resource Management (HRM): HRM refers to the people management practices that the organizations adopt to ensure that people perform at the optimum level. Human resource management encompasses all the activities that are undertaken right from recruitment to separation of the people. It is concerned with the initiating a system (Policies, plans and practices) to ensure effective and efficient utilization of the human

capital to accomplish the strategic intentions of the organization.

Human Resource: Refers to all men and women working in the organization. It includes the qualitative (knowledge, skills and abilities) and quantitative (numbers) aspects of people.

Strategic Fit: Refers to the appropriateness of various organizational strategies to achieve the strategic intentions of the organization. In case of strategic human resource management, it refers to the suitability of human resource management policies, practices and strategies to achieve the overall organizational objectives. Generally there are two types of strategic fit; vertical and horizontal. Vertical fit refers to the alignment of HRM practices with the strategic objectives of the organization whereas horizontal fit is the congruence among various HRM strategies.

Strategic Human Resource Management (SHRM): Designing and implementing a set of internally consistent policies and practices that ensure the human capital of a firm contributes to the achievement of its business objectives. Essentially, SHRM emphasises developing the firm's capacity to respond to the external environment through a better deployment of human resources. SHRM seeks to link the human resource management practices with strategic goals to improve business performance.

Strategy: A plan of action that the organization assumes based on its strategic position and intentions.

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Chapter 8
Knowledge Worker Profile:
A Framework to Clarify Expectations

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ABSTRACT

One of the major reasons for economic crisis of 2008-2009 is determined as value delivery. Major resource of value creation is the knowledge worker who works at different levels of an organisation. This study analyses knowledge worker studies in diverse disciplines, in order to determine the requests. The goal of the study is to propose a framework to clarify the skill requirements by integrating the requests at operational, team, organisational and inter-organisational levels with drivers provided by educating, attracting, motivating and retaining strategies. The framework facilitates employing the right employee for the right post while balancing the requests and the performance measures. This new vision will be beneficial for managers, human resource experts, and educators.

INTRODUCTION

Global economic crisis in 2008-2009 hit the service companies as well as the manufacturing enterprises. One of the major reasons of failure is seen as the lack of full-value delivery from the existing resources expressed in finance and intellectual capital (Hsiao & Lee, 2008). Politicians, CEOs and Managers are warned to have new mechanisms to institutionalise organisational systems and are invited to be rational on the critical resources rather than following the footprints of brand owners (Arvidsson, 2009). Economists suggest solutions by focusing on system innovations instead of technology and product innovations (Mavrotas et al., 2007). The attention is drawn to knowledge workers who are accepted as the major resource of innovation and competitiveness (Chen, 2008). Contrary to cost-focused approach to employ less skilled but increasingly global and virtual knowledge workers (Tucker et al., 2005), the skill revolution is observed while moving into a more demanding cognitive age (Brooks, 2008). New economic models are in process for

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proposing sustainable frameworks, guardianship of intellectual property, impact of intellectual quality, more knowledge production based on more reliable performance of knowledge workers.

Wider range of skills is to be recognised and supported for knowledge workers in new business models. The challenge of developing sustainable models in value chains request more than just higher education and more company-based training. The impact of intellectual quality is to be enhanced (Cope & Kazantsis, 2009); person-to-person skills or soft skills are to be developed (Warhurst, 2008). Individual knowledge facilitators are to be motivated and retained in order to achieve effective collaboration (Garcia, 2007). As an impact of all these improvements, not only individuals will be more innovative but the entire system within a company, within a city, a region or nation as Helbrecht (2004) has stated. Besides, knowledge workers are the main organizational asset that cannot be imitated and therefore create a sustainable competence (Livanage et al., 2008).

This study aims to propose a conceptual framework to define realistic expectations from a knowledge worker within the new business models. The proposed model will integrate the achievements of the previous research in diverse fields and complete a vision of a whole. The study is based on analysis of expectations in operational, team, organisational and inter-organisational work levels driven by education, attraction, motivation and retention. Requests and contributions are combined to determine the competence created in terms of personal, relational, technical and professional skills.

This chapter is so organised that next section will define the knowledge worker and summarise expectations and drivers in different dimensions. The third chapter will present the proposed framework. Final section will be the conclusion and suggestions for further studies. This new vision will open a new dimension for managers, human resource experts and educators.

BACKGROUND

Studies on knowledge worker take place mainly in information technology and management fields. In order to define a new profile for the knowledge worker, analysis in education, epistemology, psychology, economics and political science fields are reviewed as well. Previous research will be analysed grouped in common focus.

Definition of Knowledge Worker

The term Knowledge Worker was first used by Peter Drucker in his 1959 book, *Landmarks of Tomorrow* to identify the workers in the information technology fields. Today, anyone who works for a living at the tasks of developing or using knowledge is named to be a knowledge worker. Davenport has summarised the background and the operations of the post: "Knowledge workers have high degrees of expertise, education or experience, and the primary purpose of their jobs involves the creation, distribution or application of knowledge. One third to two thirds of any company workforce are included in this definition" (McKellar, 2005). This definition includes tasks of planning, acquiring, searching, analyzing, organizing, storing, programming, distributing and marketing goods and services in addition to transformation and commerce of data, information and knowledge. Hence, the term includes lawyers, teachers, scientists of all kinds in addition to programmers, system analysts, technical writers, academic professionals, researchers.

A knowledge worker is a participant of the knowledge economy where intangible products are as important as the tangible objects with raw material and physical goods. To create, produce and disseminate intangibles, knowledge workers are expected to have high level skills and high technology literacy. Greene (2006) adds characteristics like high cognitive power and abstract reasoning as well as new perspectives and insights. Gurteen (2006) mentions the responsibility feature in the

following words: *"*Knowledge workers are those people who have taken responsibility for their work lives. They continually strive to understand the world about them and modify their work practices and behaviours to better meet their personal and organisational objectives. They are self-motivated. Knowledge workers cannot be coerced, bribed, manipulated or rewarded and no amount of money or fancy technology will incentivise them to do a better job. Knowledge workers see the benefits of working differently for themselves. They are not wage slaves; they take responsibility for their work and drive improvement."

These unique features cause the knowledge workers to be the ones to find and solve difficult problems. They use the books, web and their network effectively to design solutions. They use the knowledge support to take decisions. Furthermore they are to be productive, efficient and effective to prove to be assets but not costs for the business and society. A metaphor that comes from mythology like Ulysses or Icarus, knowledge worker is somebody burnt in the process "somebody losing his old identities in this process of constant transformation and of expanding further and exploring further as an ultimate goal (Nicolopoulou & Karatas-Ozkan, 2007).

Education of a Knowledge Worker

One critical feature in Knowledge Worker definition is the high education. Drucker (1989) highlighted this characteristic by emphasizing "the level of qualification acquired during formal and informal learning". This comment changed the programs of high education and encouraged current education experts to suggest a liberal education with the professional qualifications required in a global economy (Rowley, 2000; Johnson, 2006; Stromquist et al., 2007). Quality is to be developed based on goals and content of education.

First goal was the productivity. This is why industrial engineers of Taylor are pointed as the first knowledge workers (Drucker, 2001). Educating knowledge workers was mainly technology focused. As Rowley (2000) identified the high education was requested to include how:

- to create knowledge repositories
- to enhance knowledge access
- to manage knowledge as an asset
- to measure knowledge within intellectual capital

As the e-business and supply chains gained importance, more education is requested on virtual organisations in addition to the team work (Larsen & McInerney, 2002).

The increase of globalisation caused knowledge worker to have an important role in the organisational efficiency. The universities are expected to be both local and global. Implications have been drawn for building up a networked human and technology environment to support formulation of learning communities. The aim is fostering local knowledge and human development pursuing social and organisational values (Cheng, 2004). Research and creativity have become important issues in business schools; while the learning is facilitated as individual learning, and organisational learning improves. The race among the nations has started to educate the talented workforce (Cornuel, 2007).

Improvements in education style changed universities to become learning systems for skill development instead of being profession builders. In order to respond to the goal of global effectiveness, customer oriented approaches in the courses are increased (Nayeri, et al., 2007). Furthermore, new programs are developed consisting of lifelong learning schemes, personalisation in education to take into account demands of tutoring and mentoring on an individual basis (Garcia, 2007).

Organisations expected better educated people to give the flexibility needed to switch production, better accommodate innovation, retraining and relocation (Roffe, 2007). In order to respond

to these expectations, knowledge workers are to be educated or trained in all the knowledge processes including knowledge acquisition methods (Psarras, 2006), knowledge development context and tools (Magnier-Watanabe & Senoo, 2008) as well as knowledge dissemination algorithms (Norhani, 2008).

APPROACHES TO A KNOWLEDGE WORKER AT WORK

Knowledge-based economy caused the war for talent; companies are battling for those knowledge workers that will take roles in productivity, efficiency and effectiveness of the company. Achievements can only be realised by attracting, motivating and retaining of the high skilled workers with learning ability.

Attracting the Knowledge Worker

Knowledge management blogs and magazines mention the difficulty of employing the knowledge worker. Recruitment of the knowledge worker is less dependent on the professional knowledge and instead depends on a range of factors that build up the reputation and social capital of the applicants (Moore & Taylor, 2009). It is widely known that they cannot be attracted by high salaries or rich benefits alone.

The human resources departments have difficulties to detail the competence searched for. They have to identify product, process and relational skills that will add value to the organisation. Technology related, operations related and market related knowledge is in demand as well as leadership, problem solving, communication and learning capabilities (Ahn & Chang, 2004). Employing the right talents have become an important management skill. Horwitz (et al., 2003) identified the best employers to have three important attributes:

- matching the talent with the business goals;
- finding the ability to grow and adapt in a rapidly changing environment;
- giving the flexibility to balance workplace demands and the needs of business.

Commitment to empowerment, relaxed hierarchy, flexible timing, and decentralised decision making are the recommended features of attractive managers (Magnier-Watanabe & Senoo, 2008). Encouragement for knowledge management and collaboration are the preferences of the most recent winners.

Motivating the Knowledge Worker

Even if the best workers are attracted, it is hard to retain them unless they are motivated. The comfort of the work place, the challenges of the tasks, relations with the peers and rewards form the basis of motivation. High-skilled workers love to share visions and realise thinking together. Developing mental models and learning systems throughout the organisation will help motivation. Specifically, knowledge-enhancing activities must be openly valued and acknowledged, while failure to participate in knowledge sharing must be discouraged (Lee-Kelley, 2007). Individual workers must have the freedom to interact with both internal and external peers. Since knowledge is the only asset that grows when shared (Kayakutlu, 1998), interactions should be rewarded. Sharing organisational mission and business issues to generate revenue will make the result-oriented knowledge sharing more satisfactory (Henard & McFadyen, 2008).

Motivation can also be increased by the behaviour of managers. Several suggestions for managers are summarised as below (Lee-Kelley, 2007; Rusette et al., 2007; Erickson, 2008; Stephen et al., 2008; Davenport & Iye, 2009):

- Managers would allow face-to-face interaction, while being flexible in workplace;

- Dedication to work should not be asked for without being a model;
- Free flow of opinion among the knowledge workers is to be allowed with trust;
- Knowledge workers should be involved in decision processes;
- Quality of the knowledge work should be measured and shared;
- Better insight is to be given to the excitement of creativity;
- Appreciation for self employed attitude must be shown.

Rotation on various responsibilities takes place in the must do list for motivating the knowledge workers.

Retaining the Knowledge Worker

High turnover of knowledge workers is both risky and costly. Job satisfaction is the key to keeping critical employees. It was based on the conditions of work-place, task definitions and communications with the managers and the peers. Classical approaches of giving services like health-related programs or being generous with benefits are not good enough in cases where employees are highly knowledgeable and skilled. Challenging work assignments are accepted more satisfactory than competitive pay packages (Hewitt et al., 2003). Treating any knowledge worker as an individual and making him/her feel unique is only possible with the opportunities given to enhance the skills (Fawcett et al., 2004). The importance of developing critical success factors and using relevant performance factors have always been the lead for retaining the knowledge workers (Terziovski & Morgan, 2006).

These are the employees who know they are distinctive and have an important economic value. They are aware of residing in the core competence of the organisation (Horwitz, 2006). Besides, retaining the knowledge workers means retaining the innovation lead competitiveness. The new organisational culture is to be adaptive to change (Roffe, 2007) by developing the teamwork spirit and collaboration (Lee-Kelly, 2007) to develop existing knowledge. Even in a tough economy as today, organisations are deemed to keep continuous improvement (Hamidizadeh & Farsizani, 2008).

EXPECTATIONS AT DIFFERENT BUSINESS LEVELS

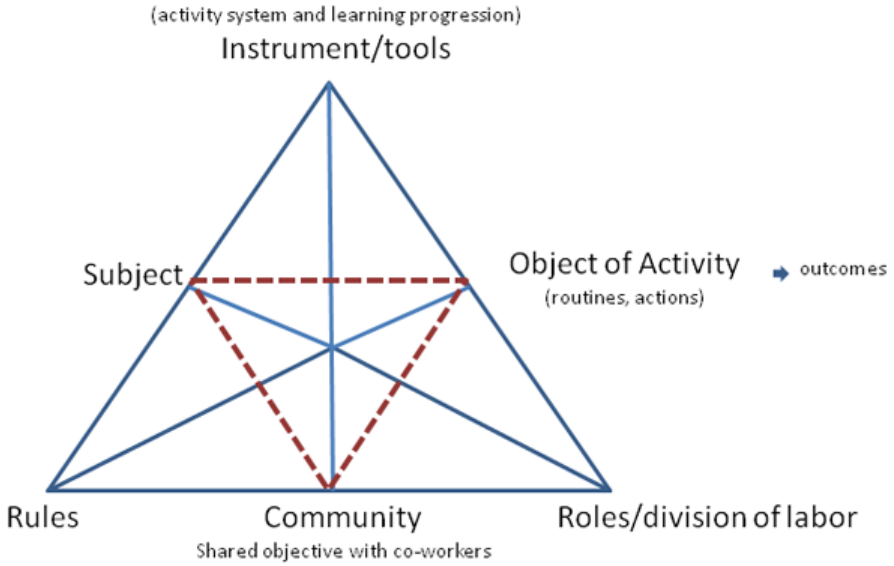
Progression of knowledge worker at work continues at different levels of the organisation. Engestrom's model for the structure of human activity is redesigned for knowledge workers by Gvaramadze (2008). The structure in Figure 1 gave us the lead to define expectations from a knowledge worker at different work levels. Investigation will be held at four work levels defined as operational, team, organisational and inter-organisational levels.

Expectations at Operational Level

Knowledge operations are defined repetitively to be generalised as knowledge acquisition, development and dissemination. Knowledge workers including engineers and medical doctors will start the work life at the operational level where they are expected to accomplish efficient knowledge processes in addition to professional performance. Knowledge-intensive and task-based environments such as research laboratories, consulting firms and high education workers are expected to fully reuse the knowledge assets in process of achieving the goals of business tasks (Liu et al., 2005).

Knowledge acquisition is gaining new knowledge from either inside or outside the organisation.It includes addition of new knowledge to the existing one by making the accumulated knowledge accessible. Explicit knowledge is easier to transmit and efficiently use and therefore it is easy

Figure 1. Structure of interactions for the knowledge worker (Gvaramadze, 2008)



to duplicate and may not always create competitive advantage. In any organisation, the challenge is to accept that not all knowledge is in a form to be readily shared, diffused, or implemented (Magnier-Watanabe & Senoo, 2008).

Knowledge development is the effective use of the knowledge accumulated in order to increase the organisational competence. This is a process that depends on workers' readiness to use and share individual knowledge. Creating knowledge repositories through collaboration of different teams will allow improvements in using the existing knowledge (Delen & Al-Hawamdeh, 2009).

Knowledge dissemination includes knowledge sharing, knowledge diffusion and knowledge marketing. It is the process that changes a lot when the workers change (Huang et al., 2007). Effective knowledge sharing is not only dependent on the skill of knowledge workers; but it requires cultural change, new management practices and investment in network technologies. Knowledge workers however are expected to be well equipped with the appropriate cultural values to facilitate the exploitation of knowledge in line with the business objectives (Norhani, 2008).

Indifferent of the field of work the expectations of knowledge worker in operation are to include the following (Psarras, 2006):

- Transform data or information into knowledge;
- Identify and verify knowledge;
- Capture and secure knowledge;
- Organise knowledge;
- Retrieve and apply knowledge;
- Combine knowledge;
- Create knowledge;
- Learn knowledge;
- Distribute/sell knowledge.

In all the business sectors profit-oriented enterprises show a tendency for limited time employment and decrease the salaries for the knowledge workers which could emerge the "just-in-time knowledge worker" (Stromquist et al., 2007). Yet, observations show a strong positive relationship between the operational and organisational performance (Fugate et al., 2009).

Expectations at Team Level

Knowledge work is typically project based defined by memos, contracts or agreements for different activities. An engineer works in a team to develop a new product; a chirurgical doctor works with a team in each surgery; an information technology expert works in software, hardware or network projects. Knowledge workers are to be leaders as well as team workers simultaneously. That is why they have to be evaluated process specific, team based and firm specific (Swart, 2006). They have to remain self-employed as well as assisting or leading other employees (Fenwick, 2007). They are expected to perform research, analysis, learning, informing, advising and guiding in team processes (Laycock, 2005).

All the team actions, transitions and interactions define and force team effectiveness. Knowledge teams are to create high performance as well as member satisfaction in accordance with the integration power and energy in the team. Members in the team are brought together primarily for their operational expertise, relational skills and contact networks (Le Pine et al., 2008).

Building knowledge teams starts with understanding the team's objectives to complete the requested services for a specific project. Developing a model and structure for the team will enable defining the skills required for the members and the leader. The last step for building a successful team will be to set the right measures to ensure that team members are in the proper job level based on skill and performance (Schell, 2008). One of the unique features of the knowledge teams would be the collaborative thinking process that will need the mindset for each project (Armstrong et al., 2008). Shared visions would allow team practices like brainstorming, improvisation and co-creation by using project management tools and methodologies (Ditkoff & Moore, 2005).

Knowledge teams are expected to be structured with definite purposes within the organisation's business mission (Henard & McFadyen, 2008). To make teams perform well, the following are to be realised (Cabrera & Cabrera, 2005):

- Cross functional interactions- possible by self-driven workers with good communication skills;
- Communication skills- enabled by training programmes geared to articulate and communicate knowledge;
- Communities of practice- caused by formalised orientation and socialisation programmes and events;
- Performance appraisals that recognise knowledge sharing;
- Incentive programmes that reward effective knowledge sharing;
- Group and firm based compensation systems;
- User friendly communication and group sharing technology;
- Open and trusting culture with strong norms of knowledge sharing.

The performance of knowledge teams are measured in the team and among the teams of different projects (Gloor et al., 2007).

Expectations at Organizational Level

Majority of the research is focused on the organisational impact of the knowledge worker. As Liebowitz (2004) stated, an organisation's accumulated value is found in the intellect, knowledge, and experience of its workforce. Firm specific power is the essential basis for sustainable competitive advantage. Required organisational synergy is created only if financial and knowledge investments are combined (Osterloh & Frey, 2006).

The innovation process that is unavoidable for today's industries, need knowledge collaboration of the work force in initiation, development and implementation phases (Gordon and Traftar, 2007). Making knowledge workers collaborators in the work environment will benefit entire

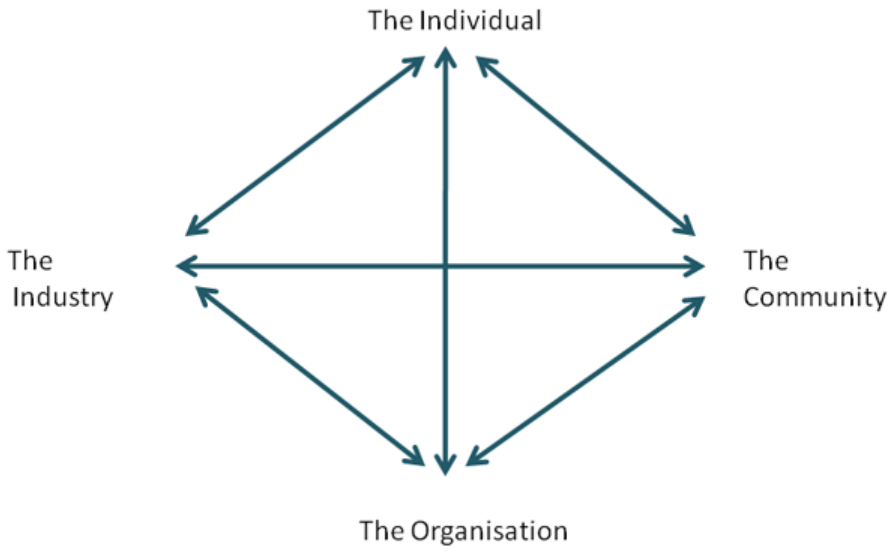
organisation (Praner, 2008). Yet, the goal satisfaction by creation of the synergy depends on size, technology, environment, culture and the strategies of the specific organisation (Jafari et al., 2008). In order to measure company performance specific to intellectual capital, employee based factors are to be clarified (Tan et al., 2008). Green (2008) has enlightened the organisational studies by giving a broad list of employee based factors influential on performance. Green's work specifies both features of employees (competencies, education, experience, relationship, productivity, profitability) and organisational drivers for the workers (assignment, retaining position, motivation, training, and turnover) among the intellectual factors. A range of technology applications are used for investigations, collaborations and communications to develop the organisational learning. It is integrated with the knowledge processes, but to be articulated in terms of the business needs and to be designed as embedded with business performance (Roffe, 2007). Organisational effectiveness is provided by the capability development and capacity planning in addition to alignment of knowledge resources with the business strategies (Spratt, 2007). Cultural and personnel controls are to be implemented to increase the firm performance (Teo et al., 2008).

Expectations at Inter-Organizational Level

Strategic alliances in the global supply chains are focused on knowledge based collaborations. Business models are designed to emphasize personal interactions that bind companies in the same industry and other industries together. Ramachandran (2003) analysed the impacts in three levels. Primary impact is defined as the information and technology diffusion to form an information society; secondary impact is the capability and capacity building and improving the knowledge usage to feed into a knowledge society and the tertiary impact is the knowledge based culture development in order to develop a value creating society. Similar interactions are simplified in the model of Arthur et al. (2008) by using knowledge mapping.

No matter what the industry is, the value chain is to create and sustain a culture that fosters innovation, creativity and learning as in any single

Figure 2. Interactions binding collaborations (Arthur et al., 2008)



company today. This new mindset is enabled by pro-active strategies and handling human resources in the chain as an investment (Thite, 2004). Suppliers and buyers are working together to create and transfer knowledge more effectively. Comprehensive and flexible strategies are to be developed to create learning and sharing culture in the value chain (Jafari et al., 2008; Yeh, 2008). Virtual teams of knowledge workers play an important role in trust building. This important role requires the abilities of critical thinking, ethical problem solving, stakeholder analysis, and comprehensive expression (Larsen & McInerney, 2002). Moreover externalisation of the collaborative knowledge worker has to contribute for the society as well as the value chain (Ehin, 2008).

Although multinational companies play the key role to accumulate an immense volume of knowledge, there is more need to expand specialised knowledge customised to the region or industry. That is why independent knowledge workers will have a growing importance for the performance of the value chains even in agricultural industries (Nicolopoulou & Karatas-Ozkan, 2007). Unlike the collaborators in the value chain, independent knowledge workers should accept themselves as connectors. Their activity is generating and linking but not transmitting the knowledge, through which organisations grow (Fenwick, 2007).

KNOWLEDGE WORKER SKILLS

If the innovation cycle is to be managed effectively value of knowledge workers will continue to grow. New challenge for managers and leaders is to take greater risks for the management of new skill set (Terziovski & Morgan, 2006). Wolff (2003) had classified skills for knowledge workers in three groups: substantive like synthesising, coordinating, analysing, verbal and numeric intelligence developed by education and training; interactive, like mentoring, negotiating, instructing, supervising and serving based on organisational culture; motor like coordination, machine operating, materials handling or technology utilisation. Johnson (2005) classified almost the same skills as basic, discipline/profession specific and technology skills. In parallel to the growth of network business and value chains, relational skills have become as important as the rest.

"Business knowledge is practical knowledge, or useful knowledge for management, production, service and innovation in industries, rather than broader social and scientific knowledge" (Gao et al., 2008). This definition gives a general idea about what is the basic professional requirement for any knowledge worker. Professional education is expected to give basic capabilities that will be enhanced by practice in industry. If the critical business issues are defined and knowledge is treated as process rather than product, know-how of activating these processes will be the responsibility for the knowledge worker (Massey et al., 2005). Professional effectiveness will be based on familiarity of the current tasks and amount of progress at the given task (Liu &Wu, 2008).

As knowledge continues to be mobilized, the cost benefit analysis of social ties is given a growing importance. A knowledge worker takes responsibility of tasks which consists of relation with all the stake holders. Hence they have influence and impact on other employees and peers, on customers, on competitors and on partners (Green, 2007). It is business critical to balance the economic values created and to strengthen the social network (Fliaster & Spiess, 2008).

Knowledge is viewed as a multifaceted resource. Management experts note that the ability to create new knowledge is dependent on an individual's ability to recognize and obtain valuable new knowledge and subsequently integrate that knowledge with existing knowledge (Henard & McFadyen, 2008). As an individual who performs in teams, a knowledge worker is expected to accumulate the acquired knowledge, use the creative knowledge, and develop unique knowledge for competitiveness. All thinking styles are to be

used to embrace logical and technical skills as well as conceptual, imaginative planning and organisational abilities (Amadi-Echendu, 2007). Unlike the human resource and knowledge experts Johnson (2006) has summarised individual skills of a knowledge worker by abilities to design, to create stories, to show empathy, to play well, to create symphony and learning in order to develop meaning.

Most recently Cobo (2008) defined a knowledge worker in nineteen features:

1. Not restricted to a specific age.
2. Highly engaged, creative, innovative, collaborative and motivated.
3. Uses information and develops knowledge in changing workplaces (not tied to an office).
4. Inventive, intuitive, and able to know things and produce ideas.
5. Capable of creating socially constructed meaning and contextually reinvent meanings.
6. Rejects the role of being an information custodian and the associated rigid ways of organizing information.
7. Network maker, always connecting people, ideas, organizations, etc.
8. Possesses an ability to use many tools to solve many different problems.
9. High digital literacy.
10. Competence to solve unknown problems in different contexts.
11. Learning by sharing, without geographical limitation.
12. Highly adaptable to different contexts/ environments.
13. Aware of the importance to provide open access to information.
14. Interest in context and the adaptability of information to new situations.
15. Capable of unlearning quickly, and always bringing in new ideas.
16. Competence to create open and flat knowledge networks.
17. Learns continuously (formally and informally) and updates knowledge.
18. Constantly experiments new technologies (especially the collaborative ones).
19. Not afraid of failure.

A knowledge worker is a professional who ensures that the gaps between the different levels of an organization are removed, if task is done at his or her most efficient capacity (Scott, 2005).

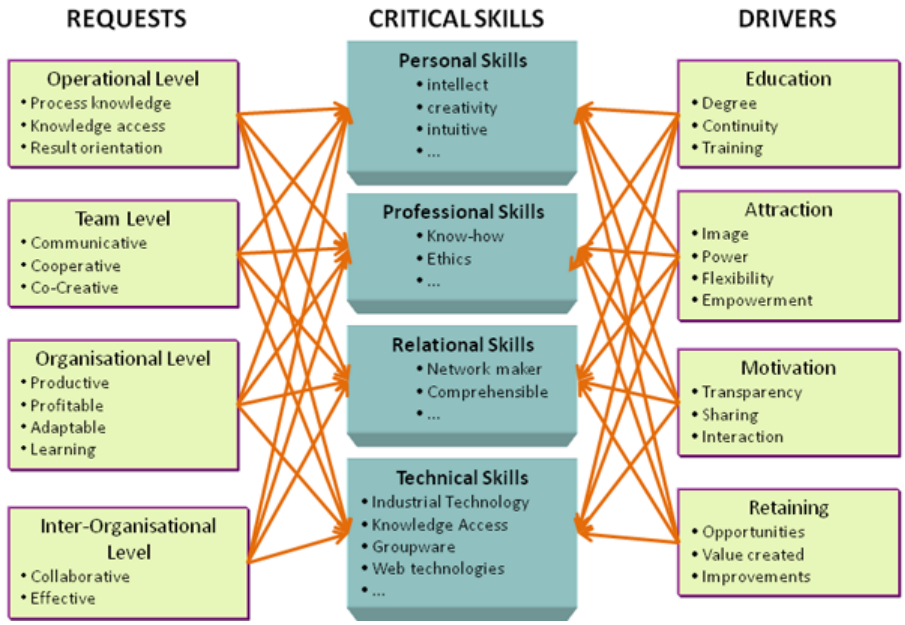
FRAMEWORK FOR EVALUATING THE SKILLS OF A KNOWLEDGE WORKER

Knowledge worker is always defined to be highly skilled. However the difficulty to define these skills increases as the requests grow. As stated in the literature survey in section 2, the expectations are diverse and immense, as if the managers are looking for a magician. To avoid the expectations to reach a point that a knowledge manager will create a rabbit in an empty hat, the uprising in performance measures should be applied in skill detection. In large companies managerial performance is linked to the business success rather than individual performance as in Toyota (Bryan & McKinsey, 2006). This measure without any doubt includes employing the right person for the right job to ensure the organisational competence.

We designed a new framework for defining the profile of a knowledge worker, to reduce mistakes in engagement, team building, collaboration and success of knowledge workers. The skills requested are to be defined integrating what is needed from the knowledge workers and what can be given to the knowledge workers. As it is shown in Figure 3, the framework combines drivers and requests to determine skills. Literature review helped in specifying all three dimensions in a clear way.

***Requests*:** As detailed in section 2, despite the interactions of different work levels, the knowl-

Figure 3. Framework to determine Knowledge Worker skills



edge worker needs to know his tasks in detail. Operational, team, organisational and inter-organisational definition of skills will enable both the worker and the manager to recognise the criticality of the tasks. At the operational level, result orientation, knowledge about the processes and ability to access knowledge are requested. In team level, all team features are in demand; worker has to be good in communication skills, knows to co-operate and to add value by co-creation in a team. In the organisational level productivity and profitability are to exist besides the ability to adopt the new culture and changes as well. Learning from organisational operations and achievement is a plus. Knowledge workers are expected to build the trust and collaboration. Therefore they are expected to be ethical and collaborative.

***Drivers*:** Education, attraction, motivation and retaining are considered as the drivers for the knowledge worker, since they will add more to the features brought to the company. Hence, the organisation has to see what they can provide for the high skilled employee to balance the requests. Degree of high level education and lifelong continuity should be considered as a benefit by the organisation as well as on-the-job-training. The worker wants to be impressed by market image, financial power and adoption to change. Structural flexibility with flexible timing and work place allows empowerment and decentralised decision, which are attractive for the knowledge worker. Transparency of the mission and goals will motivate the talented employees as much as encouraging knowledge sharing and managerial interaction. They prefer to work in companies where they have more opportunities to improve and informed about the value they create. Continuous improvements in the company will support sustainability of the work force.

***Critical Skills*:** Competence of a knowledge worker is grouped in personal, professional, relational and technical skills. The personal skills consist of individual abilities that will support his business performance. Professional skills include basic knowledge that is gained in education, industry and operational accumulations obtained through experience. Relational skills comprise of

networking, communication, knowledge sharing and collaborative creation. Technical skills will not be limited to utilisation of specific professional technologies (both software and hardware) but the literacy in using groupware and web technologies is required. Continuous follow-up of the technological changes both in information technologies and professional technologies are expected from a knowledge worker.

A good example is determining the requests for a planning engineer. The education is defined to be industrial engineering, information engineering or operational management that brings only basic professional skills. If a planning employee is needed, he is expected to know all the definitions, concepts and methodologies used in planning as well as project planning and scheduling software utilisation. Tasks will be part of a product or service project; hence will interact with other planners. Planning teams are continuously in contact with the production, purchasing, sales and quality teams either internal or external to the organisation. Plans are to be correlated with supplier and customer plans. The requests can already be defined in skills with so much information. However, the organisation has to guarantee that overwhelming candidates do not show up, since they will have a short work life. Therefore, the organisation has to go over what the company specific attractions are, how much motivation can be provided and what retaining strategies should be applied. Only then the organisation is ready to announce for a new post of planning engineer.

Application of this framework will provide benefits in any industry. It is also not specific to technology people and will bring the following benefits for an organisation:

1. Clarify the request hence deal with fewer candidates in recruitment;
2. Ability to determine the salary and the benefits based on critical skills;
3. Balance the critical skills and the performance measures;
4. Reduce turnover by starting retaining strategies in recruitment;
5. Facilitate managerial success.

CONCLUSION

High-performing enterprises are now building their competitive strategies around data-driven insights that in turn generate impressive business results. Their secret weapon is defined to be analytics (Davenport & Harris, 2007). That is why knowledge workers are given an increasing value for the improving role in innovation. New organisations even redesign processes as knowledge workers would carry out, rather than measuring their performance (Bryan & McKinsey, 2006). Leadership, talent and culture are accepted as the basis for knowledge worker skills. In a world where knowledge is a quality introduced, created and developed by the employees, the right person in the right position has more importance. In a tough economy of reducing work durations, income depends on the worker's position relative to the peers in the same knowledge level (Saint-Paul, 2007).

This study proposes a new framework to depict the exact skills requested by any company independent of the company. It was newly stated that the knowledge worker is highly skilled, who is able to convert knowledge into tangible innovative products and services. The firm in search for the talent has to find the right skills and know to keep them in the company for a long enough time to benefit. Intellect, wisdom and ideas of knowledge workers can be converted to economic and competitive values. That is why the integration of the requests are to be combined with the drivers in determination of the skills. Knowledge worker is not only the one who thinks how to work. Knowledge worker can communicate, cooperate and collaborate for the creation of innovative value adding products and services (Daugėlienė, 2007).

Future works will include the application of the framework in different industries. Validation will include utilisation of variety of methodologies like Bayes network, Analytical Network Processing and fuzzy clustering. This new state of thinking integrating both expectations and the drivers to determine the skills will be beneficial for managers, human resource experts and educators.

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Chapter 9
Knowledge Strategy:
Its Mitigating Effects on the Organization

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ABSTRACT

Knowledge strategy is defined as the set of guidelines and philosophies that guide an organization's knowledge-based activities, such as knowledge gathering, development, storage, and utilization. Much of the early literature describing knowledge strategy suggests that its role in the organization is to drive, and be driven by, organizational structure and the human resources and technology strategies. This paper derives a model that places the firm's knowledge strategy as a mitigating factor between the decisions made by management and the manner in which they are communicated to the rest of the organization. The present research is an update to a previously published paper and extends the research that first generated the metaphor of the KS as a lens.

INTRODUCTION

The importance of knowledge to the success of firms in many industries has become well-rooted in the literature. It is necessary now to address the manner in which the strategic management of knowledge manifests itself within the day-to-day operations of the firm. This understanding is crucial to the useful application of knowledge and the success of systems utilized to manage it. This foundation ensures that the knowledge obtained, developed, stored, or applied by the firm is derived from, and supports, the business strategy currently in place.

A Knowledge Strategy (KS) is the linkage between the business strategy and the knowledge activities of the organization. It is defined as the set of guidelines and rules that help to define and steer the organization's knowledge-based activities and processes (Kasten, 2006). It can be difficult to define and quantify how the KS influences the manner in which the firm utilizes knowledge in its daily operations. Knowledge strategies, like other strategic plans, can take many forms

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(explicit vs. implicit, prescriptive vs. emergent, etc.), making its expression and dissemination to the firm challenging.

This remaining paper is comprised of five parts. The next section will briefly review some of the extant literature that frames the study of knowledge strategy. Next, this literature is used to create a preliminary model of the internal interactions that drive, and are the result of, knowledge strategy. This model is transformed by the results of the first round of empirical data collected in the study, and in the penultimate section that revised model serves as a starting point for another round of empirical research. The final section concludes the paper and points to some future research directions.

LITERATURE REVIEW

After briefly discussing some of the foundational literature in the field of KS, the literature utilized to construct the initial research model forms the majority of the literature review. Both theoretical and empirical literature has been included as the basis of the model.

Some of the earliest writings regarding the strategic use of knowledge come from the business strategy development literature. Feurer, Chaharbarghi, and Distel (1995) wrote about the part played by knowledge in the implementation of business strategy. Their research stresses the importance of matching the type of knowledge maintained in the firm with its proper level in the firm. Zack (1999) explicitly defines KS as "balancing knowledge-based resources and capabilities to the knowledge required for providing products or services in ways superior to those of competitors." This definition directly links the knowledge characteristics of the organization with performance and competitive advantage. Bierly (1999) takes a similar approach to KS when he defines four basic drivers involved in the creation of a KS: internally vs. externally sourced knowledge, enhanced vs. new knowledge, fast vs. slow speed of learning, and depth vs. breadth of knowledge base. These seminal papers provide the groundwork for the research that follows.

There is a significant amount of literature describing the organizational drivers that help to shape KS. One important driver of a firm's KS is the environment within which it operates (Buckley & Carter, 2004). These variables might include the type of product or service the firm produces, the level of turbulence or instability in the industry, and the degree of fusion that exists between the industry and those that complement it (Bierly & Chakrabarti, 2001). A good understanding of the environment will then influence how and where knowledge is developed (internal vs. external, broad vs. narrow, etc.).

The external environment will also direct the development of business strategy, which in turn will define the KS (Ursic et al., 2006). There is a significant literature describing the importance of linking business strategy with knowledge strategy and how the business strategy should be the main determinant of KS (Bierly & Chakrabarti 2001; Nickerson & Silverman 1998). Southon, Todd, and Seneque (2002) describe how the KS is influenced by the board of directors while Lane and Probert (2007) analyze the effects of internal and external knowledge acquisition on firm performance.

Due to the interdisciplinary nature of knowledge, KS cannot be created in isolation. It must be informed by other aspects of the organization's plans. Three of the most important drivers of KS, in addition to the business strategy, are the organization's human resources strategy, technology strategy, and the organizational structure. Human resources policies dictate the incentive plans, training structures, and retention plans, all of which contribute directly to a firm's ability to retain tacit knowledge (Kim, Yu, & Lee, 2003). Using data collected by the Danish government, Laursen and Mahnke (2001) are able to show that the human resources practices of firms vary with respect to their KS. Firms whose knowledge strategies call

for an emphasis on external learning and linkages (e.g., consultants or universities) have a greater propensity to employ human resource practices that encourage knowledge sharing such as quality circles and job rotation.

Knowledge, especially in its explicit form, is often shared through the use of information technology. The relationship between information technology and knowledge sharing and transmittal requires that the approach to technology taken by the organization has a significant impact on its ability to capture, store, and transmit knowledge. Most firms still lean on the technology group to make their knowledge management tools work properly (McLaughlin, 2010). This means that the creation of a KS cannot take place without a clear understanding of the firm's IT capabilities and plans (Kim, Yu, & Lee, 2003; Nickerson & Silverman, 1998; Shankar et al., 2003). Syed-Ikhsan and Rowland (2004) find a significant correlation between the IT infrastructure and the creation and transfer of knowledge within the organization.

Liebeskind (1996) discusses the impact of the organization on KS creation, which is extended by Shankar et al. (2003). The organizational structure dictates the location and flow of knowledge stores by dictating the location of people, both geographically and organizationally, and their prescribed interactions. The management processes in place within the organization also affect KS creation, such as those that determine access to resources and employee mobility.

Since KS is influenced by the business strategy, human resources strategy, technology strategy, and the organizational structure, the organization must allow the KS to influence these other aspects of the firm's strategic infrastructure, as well. In order for the influence to travel both ways, there must be some manner of feedback between the various layers of the organization as well as between functions. Thus, a firm's ability to foster internal communications will have a direct affect both upon KS creation but also KS implementation. Therefore, the technology strategy must also be influenced by the KS. Johannessen, Olaisen, and Olsen (1999) describe in detail how the technological capabilities of the organization directly affect its ability to collect, control, and disseminate knowledge.

Changes in the manner in which knowledge is acquired and managed within a firm often call for a revision in structure or management processes. Organizational knowledge flows, or internal processes that encourage the free flow of knowledge, will enhance the ability to implement most knowledge strategies. Some organizational changes that are made to encourage knowledge flow are small such as title changes and department realignments, but others might be very large such as restructuring entire divisions (Chase, 1997). Girard (2005) shows that the organizational approach to knowledge sharing, including the use of such techniques as social networks, tend to be preferred over any other knowledge-sharing strategy. Jang et al. (2002) find that the socio-cultural aspects of the firm as well as the processes that were mentioned earlier influence the knowledge management strategy. After surveying 195 Spanish firms, López, Peón, and Ordás (2004) find a significant link between the organizational culture of a firm and its learning capabilities. These learning capabilities, in turn, are linked to the firm's performance.

The knowledge management (KM) processes undertaken by the firm are driven by the KS in place. In practice, the KM system is the primary means through which the KS manifests itself. The KS drives the development of the knowledge management tools, organizational processes, system content, and development cycle (Maier & Remus, 2003; Snyman & Kruger, 2004). It is important that the form taken by the KM system is truly reflective of the KS and not just in existence to check off a box on a management "to do" list.

The literature reviewed in this section forms the basis for the place of KS within the organization's strategy creation and implementation

process. The authors contributing to this stream of literature illustrate the network of influence within the organization, as well as the influences that originate from outside the organization, that help to shape the KS.

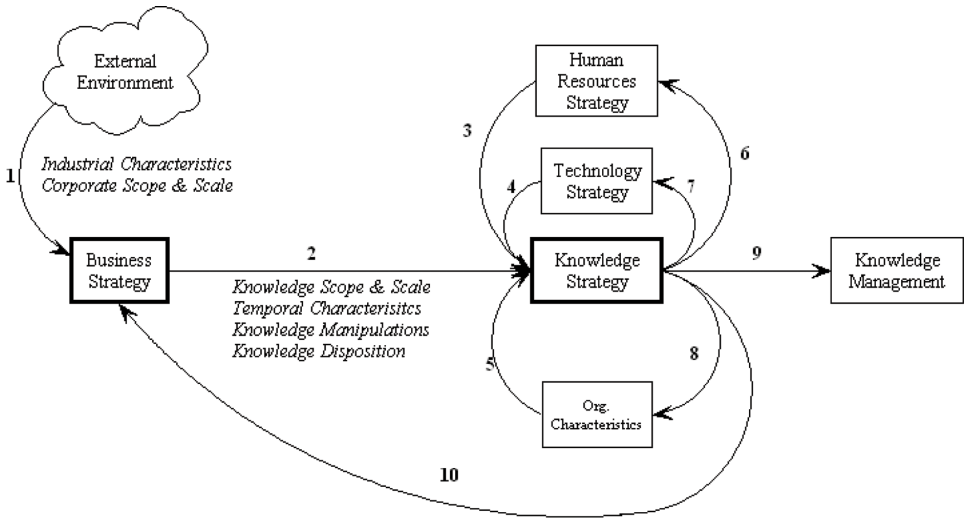
INITIAL MODEL

The literature reviewed in the previous section is codified in Figure 1. The model represents the various entities, both internal and external to the organization, which the literature suggests drives the creation of KS. Each of the works cited in the literature review was selected because it describes, theoretically or empirically, a driver of knowledge strategy. The arcs between the entities represent the influence of those entities on KS and, in the case of some, the influence of KS on the entity.

The specific literature driving each arc shown in the model is given below:

1. External environment's (turbulence, industry type, competition) influence on KS (Buckley & Carter 2004).
2. The influence of business strategy on KS (Nickerson & Silverman, 1998).
3. The influence of the human resources strategy on KS (Kim, Yu, & Lee, 2003).
4. The influence of technology strategy and technology infrastructure on KS (Kim, Yu, & Lee, 2003; Nickerson & Silverman, 1998).
5. The influence of the organization on KS (i.e., management processes, organizational structure, organizational culture, and political climate) (Shankar et al., 2003).
6. Knowledge strategy's impact upon human resources strategy and processes.
7. As KS develops, the requirements of the IT infrastructure will continue to evolve based on communication needs of the knowledge-based community (Felton & Finnie, 2003; Hughes, 1997).
8. Organizational characteristics will often change as a result of KS development (Chase, 1997). These might include size, geographical spread, or internal processes.
9. The influence of the KS on the knowledge management processes ensures that the knowledge management tools and techniques are applied to properly support the

Figure 1. Drivers of knowledge strategy



business strategy (Maier & Remus, 2003; Snyman & Kruger, 2004).

10. This link ensures that the knowledge needs of the organization are aligned with the business strategy as well as ensuring that the business strategy is developed in keeping with the knowledge capabilities and assets of the organization (Huang, 1997; von Krogh & Roos, 1995).

METHODOLGY AND RESEARCH FOCUS

How should the set of relationships between the KS drivers and the KS, which is described in the literature, be modified to reflect the practices of actual organizations engaged in the application of knowledge as a competitive asset? With a better understanding of the actual role of knowledge strategy in the organization, a research model more reflective of reality can be created and act as a foundation for future research.

This portion of the study consists of semi-structured interviews with nine top executives from a number of industries: banking, healthcare (one standalone hospital and one healthcare system), financial services, insurance, software development, and government. The research subjects are all at the highest levels of the organization: CEOs, CTOs, CIOs, Senior Vice-Presidents, and a County Executive. Each interview lasted approximately one hour. The interview included questions regarding the existence of their organization's KS, how their organization's knowledge strategy was created, its characteristics, and its manner of application. The interviews were transcribed and analyzed using content analysis. Initial coding consisted of identifying KS drivers and influencers, with subsequent coding for identifying underlying causal relationships as well as indicators of departure from those relationships noted in the literature. Throughout, linkages and differences within firms, within industries, and between industries were noted and explored with numerous follow-up questions via telephone and e-mail. As the data revealed differences between the suggestions of the literature and actual events, these differences were compiled and formed the basis of the revised research model, introduced in the next section. In most cases, the revisions to the initial model are based upon multiple observations of similar results.

A qualitative methodology was chosen for two primary reasons. First, qualitative methods are very effective at uncovering relationships between concepts that do not lend themselves to direct measurement, such as the KS. Second, qualitative methods are particularly useful when a field is relatively new and has not generated a great deal of empirical studies or theory upon which to base quantitative methodologies.

REVISION OF THE INITIAL MODEL

The data collected during this study suggest that the initial model can be revised to better reflect the reality of the role played by the KS. Five specific changes were made and are described in this section.

The first change is to remove the direct link between the external environment and KS. Rather than show this as a separate influencer, the data suggests that this influence is brought to bear through the business strategy. The KS of the two hospitals illustrate this well. Both face similar external environments as far as regulations and demographics are concerned. When faced with the need to develop internal knowledge regarding process improvement, one turned to internal training and the other initially turned outward. The character of the training programs also differed, with one being quite formal and the other taking the form of informal, after work gatherings. Ultimately, these responses differ because the strategic outlook of the institution differed. The difference is only slight, because both hospitals' strategies

were to be low-cost providers of healthcare to the community. The difference in their responses was due to management decisions about the best way to meet both the strategic imperative of cost control and their mandate to serve their population. The difference is in the beliefs of the individual management teams as to how to deal with the environment in which they operate. Thus, the revised model reflects the importance of the business strategy in dealing with external issues.

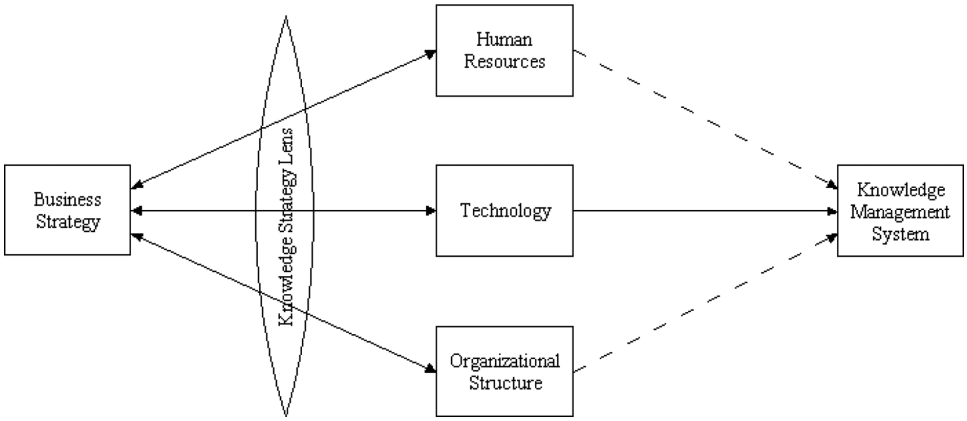
Though not shown on the original model, there are direct linkages between all three sub-strategies and the business strategy, and much of the interplay between them does not involve knowledge, so to show the connection through the KS is unduly limiting in describing their relationship. A further modification to this aspect of the model is to make the arrows connecting the business strategy to these three elements double-ended, reflecting the two-way flow of influence between them.

The labels for human resources strategy and technology strategy have been revised to read simply human resources and technology, respectively. None of the organizations in the study created an explicit human resources or technology strategy. However, technology was acquired by most of the organizations to perform a specific task that was identified as a means to meet some strategic goal. A good example of this is the knowledge management system implemented by the financial services firm. It is not driven by any technology strategy that the CTO could identify or articulate, but its development was instrumental in supporting a business strategy of improved customer service.

The removal of KS as a central element and its placement as a modulating factor in the relationship between business strategy and the sub-disciplines of human resources, technology, and organizational structure and culture is the most important revision to the model. KS is an abstract, informal, emergent set of beliefs or guidelines that helps to shape the manner in which knowledge is handled by these organizations (Kasten, 2006). KS should not occupy a central position in the model, but rather a position that allows it to exercise some influence on the way in which the other disciplines noted are used to carry out the business strategy. Figure 2 displays the revised model.

The role of KS in this model is to tune the business strategy's influence on business decisions. This is similar to how decisions are influenced by fiscal or human resources strategy. Rather than exist as an explicit set of rules or guidelines, it is the underlying set of fundamental beliefs that guide the decisions made by the various sub-disciplines. The KS is usually implicit and informal and is as much a part of organizational culture as it is a strategic direction.

Figure 2. Revised research model



One hospital's decision to implement Six-Sigma illustrates the revised role of KS. Top management decided that a strategic goal was to streamline the patient care process and reduce the number of information disconnects experienced by the patient as he or she transited the system from admissions to discharge. To accomplish this, the CEO recognized the need for advanced process analysis tools as well as a change in the way his employees addressed their duties. Had there been a formal KS in place, the CEO could have used these guidelines to introduce and implement Six Sigma. However, the KS is an implicit entity, reflecting the beliefs of the top management team about knowledge acquisition and utilization.

The KS of this management team, led by the beliefs of the CEO, supports the viability of an organic learning organization in which organizational knowledge is developed from within. Thus, while the initial training of key team members was accomplished externally, the vast majority of the Six Sigma training was accomplished internally by hospital employees who had been thoroughly indoctrinated.

Moreover, the culture of the organization has also become part of the knowledge acquisition effort; employees are excited about the new tools and their language now focuses on the improvement they can make in quality and patient care. This success is largely due to the manner in which the new knowledge was acquired by the organization and spread throughout the ranks. The knowledge building program had unequivocal support from upper management, though the financial support was minimal due to the cost reduction strategy of the organization. But, this limitation was overcome by the strategic use of career-centered inducements and CEO-provided pizza.

A different KS might be less aggressive in the development of knowledge, preferring to make use of the knowledge that naturally occurs in the organization. It might place more reliance on explicit knowledge within the firm and spend less energy worrying about their ability to apply it. Though it might have reduced the value of the knowledge, a firm following this type of KS might have relied on external trainers to introduce the employees in the use of certain analytical tools. If the funding for external trainers was not available, they might have relied on books or documents on the intranet as a substitute for training, even though these methods have certain obvious drawbacks, especially for very complex material. Thus, knowledge would be much less widespread, the excitement generated by the increasing awareness of the importance of analysis, and the substantial improvements in patient care might have been replaced by a situation where only a few people in the organization had enough training, education, and initiative to utilize the new analysis tools and the organization would not have witnessed the change in the level of conversation regarding quality and process improvement. The manner in which the human resources, technology, and organizational structure was used to implement the business strategy was strongly influenced by the KS.

The revised model shows a different pathway for the influence of the organization, technology, and human resources on KS. Rather than directly driving the KS, these other organizational factors shape the KS as the results of decisions are digested by the organization. In other words, the KS is the result of decisions made regarding knowledge; each decision produces some change in the KS. This mechanism supports the emergent nature of many knowledge strategies.

Every organization is a system, and any interaction between the components of the system is a subsystem. The nature of these interactions is usually the passing of influence and information between them. When the management team passes directions to the human resources discipline, for instance, it passes through a number of lenses before reaching the intended recipient. As it does so, these lenses impose certain influences or policies upon these directions, such as those that shape the role of knowledge. These lenses shape the message to reflect the view of upper manage-

ment regarding the use of knowledge within the organization. When there is a clearly defined set of policies regarding a particular aspect of the operation, there will likely be only one set of lenses for the message to be passed through. However, when the set of policies is not common throughout the organization, middle level management might impose their own lenses upon the incoming messages, thus transforming them in some way and possibly changing the message's ability to support the organization's goals.

The messages sent by upper management to the functional areas result in some activity taking place, which in turn generates feedback. The feedback might be explicit in the form of reports, or implicit in the form of observation. The feedback should include some measurement of the outcome of the directive as this will form the basis for future management directives.

The second area of feedback is that of process. The evaluation of the effectiveness of any set of instructions or directives provides guidance for future decisions. It is in this aspect that we find the influence of the functional area upon KS. By recognizing the role played by knowledge in the implementation of the directive, the functional area is able to provide adjustments to the KS lens that can be used to shape future decisions. The extent to which this adjustment can take place is dependent upon three things. First, the functional area's ability to recognize the role of knowledge in the execution of the business strategy is crucial to the revision of the KS. Without this, there is no basis for any internally directed analysis based upon knowledge. Second, the number of lenses in existence will also have an effect on the degree of adjustment made, since the functional area might only recognize its own KS lens and not have any idea that others exist. Third, the degree of flexibility in the lens, a metaphor for organizational and managerial flexibility, plays a large role in determining the ability of the organization to adjust its approach to knowledge.

The KS is also changed by the business strategy in the form of adjustments made by upper management. Results from previous decisions, changes in the external environment, and the knowledge lens through which they view future business decisions will drive these adjustments. As with the functional areas, there are also limitations in place to mitigate the amount, direction, and rate of change from the business strategy side. These adjustments are driven by the characteristics of the business environment, the organization's business strategy, the manager's background and style, the degree of alignment between the existing KS and the business strategy, and the number of different lenses between the upper management and the functional area.

The system, then, consists of the KS (represented by the lens and embodying the business strategy), the functional areas of the organization, and the information and direction that pass through the lens. As these messages of guidance and feedback pass back and forth between the parties and through the lenses, they adjust the shape of these lenses such that subsequent decisions will be based upon the newly contoured lenses. The KS forms an organic element in the system. It grows and changes in the system and its environment, rather than acting as a bolted-on filtering mechanism as portrayed in much of the previously reviewed literature. Unlike the business strategy, it does not exist as a discrete entity; KS is an integral part of the relationships within the system and is often only evident as an influencer of decisions rather than as a decision in its own right.

Some important distinctions can be drawn between a KS and other organizational characteristics, such as culture, which also act to modulate internal activities. Whereas entities such as culture grow organically due, in large part, to organizational composition and environment (e.g., demographics, location, industry, etc.), a KS tends to result from decisions made by the organization's leaders and members. A more important distinction is that organizational

characteristics tend toward significant levels of inertia, in that once created they can be very difficult to change. This is evident in the difficulty many firms face in changing company culture to respond to changes in technology, market requirements, or global competition. However, a KS is, by definition, a dynamic construct. It is created as a result of decisions made during the course of doing business, and continues to evolve even as it influences subsequent decisions. Thus, organizational characteristics such as culture do not exist to further the goals of an organization and often tend to hinder more than help the flow of ideas and knowledge. A KS, on the other hand, is created and shaped by the organization to promote the productive use of knowledge toward the attainment of strategic goals. Therefore, while they might both exist in a manner such as Figure 2, only one of them is the result of a reasoned approach to knowledge flow and is expected to evolve based upon organizational decisions and their results.

A few examples from the data are in order at this point to help illustrate this concept. I start by finishing the hospital example begun earlier. Influenced by the external marketplace and the strategic objective of operating within strict cost constraints, the hospital decided to acquire certain process analysis tools to enable them to design better, more efficient processes. The KS in place with the top management team, especially the CEO who was the driving force behind the project, was to provide as much training as possible internally, to embody the knowledge within the people as widely and as thoroughly as possible, and to change the culture such that the language of quality and process improvement would become the language of the organization. Thus, the KS in place was concentrated very sharply on the human resources and organizational structure and away from technology.

Large organizations being what they are, and healthcare institutions are no exception, these initiatives were met with some resistance, much of which centered on the acquisition of new knowledge as well as the sharing of existing knowledge (in other words, power). Thus, certain areas of the organization had their own lens through which they viewed knowledge-based decisions, and it was very different from the CEO's lens. However, through the recruiting of key people into the process, a critical mass began to emerge. This group, who had become believers in the ideas of the CEO, began to change the lens through which their portion of the organization viewed knowledge and with those changes, it moved closer to that of the CEO. Human resources also saw the benefit of these new processes and began changing their procedures for evaluation and promotion to include in their decisions the employee's knowledge activities such as training and knowledge sharing. Thus, the organizational structure and culture, as well as human resources, began to influence the organization's KS.

As the results of his decisions were observed, the CEO continued to adjust his KS by taking steps to encourage interdisciplinary knowledge sharing in an effort to remove the silos of knowledge that have formed the foundation of organizational culture in healthcare for years. The strategic directions of the hospital as well as that of the system, along with his observations of the organization, caused the CEO to adjust his approach to knowledge by taking steps to encourage the formation of a culture of continuous learning and process improvement. As it digested these initiatives, the organization continued to adjust its KS until, at present, the institution has a relatively coherent and uniform KS.

A contrasting example is found in the software firm. The KS of this organization is to depend heavily upon technology to gather and distribute knowledge, tending to avoid reliance on the tacit knowledge of individuals. This is the result of the need for many people within the organization to have access to the same customer and market-based knowledge simultaneously to maintain the pace of development as well as a protection

against knowledge loss when people leave the company in an industry known for its turnover. The KS lens is thus oriented toward technology and represents a low degree of variability within the organization's approach to knowledge.

The last revision to the original research model is the position of the knowledge management system. Originally driven directly from the KS, as per the literature, it appears that the knowledge management system is almost completely an artifact of the information technology area with guidance from the human resources and organizational structure. The technology function creates the knowledge management system in response to direction from upper management through the KS lens. The evidence from each organization in the study that has a knowledge management system suggests that very little influence comes through either human resources or the organizational structure.

The influence of the KS upon the decision to implement the knowledge management system is apparent in most of the firms that have one. The role of the KS here is to modify the manner in which the business strategy is implemented. For the bank, the financial services firm, and the software development firm, the KS includes a strong inclination to house organizational knowledge in some explicit form as opposed to allowing it to reside within the employees. Thus, it is not surprising that these are the firms that either have, or are creating, a knowledge management system. Organizations that seem to value the tacit knowledge within their employees do not have, or did not stress, a knowledge management system. These organizations, including both healthcare institutions and the insurance firm, approach knowledge as a human asset and view the use of a knowledge management system as an unnecessary tool, at best, or an impediment to the useful application of knowledge in the worst case.

ADDITIONAL DATA COLLECTION AND ANALYSIS

To further explore the analogy of the lens as the representation of knowledge strategy, additional interviews were performed. These interviews took place with different participants in different firms, although one firm in the second set of interviews was the result of the merger of one of the firms from the first round of interviews with one if its competitors. The participants were selected from a slightly different population. These interviews took place with managers from a somewhat lower organizational level. This change was made for two primary reasons. First, the exploration of the KS as lens should take place at a level where the results of the knowledge-based decisions being made are readily visible. This is not always the case when they are viewed from the top of the management chain. The second reason is so that we can explore the characteristics of this metaphor at the point of its primary impact. In other words, the interest is not only focused on what decisions are made, but also on how they are made. The interest is on both the process of decision-making as well as the product of the decision.

To obtain the proper data, participants were selected from the level of middle manager up to director. These positions have sufficient visibility on the operational level of the organization to be able to discuss the results of various decisions, but also have visibility into the strategic levels if necessary. Moreover, they are usually the people making the decisions, so data collected from them is the best way to see the KS in action. These participants come from the banking and finance, cosmetics, and electronic manufacturing industries. One other adjustment made for this second round was that all of the participants come from the information system design and implementation function in their respective companies. This was done so that their responses could be more easily compared.

The questions asked during the second round of interviews focused on the manner in which the KS manifested itself in decision-making and whether these decisions can be traced back to an identifiable aspect of the KS. The analysis of the data obtained from this second round of interviews was treated in the same manner as the first, utilizing several rounds of content analysis of the transcribed interviews to distill the applicable themes. The analysis brought forth three themes regarding the existence and usefulness of KS in these organizations.

Theme 1: Knowledge Strategy Varies Widely with Time and Circumstances

The lens metaphor tends to depict the KS as a relatively stable aspect of a firm's strategic portfolio. However, the findings of this study show it to be more flexible and, perhaps, unstable. The data shows a firm's KS to be greatly, and quickly, affected by changes in competitive environment, customer relationships, and organizational structure. In the case of the cosmetics manufacturer, the KS employed by the upper management, and consequently by the IT manager, was adjusted often and by significant amounts. A sudden negative change in the competitive landscape brought about a sudden tightening of internal knowledge passing requirements, especially having to do with project costs and processes. The reason for the sudden increase in these reporting and analysis requirements were thought to be aimed at reducing costs, but this was an inference by the manager. No directive from management was ever brought forth to explain the change in procedures and priorities.

In the same firm, decisions controlling the exchange of knowledge with outside entities were also revised. The changes were brought about by an agreement between the manufacturer and a major customer to share marketing data in the hopes that the manufacturer would be better able to meet the needs of the customer more effectively and efficiently. Though useful to the customer, it was also hoped to greatly benefit the manufacturer, however without a clear strategic plan in place for the use of these data, it is unclear whether these benefits were achieved. Changes in the way knowledge is shared with outside entities also took place during the outsourcing of certain IT tasks. External knowledge sharing, long considered a detrimental activity to the firm, had suddenly become part of the manager's daily routine, as was the extraction of knowledge from the outsourcing firm.

None of these issues are particularly noteworthy on their own. Firms make these decisions quite often and there are many more examples in the data collected. Moreover, we expect well-run firms to respond to changes in competitive environment and organizational structure. Storey and Hull (2010) and Wang and Belardo (2009) all discuss the importance of flexibility in KS to meet a changing environment. What is important to this study is that the lens used as a metaphor must be flexible to deal with changes in the firm's knowledge environment, but not so malleable as to make changes in firm processes that are detrimental to internal performance. Decisions that take place without any apparent strategic reasoning can sometimes pose more of a problem for employees because of their inability to grasp the underlying reasons for the decisions. In a knowledge-based environment such as IT system design, knowledge of the underlying reasons for changes that are being made often spell the difference between a successful, smooth course change and a chaotic period of readjustment.

Theme 2: KS can Differ within Departments, Divisions, and at Different Levels

The lens metaphor developed above suggests that the lenses in a firm should align to form a single, coherent KS. However, evidence gathered in this study points out very clearly that there are

likely to be multiple KS working simultaneously. Moreover, these simultaneous knowledge strategies are not the same and can even work against each other. At the cosmetics manufacturer, each project team within the same division was allowed to select its own way of managing internal knowledge stores, though there was some pressure from above to do something to preserve internal tacit knowledge distribution. However, the directive from upper management could hardly be called a knowledge strategy as it had no direction or goals attached to it. Thus, each department was left to its own to develop processes to retain its valuable IT development knowledge. Without a strategic direction to work with, this effort has met with mixed success, with most departments showing only cursory efforts and results.

At the financial services firm, the picture is much more complicated and with much higher stakes. The two organizations that were combined to form the current firm each had drastically different approaches to the use and management of organizational knowledge. These differences are quite apparent at the IT development function, where each project manager is, like at the cosmetics manufacturer, responsible for developing his or her own approach to knowledge retention. In this case, there is no direction from above to do this, but each manager recognizes the need to retain knowledge, though to widely varying degrees.

As the two merged companies have only begun to mix their operations, a typical IT development project is staffed with employees from only one of the two firms, depending upon which side of the house has taken the lead in the effort. In these cases, whatever KS is developed and employed on the project, though it might vary from other projects the employees have worked on, will be somewhat consistent with the overall culture of the organization. However, as the two merged firms become more closely linked, more employees are being assigned to work on projects led by former members of the other firm. This forces employees to adapt to widely varying approaches to many aspects of their job, including the handling of knowledge and knowledge-based objects such as documentation. This has led to certain issues within these projects such as misunderstanding of requirements and loss of lessons learned.

Simultaneous or parallel knowledge strategies are not necessarily a problem. In some instances, it is beneficial for a firm to pursue knowledge differently at various levels or in different functions, especially in complex or dynamic environments (Revilla, Prieto, & Prado, 2010). However, when different strategies are employed they must be coordinated and linked to an overall business strategy. In the case of these organizations, the knowledge strategies were completely uncoordinated to the point of working against each other, and neither firm's KS showed any direct linkage to the business strategy in place at the time. In these cases, the lack of complementarity between knowledge strategies was the problem, not the existence of multiple knowledge strategies.

Theme 3: Knowledge Strategy is Largely Invisible

It is widely known that strategies can be either explicit or emergent and that sub-strategies such as manufacturing strategies and technology strategies are usually much less explicitly stated than a firm's overall business strategy. It has also been shown that knowledge strategies are almost entirely emergent in nature, with little evidence that they are ever codified to any extent (Kasten, 2006). Hopefully, as the usefulness of knowledge strategies becomes more apparent, we can expect some solidifying of knowledge strategies in the future. However, the data collected for this study shows that, in many cases, the process of strategically considering knowledge activities has hardly begun.

The firms analyzed for this study probably had some manner of knowledge strategy, in some cases many knowledge strategies, in place, though evidence of this is sometimes scarce. While these

strategies performed as mechanisms to modulate business decisions, there was no evidence that any of the participants knew they were there. In other words, the lens only represented a local KS. Whether or not a firm-wide knowledge strategy actually exists is largely immaterial as none of the participants interviewed was aware of it. Current research has demonstrated the value of a knowledge strategy that is aligned with the firm's business strategy (Revilla & Rodriguez, 2010), but this alignment does not benefit the firm without some form of communication, even a very informal one, that communicates the knowledge strategy in place to the rest of the employees. The inability of upper management to communicate an existing knowledge strategy might be worse than having none at all if the actions of the employees are in conflict with a KS that forms part of a competitive posture.

CONCLUSION

Previous studies have shown the KS to be emergent, implicit, and a moving target (Kasten, 2006). Because of its nature, it will necessarily take different forms in different organizations and industries. This paper has taken the first step to document these variations. By portraying the KS as a lens that modulates the decisions and information passing through various parts of the organization, it provides a different framework through which other researcher can begin to better characterize the impact the KS has on the organization as well as the organization's impact on the KS.

The research was extended with a second round of interviews that were performed with the lens metaphor as a research focus. The findings indicate a fledgling understanding of KS in many organizations, as well as a much more complicated view of KS within many firms. To add to the list of KS characteristics already noted, the KS might be multi-leveled, divergent between various levels and parts of the organization, or totally invisible. Each of these issues poses certain challenges to those trying to obtain the benefits of a KS.

This study represents just the first steps in a research program that is aimed at gaining an understanding of how the KS shapes decisions and the results of those decisions. As an exploratory study, it has significant limitations in its ability to provide generalized conclusions, but the purpose of the study is more to provide a framework for the study of organizational issues surrounding KS. These might include analyses of the role KS plays in modifying internal interpersonal influences and technology choices.

Note: this is an update of a paper originally published in the *International Journal of Knowledge Management* (Kasten, 2009).

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Chapter 10
Assigning People as Number One Priority:
Engaging With Disadvantaged Communities in Healthcare Research

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ABSTRACT

Notions of the "expert patient," user choices about where care is provided and by whom, and enhanced understanding between patients and healthcare workers for continuity of care all have implications for workforce planning and human resources. Modern health systems and care require a range of patient and community inputs if they are to be relevant for their users. However, partnering with disadvantaged communities for such purposes is not an easy undertaking. Such partnership efforts need to be premised on a participatory approach and face multiple challenges. Given the range of the stakeholders involved, the sharing of turf, risks, and resources that are usually part of such efforts requires careful consideration of all the partners. Further, there is always the possible exhaustion of the communities from being repeatedly over-researched, as well as the frequently encountered initial lack of trust between partners-to-be who have not previously collaborated. In such circumstances, the sharing of assets and a focus on enhancing the mutual capacities for a common purpose needs to be spelled out clearly from the start. Notwithstanding these and other challenges, over the past decade partnerships have become a frequent requirement for government and funding agency assistance. Research partnerships that incorporate community assets and values are among the defining approaches to social problem solving, where partnering has become the fundamental and strategic component of efforts aimed at promoting community health.

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INTRODUCTION: PARTNERSHIPS AND THE RELEVANCE FOR HEALTH CARE

Patients, clients or individuals are now assigned the number one priority for health systems and healthcare human resources planning (Hartzband & Groopman, 2009; Kobberdahl & Porter 2009). A prerequisite for such importance is that the views of patients will need to be heard and considered by healthcare practitioners, administrators, and policymakers. Indeed within the healthcare sector, recent decades have witnessed several features that have had a direct impact on confirming that people/patients are valued as the main and essential constituents of effective health systems. One aspect is that, with the move to patient-centered care delivery, patient engagement and patient education and the "expert patient" (where patients participate and are involved in their traditional "formal" care) has now become the centre-stage of health and social care systems. Such patient involvement comprises many activities, ranging from their involvement in individual treatment decisions and regimes, through patient consultation to the collective lobbying of organisations to influence health policy decisions (Andersson & El Ansari, 2008; Andersson, Tritter, & Wilson 2006). The aim is patient engagement and patient-focused interventions (Coulter, 2006; Coulter & Ellins, 2006). But health has traditionally been an expert-dominated field, and hence patient involvement has been a controversial development that has been resisted by some professionals (Shaw & Baker, 2004). Successful patient involvement builds on increased health literacy. Thus, interventions to build the capacity and health literacy of user groups are of growing importance (Kickbusch, 2001) and information is vital to make choice meaningful (Godolphin, Towle, & McKendry, 2001). Indeed health systems will need to provide a great deal of information to users of these health services. In health care, efficient information management is fundamentally critical to assure high quality and cost-effective patient care (Jaspers et al., 2000). All these features present challenges to healthcare systems and to the traditional role of healthcare professionals.

A second aspect is the significant growth in choices about where care is provided and by whom: the provision of non-traditional care by non-traditional practitioners (e.g. using a variety of complementary therapies), and a range of community care services (Mavundla, Toth, & Mphelane, 2009; Zavradashvili et al., 2009) This has implications for health information, human resources and workforce planning, where informed patients provide inputs into decisions that are mutually agreed upon between them and their practitioners. A third challenge is the aging population, with the corresponding increase in chronic diseases, long-term conditions, and various extents of a range of disabilities. In such situations, the patient is not a transient client but one whose self-management skills are critical. Thus patient knowledge and information about the condition(s) is vital and patient-professional understanding for care continuity is critical (Greenhalgh, 2009; Griffiths, Foster, Ramsay, Eldridge, & Taylor, 2007).

All these challenges and demands have manpower and workforce implications. On the one hand, there is a definite increased need for well-educated medical and health informatics specialists (Jaspers et al., 2000). This requires proactive initiatives to train graduates in information and communications technologies that are increasingly needed in the healthcare field (Jaspers et al., 2000). National health care systems are increasingly required to deal with global problems and solutions (Ball, Garets, & Handler, 2003; Hasman, Safran, & Takeda, 2003). An "information inequity" has also been suggested, where those with the most severe health problems are often those with the weakest health information systems (Stansfield, 2007). In developing countries, the problems of health information are exacerbated due to: the absence of standards and identifiers; medical

records that are largely irretrievable; data that are often not aggregated and analyzed; the existence of a profusion of indicators for each disease; and health information system investments that are donor- driven, rather than system-building (Stansfield, 2007).

Tailored care is premised on the importance of the individual (patient) voice for treatment and concordance with regimes. What follows is that strategic and health information management and medical/health informatics will require partnerships in order to provide the impetus for the increasing sophistication of health care and health systems (Jaspers et al., 2000). There is little doubt that collaborative efforts in health and social care are essential (Social Exclusion Unit, 1998) if targets are to be reached (Statham, 2000). It is now also evident that health and healthcare problems are rarely a result of one single isolated factor, but rather a consequence of multi-factorial etiologies. Hence no one agency, ministry, or player can remedy such problems. As the well-being of people has multiple environmental, cultural, economic, and social contexts, the solutions for better health are all joined, interweaved, and interlaced together. This requires that all stakeholders (including the patients) need to work together in a coordinated manner (El Ansari, 2008). However, generally in health and health care, many of the voices of patients and people that are aired and heard are channelled through service or research collaborative conduits between academics, health service personnel, and lay people and patients (Erwin, Blumenthal, Chapel, & Allwood, 2004; Maurana, Goldenberg, & Hathaway, 2000).

For today's healthcare and social systems, the examples of the variety of challenges that could benefit from collaborative-initiatives are plentiful. They range from disease prevention to health promotion and from health education and disease management to social issues. These include: immunization; HIV/AIDS; teen pregnancy; violence in communities; intimate partner violence; street gangs; Healthy Cities; drug or alcohol abuse (Hallfors, Cho, Livert, & Kadushin, 2002; Mansergh, Rohrbach, Montgomery, Pentz, & Johnson, 1996); physical inactivity; and positive youth development (Kegler & Wyatt, 2003). They also include obesity and weight management; community-based and community-sensitive interprofessional health professional education; child injury prevention; infectious diseases (El Ansari, 2006); and promoting maternal health, amongst others. Partnerships are also common vehicles for addressing health and social disparities (Wynn et al., 2006), and are generally employed for community health improvement (Shortell et al., 2002). As healthcare systems worldwide struggle with the increasing demands for limited healthcare resources, the call for alliances, collaboration, and partnerships can be heard (Popay & Williams, 1998).

Research Partnerships

The consequence of such a state of affairs is that engaging in a collaborative manner with the patients and communities that we serve is a critical pre-requisite for any joint initiative that involves these people. A common channel for such activities is in the form of collaborative research partnerships. A research partnership is defined as a "community-centred" (Singer, 1993) participatory approach to research that equitably involves community members, agency representatives, and researchers (Israel, Schulz, Parker & Becker, 1998). Such partnerships aim to enhance the evidence base for practice; however, many overlapping difficulties underpin these efforts (Israel, Schurman, & Hugentobler, 1992). For instance, one needs to be aware of the value systems of the partners (Richards, 1996). Similarly, the foreseen costs and the expected benefits that could accrue to the stakeholders from such partnership arrangements need thorough consideration. The multi-directional empowerment processes (McMillan, Florin, Stevenson, Kerman, & Mitchell, 1995) and the capacity transfers between all the

players involved in a partnership necessitate reflection and deliberation. In addition, the interlacing relationships of the partners, the ensuing rules and procedures, the roles of the collaborators and stakeholders, as well as leadership issues (Alexander, Zakocs, Earp, & French, 2006; Jooste, 2004) require a good deal of awareness of the intricacies of working partnerships. Multidisciplinary, ethical research that is of relevance to the participating patients and communities needs to be designed in a consultative manner where all partners are genuinely involved in the "ground floor" of the initiative. The effort must be agreed upon to the satisfaction of all the partners, successfully implemented in an empowering manner, and the processes and the outcomes widely disseminated at relevant forums.

What emerges is that it is critical, in order to achieve a synergistic effect of the partnership (Weiss, Anderson, & Lasker, 2002), that these factors and others need to be in place (Zakocs & Edwards, 2006). Not surprisingly, the whole system approach to health has encouraged working in partnerships (Department of Health, 2000a), and particularly in the healthcare sector "Partnership in Action" has been promoted by government health policies (Department of Health, 2000b). Similarly, successful partnerships between indigenous communities and researchers have become increasingly important (Barnes, 2000). Understandably, such initiatives come with a set of challenges (Gil de Gibaja, 2001).

This chapter outlines the building of research partnerships between academic researchers and participating communities with regard to issues of manpower and workforce planning. It describes collaboration in research with five different, previously disadvantaged communities in South Africa (SA). The research was undertaken soon after SA's first democratic elections; where collaboration, consultation and equal status, voices and inputs were all new concepts for everyone involved in the initiative.

The chapter begins with an introduction that highlights partnerships and the relevance for health care. It then considers some of the issues that need attention when researchers partner with patients and with communities. It moves on to describe a multi-site partnership initiative in South Africa that was funded by the Kellogg Foundation, and provides a conceptual model to guide partnerships between researchers and patients. It then details the challenges that were encountered in the planning and implementation of a research partnership between the author and these partnership initiatives. It provides ideas and examples of how such a research partnership can be undertaken. It also draws on the author's real life experience in living and working with rather isolated communities in five provinces in South Africa for some years. Finally it highlights, by way of a reflective discussion, the many issues as to how such research partnerships need to privilege the people's voices, be respectful of local traditions, and be culturally safe.

RESEARCHING WITH PATIENTS AND WITH COMMUNITIES

Partnering with patients and with communities is an increasingly important strategy for successful public health research, despite the fact that partnerships between lay people/ patients and researchers are difficult (Klein, Williams, & Witbrodt, 1999). Nevertheless, health practitioners and community activists appreciate the value of working with communities (El Ansari & Phillips, 2001) and the virtues of patient engagement. As a result, a range of research partnerships and partnership models have come to the fore. These include participatory action research (Klein et al., 1999), collaborative community research consortia (Sanstad, Stall, Goldstein, Everett, & Brousseau, 1999), partnering with youth in collaborative research (Harper & Carver, 1999), or research-focused joint efforts between academic researchers and lay people (El

Ansari, Phillips, & Zwi, 2002). Collectively, these efforts challenge social, structural, and physical environmental inequities by the active involvement of community members, organisational representatives, and researchers in all aspects of the research process. There are well-defined sets of challenges that face such efforts.

For research partnerships between academics and communities, the community is, factually, where research, prevention, and intervention take place (MacQueen et al., 2001). However, it is often in these same communities that, regrettably, resistance to research is stumbled upon in terms of suspiciousness, conflict, or unfriendliness. These feelings, in themselves, do not represent a great starting point for a budding partnership initiative, where the aim is to increase grassroots empowerment, promote civic engagement, enhance diversity, intensify advocacy, and augment change (Wolff, 2001). In SA such feelings were complicated by a history that was characterised by separation politics and by variations of interpretation. Previous strategies, segregation practices, and separate racial development resulted in incongruent provision of resources, facilities, education, and jobs. Such historical geographical, social, and political separations generated consequences in relation to the partnership efforts for development and health in SA. Nevertheless, underprivileged communities and lay people are often willing to make sacrifices to become involved in such collaborative activities (El Ansari & Phillips, 2004).

PARTNERSHIPS IN SOUTH AFRICA

The focus of this section is the Partnerships in Health Professions Education (HPE) initiatives in SA. In the 1990s, seven partnerships were initiated in various provinces of SA, as joint initiatives between the local/ regional health service providers, the academic training institutions, and the local communities. The W.K. Kellogg Foundation supported these partnerships as collaborative efforts to influence health professionals' education to be more community-sensitive. They involved university-community; university-local health system; and local health system-community relationships. The participating partners jointly determined the priority issues and planned the educational bases for HPE (El Ansari, 2002). For a sense of equality, each partnership's steering committee comprised 25% health services, 25% academic institutions, and 50% community members. However, there was one critical snag.

At that time of SA's history, there were no local models to draw upon. The partnerships needed guidance in implementing their activities and programmes, and support in the evaluation of their functioning and performance in order to gain insight into their shortcomings and successes. Incidentally, at the same time, in another continent, the author was focussing his doctoral work to develop appropriate methodologies for researching and evaluating partnerships in disadvantaged settings.

The lay people's aspiration to assess the partnerships, review their collaborative efforts, and enhance their expertise in evaluating their joint enterprise was met with the author's desire for partnerships that could keenly engage with the evaluation work. This was the basis for the exchanges upon which a reciprocal collaboration would later be premised. The partnerships and the author went through a year's regular communication. During this time most of the issues both to the partnerships and the author had come out in the open for debate, clarifications, and where possible, consensus. Hence, the prospect of a research partnership based on equal input from the lay citizens and the author was commencing to materialize. Together the partnerships and the author worked, in a steady and incremental approach, on mutual concerns in order to spell out, resolve, and consent upon the rules of engagement. Many issues surfaced. and were interlaced and provide empirical guidance for conducting the

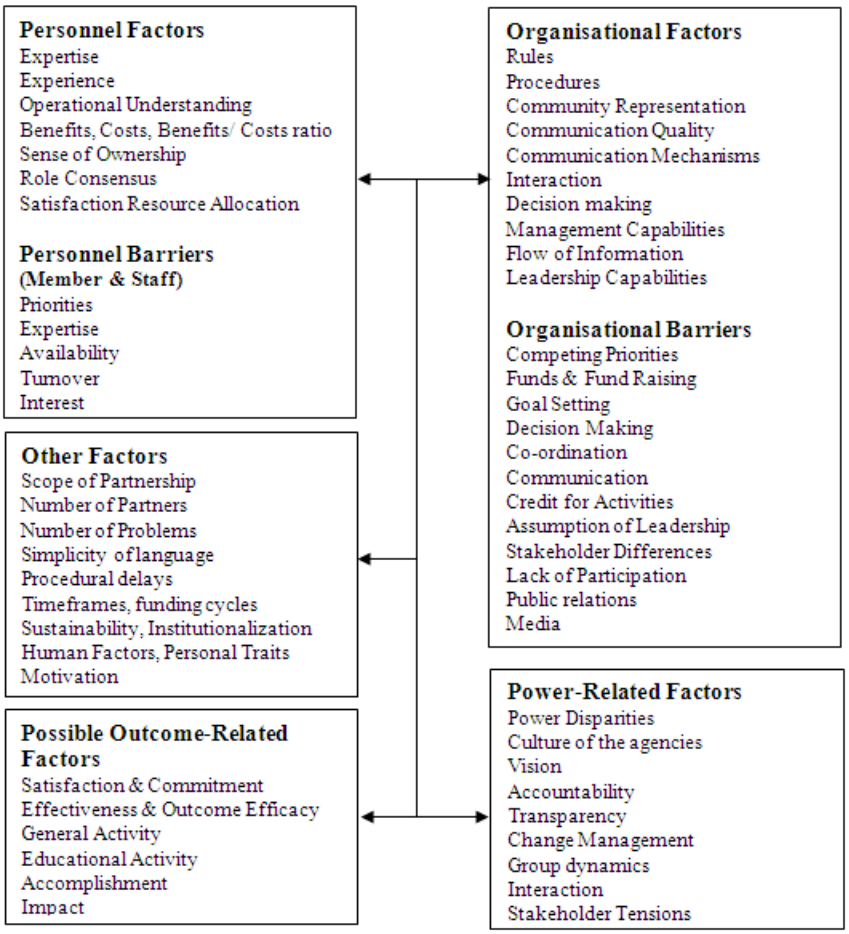
various activities when researchers engage in collaborative work with their respective communities.

A CONCEPTUAL MODEL

The intrinsic and extrinsic groups of factors that are vital to a successful research partnership are illustrated in Figure 1. The figure depicts that effective partnership functioning builds on many interacting pillars. The multiple features address personnel factors and barriers; organisational factors and barriers; human and personal traits; power-related factors; time factors; and outcomes. Given that the variables are intricately interlaced, this makes the various factors difficult to isolate, and when evaluations are commissioned difficult to attribute what has led to the effectiveness of a partnership. The multiple features highlighted in the figure collectively enable partnerships to fulfill their common objectives.

A very important point to note is that the factors illustrated in the model are generic, interacting, and flexible. Indeed they are! There is definitely no single blue print for partnerships, and it would not be desirable (and perhaps even counterproductive) to have fixed blue prints as that could hinder creativity, innovation, originality, and inspiration which are the salient aspects that characterize working partnerships. Rather what is available from the published literature is a range of factors, a variety of pre-requisites, an array of

Figure 1. A conceptual framework for appreciating partnership functioning



features, an assortment of principles and attributes, a pool of elements, a collection of characteristics, and a mixture of qualities that collectively work together in an intricate manner to generate an effective partnership. Unsurprisingly, partnerships have been set up in different continents and countries, with different stakeholders and diverse partners, with different aims, goals, and objectives, and with very different outcomes, but one feature always remains the same. That is the challenges that face such partnerships are usually always identical regardless of country, stakeholders, aims, or outcomes. This is because many more of the challenges that face partnerships are generated by the simple fact of people from different agencies and organizations and with different values and traditions working together. Conversely, far fewer of the challenges that face partnerships are attributed to what the partners are actually trying to accomplish and achieve. The implication is that while establishing a working partnership is a science with a growing evidence base, it is also as much an "art" in that it requires imagination, foresight, and experimentation. This highlights the importance of simultaneously understanding the "processes" of partnerships rather than focusing solely on outcomes (Granner & Sharpe, 2004), and acknowledging the complexities of such a way of working (Grice, 2001; Mitchell & Shortell, 2000; Mizrahi & Rosenthal, 2001).

THE CHALLENGES OF RESEARCH PARTNERSHIP

Tensions

An early challenge was that service-oriented community agencies and organisations might perceive evaluative research as insensitive, irrelevant, or a threat to privacy, staff, or programme funding (Goede & El Ansari, 2003; Klein et al., 1999). Researchers need to be mindful that collaboration between service providers and researchers is difficult (Butterfoss & Kegler 2002), that the cultures of the service and research worlds might be conflicting, and that community–campus unions require a good deal of ground work (Cavanaugh & Cheney, 2002). Hence, the investment of time and effort in establishing and maintaining contact, and building rapport and trust is important, even before potential partners actually meet each other in person for the first time. A researcher needs to clarify, that as an external researcher, he or she poses minimal or no threat to the partnership. Similarly, researchers need to frequently try to identify and abolish any social or cultural distances between themselves and the participating lay people. Thus, collectively both parties have to define the terms of their engagement in research; to come to consensus when their visions differ; to maintain respectful attitudes all through the effort; to build sustainable relationships with each other (Polivka, Dresbach, Heimlich, & Elliott, 2001); to create work groups that would contribute to the various components of the research work; and to negotiate collaborative ownership and leadership (TurningPoint, 2001). All these mean receiving advice and input from all partners and avoiding duplications. In doing so, the author had to consider a range of multi-stakeholder perspectives and viewpoints: the academic medical and nursing training institutions; a range of national, provincial, municipal, and local health service providers; a variety of other volunteer and statuary agencies and non governmental organisations; and the beneficiary lay communities and civic groups. In the case of these South African partnerships, it was clear that the research purpose was to provide information that could facilitate positive changes, rather than to verify accomplished outcomes against initially stated objectives. The intent and goal of the partnering was to improve, not to prove. Generally in partnerships, such tensions as described above can be decreased when researchers, people, stakeholders and patients feel that they have collective ownership for their partnership.

Collective Ownership

In partnerships, a collective sense of ownership is critical. It is necessary to decrease both the marginalization of other forms of peoples' knowledge and the distance between the university and the community (El Ansari et al., 2002). It is moving away from a "them and us" mentality (Pietroni & Chase, 1993). Hence researchers need to seek to involve the lay people and patients in co-responsibility from the ground floor formation of their partnership. A collective ownership is crucial to gain the benefits of the participatory approach in public health research. During the year prior to the study, the author consulted the partnerships for their views of the research aims, questions, and the potential roles of each partner. The community's views and research agenda were critical if a longer-term mutual commitment was to be achieved. Researchers also need to be attentive to joint ownership of decisions, and when the community is engaged at the partnership's inception, ownership is incrementally developed. Partnership success depends on co-ownership and co-responsibility. Individuals are sceptical about whether being equal partners can become a reality of shared ownership. Thus early in the field at each partnership, it is essential to develop jointly agreed research norms and fair division of labour that promote sensitivity and respect. Moreover, for constituencies to feel that they have a collective ownership for their partnership, the visions of all the involved parties need to be congruent and to be included in the planning and implementation of the partnership, and the power bases of the parties (the author/researcher, the "professional" partners who are involved in the partnership and the lay people) need to not be disparate.

Vision and Power

Congruency between the communities' and the researcher's own agendas needed to be struck. In order to achieve this both parties had to explicitly recognise that there are power imbalances between the professionals and the underprivileged groups with whom they work. It is important that secular knowledge is taken seriously. Power embraces the knowledge gained to influence resources and policies (knowledge power); competencies in utilizing data and information (information power, the "know what"); capacities of the stakeholders (technical power, the "know how"); and access to resources and funds (economic power) (El Ansari et al., 2002). Very early in the process, the author aimed to prevent (and deal with) any suspicion, caucus meetings, or possible mistrusts (El Ansari & Phillips, 2001). In doing so researchers need to recognise the fact that it is the recipient and the patient, rather than the provider, that is the central figure. Hence control need not be in the professionals' hands. Consequently, it is critical to hold early and lengthy negotiations for optimal congruency between the research topic and the community needs. Together lay people and researchers should undertake multiple refinements of the research objectives. Together they need to decide whether the research purpose will focus on operational, day to day programmatic features (important to lay community) or on policy questions seeking answers across multiple funded sites (appealing to donors). The idea is to display flexible negotiations of both the scientific and community priorities as well as the utility of this collaborative research evaluation. To ensure the partners' visions and an equalised power base, the partners' value systems and their unique ways of "doing business" need to be considered.

Value Systems

The diversity and multiplicity of stakeholders are likely to generate different value systems, philosophies, assumptions, and beliefs about research that require a value-based conceptualisation (Buchanan, 1996). When the researcher is accustomed to designs based on principles of scientific practice, partnerships with lay patients

require a change to including and integrating local community values (Allison, 1996). This sharing of mutual values and aims with a broad-based and diverse membership is a critical task. The vocabulary that is employed between researchers and service providers needs to facilitate dialogue, communication, responsibilities, and action plans (Binson, Harper, Grinstad, & Sanstad, 1997). The partners' value systems also determine what costs are acceptable to them and what benefits would be appreciated, based on stakeholders' preferences and priorities. Hence, it is necessary for a researcher to engage in multiple exchanges and refinements of mutual ideas until the purpose of the work is agreed, and until the steering groups of the participating partnerships consent to the research. Collectively both parties work together so that the research questions are of interest and of relevance to the stakeholders, and gradually, a feeling of co-ownership of the research needs to emerge, especially when there was no previous direct interaction prior to the research.

Hence, in order to better appreciate the culture, the author spent several months at each of the five South African partnerships, where with the engagement of the lay people, the author began to collect the agreed data. A researcher's interactions with the community are made possible by a deeper comprehension of their settings, contexts, and values. By sharing their cultural festivities, visions, social occasions and gatherings, successes and special events, the distance between the author and the lay community would get thinner. Hence all along, the author was careful of any professional domination or community fears that would represent barriers to a joint ownership. It is indeed true that peoples' power together with professional authority can maximise the impact of collaboration (Harper & Carver, 1999). Furthermore, the values of each partner (whether researcher, practitioner or patient) will ultimately influence each stakeholder's perceptions of the costs that each incurs in their partnership and the benefits that accrue from their involvement.

Costs and Benefits

The costs and benefits of research collaboration to both the researcher and the lay people have to be assessed from the beginning (El Ansari & Phillips, 2004). The partnerships' participation would provide the researcher access to their constituencies and agencies, help in data collection (and basic analysis), and when feasible would provide transportation across their multiple programmes that were dispersed in various localities. These represent costs for the community. In return, within each partnership, the author trained some lay members on data collection and some fundamental data scrutiny, held talks and debates on partnership-working and the challenges associated with it, shared some of the published literature, and disseminated examples of lessons learnt from the other partnerships that the author was also researching. Moreover as the research progressed, the author fed back the research's provisional findings to the partnerships in order to enhance their policies and practices. These represent benefits to the community. Such participatory actions contribute to transferring research skills to the partnerships' lay people regarding data collection and analysis techniques, computer software applications, and other research challenges (benefits to the community). These collaborative contributions to empowering a local expertise base would, in turn, enhance the research capacity of the collaborative effort after the researcher leaves the projects.

In connection with real expenditure, there were no monetary costs to the partnerships in terms of evaluation charges, as the author had previously secured some moderate research funding from the U.K. (no real costs to the community). In order to realistically evaluate the multiple aspects of the partnerships, the author spent considerable time with the partnerships to collect the data, enter it into the computer, analyse it, and write up the findings (costs for the researcher). In return the author wrote his doctoral thesis based

on the work, and would disseminate the results (benefits to the researcher and the community). In summary, researchers have to think about the time taken from other obligations for the partnerships to participate in the research. This and other issues required support from the partnerships' leadership, an appreciation of the joint working effort, and a recognition of the potential skills that could accrue to the partnerships without pressure for additional commitment. Researchers also need to think about both the influence of the partnerships' staff turn over and the instabilities in community organization on the evaluation, as well as the impact of limited funding of some of the partnerships' programmes for the whole research endeavour. A common cost that deters people from involvement in a partnership is the potential of an unpleasant feeling that the partnership is not actually playing a role in effectively narrowing any gaps between the professionals and the lay people in the community. Conversely when such gaps are being narrowed or abolished altogether, this represents a definite benefit and incentive for further committed participation from the patients and lay people.

Narrowing the Gap

Bridging any existing cultural (and social) gaps between the community and the researcher is another factor (Vega, 1992). When working with communities, researchers need to reflect about where best they should be physically stationed during the execution of the research. When the author stayed, lived, and worked within the community neighbourhood, he observed and learnt more about the issues and contexts than would have been possible if he was stationed elsewhere (e.g., on the university grounds, or in a health service department). Hence, researchers need to be geared up to move away from their "ivory towers" in order to learn more about the patients and people they are working with. This has the added advantage of emphasizing the even-handed relationships between all as equal research partners, hence allaying any sense of professional domination. Through interactions and dealings in the community the researcher creates connections and nurtures the budding relationships. An inter-dependence is being created where the researcher's knowledge and research base are being amalgamated with the community's insights and understandings. Through recurring exchanges both parties, as partners, collectively narrow the gap, with no command from the professional or worry from the lay people. This is important for community and patient engagement.

This process of purposely living among the people in the localities that were participating in the research may not always be an easy one. Some areas had no running water or electricity, while others were risky, given the prevalence of weapons and violence in SA. Still it was the most direct way to truly understand what these people were actually concerned about, and what their collective inspirations were. Given the literacy rates in SA at that time, and in order to narrow the gap, it was also important that we collectively consider what the written, verbal, or other means of dissemination will be and when they will be released; as well as the nature of any interim analysis of the data that would be undertaken and the advice that would be provided while in the field. However, for any established gaps to be narrowed or abolished, empowerment and capacity transfer act as the "equalising conduit."

Empowerment and Capacity Transfer

A common misconception is that empowerment and capacity transfer is something that flows, in a unidirectional manner, usually from the researcher to the community. This is very untrue. In genuine partnership efforts, it is not only the community capacity that is developed, but rather a co-learning and empowering process that is initiated and maintained that facilitates the reciprocal transfer of knowledge, skills, capacities, and power to

all partners (Nyden & Wiewel, 1992). In many instances academics have over-valued their own talents and abilities and conversely, communities and oppressed groups have underrated their skills in a range of areas. Empowerment is a two-way process, where thinking, behaving, capacity building, co-learning, communicating, facilitating, innovating, experimenting, as well as the transferring of expertise, is reciprocal in order to achieve healthy and just communities and public systems. It is a flow that goes recursively back and forth in order that lay participants and patients do not perceive research as an elite university "business" that happens "over there" and is undertaken by "those people." In the same way that university researchers need to find supporting ways to empower and encourage potential community scholars to engage in creative, problem-solving community research, community members similarly need to transfer their long-earned lay familiarities in community organising, reaching target communities, and working with community groups to academic researchers. It is indeed a responsible and innovative dyadic process with the duty of problem-solving and strengthening the research abilities of all the partners. Hence, both the researcher and the community have to judge the language and technical jargon that is used between the stakeholders. Similarly, besides the journals and other academic outlets, there needs to be a debate about the use of local meetings and opportunities that use non-technical language in order to communicate the findings.

In the research partnership with the South African communities, the author and the local people collectively employed and expanded a repertoire of multi-disciplinary, pluralistic methods to examine problems that were of concern to them. This included aspects of naturalistic inquiry (interviews) that are appropriate in providing in-depth information and context, as well as processes and outcomes to the providers and the communities. In addition, both parties also utilised a quantitative approach (survey) in order to capture and gain an understanding of the many facts on the range of facets of their partnerships. As partners, they used pluralistic evaluation that employs evidence from many sources, using different methods to generate conclusions concerning outcomes (Billings, 2000). But using several methods at several sites to bear on a research question is not an easy process. On the one hand, such cluster research is useful in the aggregation of data to find commonalties and/or contrasts. On the other hand, how quality assurance mechanisms would be implemented, monitored, and maintained, especially in multi-site research consumed a good deal of the partners' deliberations and time. The difficulties are also further augmented when a community comprises several competing factions, or diverse voluntary, civic agencies and non-governmental organisations. Nevertheless, engaging the multiple viewpoints increases the political feasibility of the research. Hence, it is critical that researchers be attentive in maintaining equality and neutrality all the time while preserving honesty, integrity, trustworthiness, empathy, compassion, confidentiality, respect, responsibility, critical self-appraisal, and commitment. Thus, a high degree of ethical awareness is truly essential when engaging with communities.

REFLECTIVE DISCUSSION

Partnerships are a critical component in setting up collaborative agreements to accomplish improved outcomes. Partnerships are required now more than ever (Wolff, 2001), particularly in the present times of critical economic turbulence, where sustained economic hardship has led to poorer physical, psychological, and cognitive functioning (Lynch, Kaplan, & Shema, 1997). Public health and public health informatics offer precious and timely individual health information systematized in an array of information systems. It needs to be noted that partnerships for health and health informatics are not only for the function of acting

as a storehouse of valuable health information, but also for bringing about and achieving improved individual patient and population health. This can truly happen when the voices and opinions of individuals/patients and people is assigned as the top priority.

Besides the challenges inherent in the collaborative approach, particularly partnerships that aim to strengthen human resources for public health informatics pose separate challenges. These include the appropriate use of information technologies; the cultural, social and political impediments; the evaluation metrics for public health information systems; the standards for data exchange; and the education and training of public health informaticians and researchers (Detmer, 2007). This is further complicated by the wide variety of informatics domains: applied clinical informatics; clinical research informatics; public health/population informatics; translational bioinformatics; nursing informatics; and public policy informatics (Detmer, 2007). All these highlight the need to create a skilled informatics workforce by way of partnerships and pairing of universities and actual implementation sites. Such an "informatics" workforce would include physicians; nurses; pharmacists; computer, information, and behavioral scientists; biomedical engineers; academic researchers; educators; information technology managers; and related corporate partners (Detmer, 2007). Hence, partnerships are inevitably required between many stakeholders. These might also include health ministries (district, regional, and national); researchers and evaluators; legislators and policy analysts; NGOs and consumer organizations; advocacy groups; communities and patients; journalists; private sector health providers and insurers; and donors and international agencies (Stansfield, 2007). Such partnerships will need to meet many challenges in order to leverage private sector expertise; identify standards for the core information architecture; capture distributed innovation for information technology tools; evaluate and document that information technology speeds access and improves quality of care; enhance web-based dissemination of micro-data; build capacity for data analysis; reward transparency and accountability; and deliver evidence that access to better information does mean better decisions and better health (Stansfield, 2007).

CONCLUSION

When public health, hospitals, and health care agencies and patients work together in a collaborative mode, the process is a complex one. Partnerships to evaluate complex interventions is a challenging process, given the range of concerns, the contingencies of programme content and delivery, and the multiplicity of outcomes (El Ansari & Phillips, 2001; Klein et al., 1999). This chapter has detailed the development of healthcare research partnerships to promote and privilege the voice of the patients and lay people from the perspective of processes, dealings, and day-to-day difficulties. It has teased out many concepts related to ideas and practical activities that require attention from researchers and lay members who take on research partnerships. The author has sought to highlight and exemplify the concepts underlying some challenges of collaborative research based on the author's SA experience, and to suggest ways of preventing similar pitfalls.

Researchers need to have a strong understanding of the community's, the problems' and the localities' culture, history, tradition, context, and setting. For instance, it was difficult to collect the demographic (ethnic) data required for any inquiry in the very highly politicised atmosphere of the immediate post-election South Africa. Hence, data collection about ethnicity was difficult and had a low response rate. The sample's ethnic profile was useful, but SA was emerging from a deeply entrenched ethnic segregation, hence the author learned that sensitivity to cultural community issues and non-verbal clues is as important. Researchers will need to

frequently ask themselves: is it ethical and feasible to collect the data that they are collecting? In addition, research and evaluation are time consuming businesses; researchers need to minimally disrupt any of the community's normal functions during the research process. They need to quickly learn to blend in with the partnerships' activities. Data is best collected amidst daily activities, e.g., after partnership meetings, where many members are present and available. Transport to the multiple sites that are being researched will also frequently be a difficult task. Hence the author capitalised on visits that were already scheduled to the projects, where he could go along to collect the data. Thus, a good deal of flexibility is required as schedules change, people change, and priorities change. Similarly, a good deal of self-control is required when our own schedules as researchers suffer as the immediate consequence of such changes.

A major lesson is that partnering requires patience and flexibility among partners who, despite their common research agenda, differ in other ways. Within this realm, researchers need to learn that letting go of egos and agendas must be worked out on a regular basis. Lay involvement in evaluation of programmes is also important. In order to gain community trust, communication, truth telling, transparency (not concealing information), accountability, reliability, and reciprocity are all required. Researchers should not miss the opportunity to learn from the communities and people as to what might serve them best and what approaches to research can produce the most useful information in the least intrusive ways. Partnering and community engagement in research is about identifying and meeting the challenges. It is about creating innovative strategies. It is about negotiations and deliberations for a collective purpose and mutual benefit. Most importantly it is about co-learning with an open and receptive heart. Collaborative research connections offer one real model of how to move away from the real division between research and service toward the ideal partnership between these two worlds.

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Chapter 11
Human Resource Development and Technology Integration

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ABSTRACT

In the information age, technology is rapidly becoming an integral part of organizational life. Ever increasing technology applications have significantly reshaped the day-to-day practices of human resource development (HRD). This chapter explores the role of technology in HRD. Specifically, it addresses three issues. First, it identifies the challenges that technology has brought to HRD in the twenty-first century. Second, it analyzes the impact of technology on HRD practices with a focus on emerging HRD practices in virtual environments. Third, it provides insights into the future of virtual HRD in training and development, organizational development, and career development.

INTRODUCTION

Modern-day organizations are facing a number of challenges: intensified globalization, increased market competition, changing workforce demographics, rapidly changing technology and e-business, just to name a few. Of these, technology has perhaps made the most profound impact on organizational practices. Take a moment and reflect on the following questions: How many work-related emails do you receive on average, every day? How often do you receive electronic invitations to meetings, social events, free Webinars or professional development workshops? What types of automated reminders do you set up to remind you of an approaching deadline for a project or mandatory online training? Do any of your work meetings occur on social networking sites (e.g., Facebook™, LinkedIn™, Twitter) or in virtual worlds (e.g., SecondLife™ or ActiveWorlds™)? When was the last time you used Skype to communicate with a colleague or business partner in another part of the country or world? Did you turn to Blog, Wiki, online discussion forums or chat rooms to exchange knowledge? How many times did you use the Internet to search for new information? Does your company use the Intranet

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and/or Listserv for internal communication or social networking sites for recruitment, sales and marketing, operations management, and customer support? What's your reaction to these questions? Are you surprised or perhaps even overwhelmed? As Carroll and Wager (2010) so aptly summarized, "technology has further revolutionalized the ways in which many companies do business, forcing a paradigm shift for management that has resulted in new and innovative approaches to carrying out business with customers, employees and other stakeholders."

For the field of human resource development (HRD)—whose primary goal is to improve organizational effectiveness by developing individual knowledge, skills, and expertise—technology has significant implications. Not only has it provided exciting opportunities for HRD, it also presents difficult challenges for HRD professionals in promoting individual and organizational learning and performance improvement (Benson, Johnson, & Kuchinke, 2002). For example, almost a decade ago, Hronec (1993) projected that the role of information, in driving and evaluating initiatives related to HRD, is more significant than ever before. As a result, the successful application of HRD interventions and tools has become increasingly dependent upon the use of technology.

Despite wide recognition of the importance of technology to organizations, there has been little systematic research on its impact on HRD practices. As Bennett (2009) noted, "how important new technologies have been to HRD is an open question" (pp. 362-363). Furthermore, discussions about technology in HRD, while not devoid in the field, have not been adequately emphasized. Consequently, how organizations integrate technology into their work processes remains unclear. To fill these gaps, this chapter explores the role of technology (primarily Internet and Web-based) on the practice of HRD. Specifically, it addresses three issues. First, it identifies the challenges which technology has brought to HRD in the twenty-first century. Second, it analyzes the impact of technology on HRD with a special focus on emerging HRD practices in virtual environments. Third, it provides insights into the future of virtual HRD.

BACKGROUND

Current literature on the role of technology in the field of HRD (e.g., Benson et al., 2002; Githens, Dirani, Gitonga, & Teng, 2008) suggests that it is increasingly becoming a critical component of not only the day-to-day practice of HRD, but the effective completion of organizational tasks. The increasing emphasis on knowledge creation and technology application in HRD has led to the burgeoning concept of virtual HRD (VHRD). What follows is a discussion of the notion of technology in organizations, as well as two emerging concepts in HRD which point to a continuing evolution of the role of technology in HRD—VHRD and Web 2.0.

Technology

Information technology (IT) has grown exponentially, and globally, during the past two decades, leading to changes in nearly every field of practice, including HRD. And the term *technology* has been loosely used in our language. Technology is generally viewed as the application of the sciences to the objectives of industry, business, government systems, and human endeavors. As a process, technology is a "socio-technical means of defining and solving problems" (Swanson & Holton, 2001, p. 382). In the field of HRD, technology has been defined as open space technology (Owen, 1997), or human performance technology (International Society for Performance Improvement, 2000), or technology-based training (Kruse & Keil, 2000).

The technology revolution has brought forth an evolving and increasing set of IT tools for use in the digital workplace: e-mail; mailing lists; instant messaging; bulletin boards; newsgroups; Internet search engines; and Web databases are

some. While IT provides access to static forms of data and simple exchanges with others, it is information and communication technology (ICT) that has added the interactive (communication) dimension (facilitated by technology) into the workplace. According to Lewis (1998), the innovative impact of ICT lies in its ability of enabling operational communications in organizations through electronic interaction, which "not only removes the constraints of time and place, but also leaves a trace which forms part of the often missing organizational memory" (p. 13). More recently, Bastiaens (2009) described how ICT has enabled the virtual organization, organization development, e-learning, and performance improvement. As organizations respond to factors such as globalization and new world financial constraints, they often utilize ICT to accomplish work tasks; hence work becomes more 'virtual'. Examples include employees working from home while being connected to the company, multiple company locations being connected to one another through ICT, or a network of professionals in geographically disbursed locations communicating via ICT.

The potential of IT to transform organizations has been a persistent theme in both management, and information systems literatures since computers were first introduced commercially in the 1950s. Leavitt and Whisler (1958) first envisioned that organizations would leverage their mainframe computing power to reduce middle management levels and push decision making upward to a small executive elite. With the advent of desktop computing in the 1980s, this vision shifted the focus on a workforce of autonomous knowledge workers and an empowered clerical staff. During the 1990s, as computers became networked within and across organizations, predictions of "virtual organizations" emerged. More recently, the World Wide Web has spawned still another set of projections for electronic commerce among "boundary-less" organizations and "intranet systems" within them. Business process reengineering has given way to broader agendas for organizational transformation and knowledge management. Five decades following Leavitt and Whisler's projection, IT is being seen as a powerful force enabling radical new designs for organizations.

Technology has enabled a multitude of virtual tools and the integration of diverse systems which connect people with one another and with rich sources of information. It is estimated that 300 million people worldwide have registered for participation in some type of progressive virtual environment (King, 2009). In the organizational context, technology has transformed workplaces from physical spaces into virtual environments (Chalofsky, 2010) where bandwidth, networking, collaboration and innovation become essential. For example, Intranets make it possible for organizations to engage in proactive internal communications and leverage technology for flexibility in terms of work pace, work flow and work location (Bennett, 2009). These tools contribute to reduced costs, improved products, and better work-life balance. In capturing the impact of IT, Benson et al. (2002) made the following remarks:

"IT represents an evolving social transformation with profound implications and severe challenges and issues…IT is not a value-neutral instrumental innovation but rather a profound force on our lives." (p. 401)

As a result, organizations which adopt fewer IT tools and resources may lose out on significant education and development related opportunities (Teng et al., 2009).

Human Resource Development (HRD)

HRD is a multidisciplinary field of practice with core focus on learning and performance. It is a process of building the capacity of human resources through training and development, organization development, and career development

for the purpose of improving performance at the individual, team, work process, and organizational levels (Swanson & Holton, 2001). McLagan (1989) argued that HRD is "something everyone does" (p. 52). In recent years, the focus of HRD has been expanded from organizations only to communities and nations. Situated in the national and global context, HRD is viewed as a process of developing adults' work-based knowledge and expertise for the benefit of the individual, group, organization, community, nation, and ultimately, the whole of humanity (McLean & McLean, 2001). As a discipline, HRD has grown to encompass more than the traditional domains and includes issues such as ethics, diversity, human and social capital development, strategic change, policy development, secondary and postsecondary education reform, and nonprofit business development (Torraco, 2005). In addition, the HRD function is shifting from being preoccupied with individual performance and training-dominated activities to becoming more strategically oriented in practice (focusing on learning and knowledge creation to enhance individuals' competencies and collaboration with organizations (Wang & Ellinger, 2008). It is this integrated perspective that positions HRD in a critical role in developing an organization's competitive edge.

VHRD

As a result of the organization's quest for technology enhanced knowledge, there is the emergence of the concept of virtual HRD (VHRD). VHRD is in the early stages of development; few definitions exist. Currently, this concept has been defined from two perspectives—adult learning, and knowledge management. McWhorter, Mancuso, and Hurt (2008) first introduced the notion of VHRD through their empirical study of instances of adult learning in a virtual world. Building on Swanson and Holton's definition of HRD, these authors defined VHRD as "a process for developing and unleashing human expertise through training and development (T&D), organization development (OD), and career development (CD), by utilizing a technology-enabled environment for the purpose of improving learning and performance" (p. 1150). From a knowledge management perspective, Bennett (2009) defined VHRD as "a media-rich and culturally relevant Web environment that strategically improves expertise, performance, innovation, and community building through formal and informal learning" (p. 365). This definition views VHRD as a combination of people and technology, wherein many of the traditional areas of HRD become computer mediated. Core to both of these conceptualizations is learning (driver), technology (facilitator for learning), interaction between human and technology (process), culture (context), and innovation and effectiveness (intended consequence).

VHRD has the potential to revolutionize HRD by more directly connecting learning and performance initiatives within organizational systems (Bennett, 2009). It corresponds with calls for the field of HRD to become more strategic, business-savvy, and future-oriented (Ulrich, 1997). Ulrich identified four areas which can help HR professionals move in such a direction: (a) strategically managing human resources; (b) developing administrative expertise to manage organization infrastructure; (c) managing employee contribution; and (d) managing transformation, change and organization renewal. VHRD requires HR professionals to contribute to all four areas through the creation of virtual systems which, hopefully, will enhance organization performance and development. To accomplish these activities requires integration with information technology.

Web 2.0

What is extraordinary about the emerging concept of Web 2.0 is the apparent resulting shifts in practice—new labels such as *enterprise 2.0* (Paroutis & Al Saleh, 2009), *health 2.0* and *medicine 2.0* (Hughes & Joshi, 2008), and *library*

2.0 (Liesegang, 2007). These emerging practices perhaps suggest a twist in the traditional practices of organizations, health care, medicine, and library services, respectively. Similarly, the field of HRD appears to be influenced by Web 2.0 as it carries out VHRD. Web 2.0 is described as an environment or a platform, a set of services, or set of tools enabling collaboration, communication, community-building, co-construction, interaction, participation, and sharing (Engeström & Sannino, 2010; Hatakka, 2009; Obi, 2008; Paroutis & Al Saleh, 2009). Critten & Moteleb (2008) described Web 2.0 by referring to the collectively generated knowledge "where emphasis moves from individuals using the web to improve their own knowledge (Web 1.0) to Web 2.0 where individuals both share their knowledge with each other and, more crucially, through their sharing change and add to the body of knowledge shared by them all" (p. 57). The Web 2.0 technologies or tools typically cited included blogs, RSS feeds, social bookmarks, social networks, tags, and wikis.

Integrating Technology into HRD: Critical Issues

Advances in technology play a pivotal role in work, learning, and research affecting HRD. In this regard, Swanson and Holton (2009) outlined three tiers of technology which have greatly impacted the field. The first tier, *Workforce Technology*, encompasses trainers who analyze job-specific skills and subsequently target training to assist employees in getting work done proficiently. The second tier, *Technology within HRD,* looks at how HRD activities are delivered. The third tier, *Information Technology and HRD*, is considered a paradigm shift in which information technology (IT) has dramatically altered the way work is accomplished and shifted the locus of control from HRD professionals to individuals and work groups thereby enabling development wherever and whenever needed. This notion is supported by empirical evidence. For instance, the results of Ford's (1990) study suggested that employees trained adequately on the use of a personal computer (PC) raised productivity in organizations where technology was valued and yielded positive outcomes. Peterson (1997) argued that developments in technology may help business professionals prepare for cross-cultural experiences. More recently, Church et al. (2002) demonstrated through a case study how an organization used Web-career tools to drive cultural change successfully. Gardner, Lepak and Bartol (2003) surveyed 455 HR executives and found that the integration of IT impacts HR roles by changing demands for information and the need for IT support. In this case, IT enabled HR professionals to provide improved information responsiveness, have more information autonomy and more external professional links. IT has also allowed more efficient access and dissemination of information while shaping and changing job expectations. In sum, technological tools have proved to be useful for learning, performance enhancement, and organizational change and development (Benson et al., 2002).

The wide array of technologies can be exciting and promising when they contribute to the expediting of internal and external communications, standardized business and human resource processes, and organization change and development (Church et al., 2002). They can also be daunting and overwhelming as the constant and rapid technology changes increasingly make organizational and individual knowledge obsolete. Technology presents numerous challenges, which will only increase as the rate of technology change continues to accelerate.

HIGH-TECH VS. HIGH-TOUCH

The first challenge is how to balance high-tech interventions and high-level human interaction. Historically, HRD has functioned at a low-tech level. The twenty-first-century challenge for

HRD, according to Swanson and Holton (2001) is, therefore, be engaged in high-tech means of developing and unleashing human expertise in response to the demand for conducting HRD activities in a more efficient and cost-effective manner. Apart from its own technology, the HRD profession has been characterized by "sensitive engagement of client and participation high-touch" (p. 384). The new challenge for HRD, then, is to leverage technology without losing the human touch. HRD professionals need to learn more about how to effectively harness high-tech and high-touch interventions.

Changing HRD Roles and Skills

Technology has changed the role and skill requirements of HRD professionals. Twenty years ago, McLagan (1989) identified 27 core HRD competencies in four broad categories: (1) technical competencies (e.g., knowledge of adult learning and career development, computer competence, evaluation skill, media selection skill, training and development theories and techniques); (2) business competencies (e.g., budget and resource management skill, knowledge of business and organization behavior, OD theories and techniques); (3) interpersonal competencies (e.g., coaching skill, feedback skill, group process skill, negotiation skill, presentation skill; and (4) intellectual competencies (e.g., data-reduction skill, information-search skill, vision skill). Ten years later, Dare and Leach (1998) found that three competencies identified by McLagan were perceived as significantly more important as they were before. These include the technical competencies of research and electronic-systems skills, and the intellectual competency of visioning skill. In addition, these authors found two technical competencies (competency identification skill and objectives preparation skill) were seen as significantly less important than they were before. In today's virtual workplace, it is not difficult to project that the skills needed for effective virtual interaction would be drastically different from those in the 90s (Bastiaens, 2009; McLean, 2006; Torraco, 2005). HRD professionals will not only have to help others cope with the consequences of new technologies, and help organizations create new strategies for developing and retain knowledge talent, they must also continue to transition their own roles as virtual knowledge workers. Below are examples of new or different competencies required for virtual HRD in the twenty-first century.

- Knowledge of current technologies available to organizations (e.g., Internet and Intranet communications, video conferencing, web conferencing, search engines, instant messaging, podcasts, blogs, wikis, and virtual worlds)
- Ability to leverage existing technology and virtual environments for strategic advantage
- Systems thinking and intuitive thinking
- Visual-spatial skills
- Ability to communicate and interact in non-face-to-face (virtual) environments;
- Knowledge of context-sensitive motivation strategies (face-to-face, hybrid, virtual environments)
- Knowledge of diverse cultures represented by virtual teams which are geographically dispersed
- Management skills for supervising employees in a virtual environment
- Requisite skills for evaluating virtual environments

Unintended Consequences of Technology

The next challenge concerns leveraging the unintended consequences of technology application. Ample literature has chronicled the side-effects encountered when introducing technology into organizations. Robey and Boudreau (1997) pro-

vided a few examples of the "seemingly polarized pairs of social outcomes" (p. 170): empowered employees and oppressed employees; extended hierarchy and reduced hierarchy; organizational rigidity and organizational flexibility; and increases in staff and radical downsizing. Stephens and Szajna (1998) raised concerns about whether telecommunicating could lead to exploitation of people if organizations give them reduced pay and benefits, or treat them differently from traditional employees. Ardichivili (2002) identified several unexpected barriers leading to low online community participation, including barriers associated with individual psychology (e.g., fear of losing face, being criticized, letting colleagues down, or misleading others), and barriers associated with corporate security restrictions. Similarly, Church et al. (2002) outlined unintended consequences of technology in organizational development initiatives: decreased employee participation or lack of adequate representation; lack of faith in the system and confidentiality; and technological glitches. More recently, Morris (2008) identified increased stress associated with the use of technology, including disruption of work-life balance, physical health issues, and psychological stress. In addition to the inability of anticipating or managing these unintended consequences, organizations often overlook variables such as age, gender, and ethics in their technology adoption related decision making processes. Using age as an example, research suggests that age has an important influence on technology use in the workplace. Specifically, age differences in information processing impacted the older workers' performance of computer-based tasks (e.g., data entry, file maintenance, and inventory management (Morris & Venkatesh, 2000). Unintended consequences such as these, if not considered or managed carefully, "can seriously threaten the quality and validity of any data or information collected, the integrity of an entire process, and ultimately, the value of the overall organization development and change effort" (Church et al., pp. 503-504).

Ethical Issues

Finally, shifting of practices from face to face to virtual environments requires new ethical considerations. As virtual systems create significant opportunities to store vast amounts of confidential information, policies must be developed to protect the privacy of workers as well as protect the sensitive data that organizations now have in digital forms. Ethical conduct and trust play a critical role in the development of virtual organizations in the global market (Grydzewski, Hejduk, Snkowsda, & Wantuchowicz, 2008). HRD professionals must insure that HRD practices in virtual environments are congruent with accepted ethical codes of conduct.

EMERGING VHRD PRACTICES

This section discusses some of HRD related activities which have already been implemented virtually or discussed by HRD researchers. These activities include: virtual learning; virtual mentoring (Bierema & Hill, 2005); virtual teams (Workman, 2005); virtual learning communities (Birchall & Giambona, 2007); virtual communities of practice (Ardichvili, 2008); virtual knowledge management (Bennett, 2009); virtual organizations (Henderson & Provo, 2006); and virtual worlds (McWhorter et al., 2008). These, however, do not represent an exhaustive list.

Virtual Learning

Facilitating learning for individuals and organizations has been an essential role for HRD. Chalofskey (1992) projected, almost two decades ago, that computer-assisted learning (CAL) would be a new form of learning in the information age. Now, given the sophistication of media available

today, people can learn in a richer, more integrated, and potentially more creative way. Technologies for learning range from asynchronous e-mail, weblogs, bulletin boards, and distance learning platforms, to more robust synchronous environments of virtual chat, virtual classrooms, and virtual worlds. These virtual environments can enable learning engagement by providing flexibility and accessibility (Sambrook, 2005), as well as tools tailored to different learning styles, different learning pace, and different levels of participation (Macpherson, Elliot, & Homan, 2004). Further, the technology-enabled cognitive tools for learning allow individuals to develop higher-level skills (e.g., logic, computation, and analysis) rather than mere memorization. As a result, virtual learning is no longer merely a cognitive process but also involves human emotions, imagination, and intuition (Bouras & Tsiatsos, 2006). And, intuition is an unconscious activity important for creativity (Torrance & Safter, 1999).

Virtual Mentoring

The concept of virtual mentoring was championed in the field of HRD by Bierema and Hill (2005) who claimed that technology can facilitate the relationship between the mentor and the protégé. They noted that despite some drawbacks, virtual mentoring has the potential to foster a "deliberative, reflective, and thoughtful exchange" (p. 559). Virtual mentoring is also cost saving compared to traditional mentoring practices which may require frequent traveling for the mentors and protégés who are geographically apart. Last, and perhaps the most important, given the elitist nature of traditional mentoring, virtual mentoring can be a valuable alternative career development strategy for the underrepresented workforce (e.g, women and people of color) who are often excluded from mentoring programs (Wang, 2009). In fact, the topic of e-mentoring has received increasing research attention, and its value for the development of professional women' careers has already been established (Headlam-Wells, Gosland, & Graig, 2005).

Virtual Teams

With the unique feature of allowing interdisciplinary activities to cross traditional unit boundaries and geographies, virtual teams are rapidly becoming the norm in many organizations today (Reine & Trompendaars, 2000). Workman (2005) examined virtual teams in a transnational organization where members who were geographically dispersed used contemporary technology for communication and coordination of teamwork. Interestingly, he found that tightly controlled teams outperformed loosely structured and managed virtual teams, and he called for virtual team members to "communicate, plan, problem solve, derive products or solutions, and monitor their performance" (p. 436).

A number of variables are found which affect the success of virtual teams, including: communication (Dewey & Carter; 2003; Johnson & Jeris, 2004); trust (Colky, Colky, & Young, 2002); knowledge of technology (Benson et al., 2002; Church et al., 2002); socio-emotional capability of virtual workers (Jones & Ruona, 2006); and leadership (Moran, 2005). Jarvenpaa and Leidner (1999) studied global virtual teams where the participants had never met before, and found that teams with leaders who used traditional control mechanisms, such as weekly status reports, seemed to have lower level trust within the teams and therefore reduced the likelihood of success. They also identified two factors which contributed to successful virtual team practices. One was having enthusiastic social communication at the outset which gave way to high task focus. The other was providing timely responses to communication without being negative. Therefore, identifying strategies to encourage self-organization and trust building are essential for virtual work.

Virtual Organizations

Technology advancement, together with globalization, has shifted traditional organizations toward virtual organizations (Beck, 2003; Henderson & Provo, 2006 p. 275). Knowledge workers are crucial to virtual organizations where employees need to understand how to manipulate computer systems to perform tasks effectively. One issue for HRD professionals to consider is how to motivate employees in a virtual environment where face-to-face interaction is minimum or not present. Henderson and Provo (2006) urged HRD professionals to seek strategies to deal with the new complexities that will be generated by continuing technology advancements. Lewis (1998) called for the need for investment in understanding current practices and human behavior in order to create virtual learning organizations, because "the returns could well be enormous" (p. 13).

Virtual Learning Organizations/ Communities

In virtual learning environments, information and communication technology enables the exchange of tacit knowledge, and provides new members with a means of gaining knowledge about the organizational culture (Lewis, 1998). Birchall and Giambona (2007) stated that a virtual learning community offers several advantages over traditional means for knowledge sharing, and that trust plays a significant role in virtual learning communities. However, building trust can be challenging given the absence of non-verbal cues in a computer mediated environment. Since communication is a key factor of trust building, it is critical how and what communication mechanisms are selected to trigger meaningful and sincere dialogues.

Virtual Communities of Practice

Virtual environments enable the co-creation of knowledge which promotes the formation of virtual communities of practice. A community of practice is "a group of people informally bound together by shared expertise and passion" (Wenger, 2002, p. 1). Virtual communities of practice are usually distinguished from virtual teams because they are normally organized around community members' common interests, but are not usually working toward achieving specific performance goals as observed in virtual teams. Communities of practice are "important vehicles for collective learning in the workplace" (Ardichvili, 2008, p. 541) and have the potential to lead to "the most intensive interaction and knowledge generation and exchange" (Ardichvili, 2002, p. 456). This view is consistent with Lien, Hung, and McLean's (2007) case studies of organizational learning within six high-technology firms in Taiwan. In this study, the authors found that virtual communities of practice contributed to the linkage of knowledge sharing and knowledge management.

Virtual Knowledge Management

Knowledge management (KM) is a social activity aided by technology, therefore, essential for developing VHRD, Bennett, 2009). KM analyzes how knowledge is acquired, created, and distributed in organizations (Lengnick-Hall & Lengnick-Hall, 2003). Specifically, it focuses on understanding the interactions between tacit and explicit knowledge, the process of knowledge creation and conversion. As Ardichvili (2002) observed, "contemporary Web-based KM systems integrate real-time information sharing and coordination between: various departments; knowledge sharing and discussion between individual employees and teams and communities; skill databases; company yellow pages; product and service information; and Web presence for customer information gathering" (pp. 455-456). These features make a contemporary

KM system an ideal tool for promoting organizational learning, a central theme of HRD.

Virtual Worlds

Virtual worlds are "a three-dimensional world where multiple people can interact in real-time while using avatars (virtual icons) as representations of themselves" (Chapman, 2008, p. 917). Virtual worlds emphasize team play and community, giving a sense of presence lacking in other media, thereby simulating a high-level of involvement and immersion in a virtual environment (Johnson, Vorderstrasse, & Shaw, 2009). The most popular virtual worlds are *Active Worlds* and *Second Life*. Virtual worlds have the ability to take online collaboration and interaction to new levels, break down hierarchies, and eliminate geographic boundaries (Chapman, 2008; Gronstedt, 2007; Hutchinson, 2007). Furthermore, learning in virtual worlds is learner driven (built by users), rather than instructor driven (built by owners); therefore, virtual worlds hold great promise for new, exciting, and innovative learning experiences (Crites & Homan, 2009). Organizations such as IBM, Cisco, and Manpower have leveraged virtual worlds to "cut travel, training, and meeting costs, gain substantial access to global talent, trim back internal redundancy, and increase communications among departments that were once isolated from one another" (King, 2009, p. 12).

FUTURE TRENDS

This section discusses some broad implications of technology integration in the three domains of HRD: training and development; organization development; and career development. As McLagan (1989) argued, HRD is "something everyone does" (p. 52). This speaks to the importance of understanding future trends of HRD in a technology dominated era. And the implications, although not yet fully understood, point to some specific areas into which technologies can be integrated within organizations. These areas, therefore, may be guides for organizational leaders, managers, trainers, and human resource developers in their effort to use technology for enhancing individual, group, and organizational effectiveness.

Technology-Enabled Training and Development

Training at work, a core domain of HRD, is increasingly becoming a Web-based activity (Benson et al., 2002). Examples of IT tools used to support both formal training interventions and informal learning activities include e-mail, bulletin board messaging systems, wikis, discussion boards, video conferencing, simulations, and chat rooms. Web-based training offers flexibility, a consistent delivery of training materials, and self-paced learning opportunities. Both learners and organizations can benefit from reduced travel and other expenses associated with attendance in training sessions (Schooley, 2009). This potential for reducing costs will likely lead to an increased participation rate and meaningful self-directed learning. One of the challenges for HRD professionals in this area of training and development is how to deal with the changing nature of instructional design and assume the new role of delivering instruction using a wide range of Web-based technologies (Benson et al., 2002). These new roles require greater skill in areas which are not typically within the repertoire of expertise of HRD professionals, such as technology management, troubleshooting, graphic design, and media production. One way HRD professionals can address this challenge is to partner with professional instructional designers and technologists to ensure the virtual learning environment is user-friendly and usable—two critical factors influencing online learning (Sambrook, 2005). In addition, HRD professionals must be certain that learning is integrated into an organization's work processes and reward systems (Holton & Baldwin, 2003) which can

be managed electronically (Bennett, 2009). The advantages of using technology for training and learning has been recognized by HRD scholars both conceptually and empirically for more than twenty years, including facilitating self-directed learning, and enhancing adult learning (Manz & Manz, 1991), increasing interactions between the instructor and the learner (Russ-Eft, 1994), saving costs (Harp, Tayler, & Satzinger, 1998), and boosting trainees' self-efficacy (Christoph, Schoenfeld, & Tansky, 1998).

Technology-Enabled Organization Development

As Benson et al. (2002) and Church et al. (2002) pointed out, to be successful in any change initiative, organizations must adopt the perspective that OD is a data-driven process for change; hence, the successful application of OD interventions is becoming increasingly dependent upon the use of technology. According to Church et al. (2002), direct attention to the role of Web-based technology in OD must be given to three areas: (1) data-based assessment tools and techniques (e.g., survey, 360-degree feedback, selection tests); (2) team building (e.g., virtual teaming, information sharing); and (3) management and employee development (e.g., career tools, interactive training, self-paced learning). This focus requires organizations to develop employees who are comfortable with technology and have access to the data and tools they need to support change (Benson et al., 2002). In their study, Milton, Watkins and Daley (2005) found that the virtual environment provides opportunities for facilitators to be deliberate in how they intervene in group situations, using reflection on the results of the interventions, and be flexible in responding to group needs. Further, they posit that the virtual environment is a powerful tool for modeling OD interventions. And, HRD professionals have a tremendous opportunity to use IT tools to enhance learning, job performance, and organizational decision making (Benson et al., 2002). In addition, organizations must also conduct careful assessment of their decisions about the effectiveness of their use of Web-based technologies, as well as how those decisions affect the organization's bottom line. Given the limitations of the existing approaches to evaluation, HRD professionals must develop new measures to adequately evaluate the impact of technology application on organization change and development (Benson et al., 2002).

In sum, technology allows OD initiatives to be structured not only into communication channels but into daily virtual work. Action technologies, virtual team development, innovation, and change processes may be accomplished through VHRD. A research area HRD professionals can explore is whether and how VHRD fosters high-performing and healthy organizations (Bennett, 2009).

Technology-Enabled Career Development

The role of technology in management and employee development has increased significantly (Church et al., 2002). Such application has enabled many new approaches to individual development. Examples include online career management tools, internal and external job posting worldwide, customized interactive training and work simulations online; and sophisticated software programs that assist the design of learning objectives, link content to objectives, and assess learning outcomes (Tippins, 2002). Pierce and Pitts (2005) predicted that virtual career development is a likely avenue for assisting individuals and organizations with career development efforts (Pierce & Pitts, 2005). They urged HRD professionals to seek ways to leverage this valuable career development resource.

However, career development in virtual environments will have a different complexion reflecting different organizational values (Bennett, 2009). Several issues are important to consider here. One is about the management of career development data. Organizations need to

set priorities about the use and reuse of career development data. For example, virtual mentoring leaves a record of communications that could affect the attitude about openness a mentor and a protégé feel toward sharing information (Bierema & Hill, 2005). Organizational assumptions about how to judge merit for promotion are also an issue. And, how important face-to-face time is for advancement opportunities will affect career development in virtual work. Organizations also need to develop a new generation of leaders and prepare them for working and managing within virtual environments. Additionally, the methods we use to promote people in virtual work become another issue. Both likability and competence are important factors for career progression. In the past, women have often been at a disadvantage because their personal and social obligations have restricted their ability to participate in informal networking, particularly events after business hours (Wang, 2009). In a technology-enabled environment, this issue may be somewhat mitigated if informal networks, such as virtual social networking, meet on-line. Further, technology has long been considered a male-oriented domain, which could disadvantage females using technology tool for communication or working with technology development. Heilman, Wallen, Fuchs, and Tamkins (2004) found, through a series of studies, that women who show competence in mail-gendered tasks tend to be disliked for their success, which is problematic for promotion. Each of the issues identified above warrants systematic research efforts.

CONCLUSION

New forms of information and communication technology (ICT) provide an abundance of options for work and learning today. This trend is likely to increase as the millennial generation enters the workforce holding an unprecedented technical savvy. In the technology-enabled environment, students will be able to follow personalized learning pathways which allow greater flexibility for different learning styles and intrinsic motivational factors (Christensen, Horn, & Johnson, 2008). The future workforce will be increasingly comfortable with learning and communicating using technology. As individuals assume a bigger responsibility for directing their own career development paths, the traditional employer-employee relationship will be redefined. As far as HRD is concerned, technological development and corresponding change in the workforce will continue to move HRD activities to a more virtual process. VHRD, as a paradigm shift for the field, will continue to transform organizations and alter many of the core HRD practices and skill sets. The reach of HRD can be greatly increased as virtual work crosses space and time boundaries.

Mitroff and Linstone (1993) suggested a set of guidelines for managing social and technical change in organizational settings. They proposed that organizations should: (1) strike a balance among technical, organizational, and personal perspectives; (2) foster a culture holding a variety of perspectives; (3) recognize that organizational and personal perspectives require greatly different methods than do technical ones; (4) pay attention to the mutual impact, interdependencies, and integration of perspectives; and (5) beware of thinking statistically in dynamic environments. These guidelines would also work well as guiding principles for holistic thinking about learning and knowledge management in organizational settings. Certainly, these suggestions can be useful in guiding future VHRD practice.

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KEY TERMS AND DEFINTIONS

Human Resource Development: A process of enhancing individual, group, and organization effectiveness through training and development, organization development, and career development.

Virtual Community of Practice: A group of people who are informally bound together by common interests and communicate virtually.

Virtual Environment: A technology-enabled environment that requires no face-to-face human interactions.

Virtual Human Resource Development: A process of using Internet- or Web-based technologies to enhance individual, group, and organization effectiveness through training and development, organization development, and career development.

Virtual Team: A team where members work in geographically disbursed locations and communicate virtually.

Virtual Workplace: A work environment where organizational members perform tasks in the virtual environment enabled by Internet- or Web-based technologies.

Virtual Worlds: A 3-D environment where multi-users interact in real time using avatars as representation of themselves.

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Section 2
Development and Design Methodologies

This section provides in-depth coverage of conceptual architecture frameworks to provide the reader with a comprehensive understanding of the emerging developments within the field of Human Resources Management. Research fundamentals imperative to the understanding of developmental processes within Human Resources Management are offered. From broad examinations to specific discussions on methodology, the research found within this section spans the discipline while offering detailed, specific discussions. From basic designs to abstract development, these chapters serve to expand the reaches of development and design technologies within the Human Resources Management community. This section includes 10 contributions from researchers throughout the world on the topic of Human Resources Management.

Chapter 12
HRM Adaptation to Knowledge Management Initiatives: Three Mexican Cases

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EXECUTIVE SUMMARY

Organizational knowledge and human capital are increasingly regarded as key levers of competitive advantage in today's global, dynamic and complex business environment. People are the ultimate knowledge creators and bearers; although organizations may have memory systems, they do not think by themselves. Human resource management (HRM) has a strategic role facilitating knowledge management (KM) initiatives, specifically in activities such as: recruitment, training and compensation. Although many studies raise the question of how HRM shapes KM, limited research in Latin America has explored this matter. This chapter aims to explore how HRM policies and practices have been designed in three organizations located in Mexico, in order to support KM initiatives. The findings suggest that the strategic role of HRM in supporting KM initiatives must be expanded. HRM policies, practices, and compensation systems, such as incentives and bonus packages to motivate employees to create and share knowledge, need to be redefined. Recruitment, selection and, training and development must be tailored to obtain a successful implementation of the KM program.

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BACKGROUND

Nowadays, firms are facing a more dynamic environment, where uncertainty and technological changes dominate. As a result, organizations have to base their strategy and competitive advantage on intangible resources and capabilities. Managers should know how to administer the challenges and advantages that the environment presents, particularly in cases where the time factor is vital to develop, implement and transfer innovation systems for their survival. Furthermore, firms must develop flexible, administrative capacity to effectively coordinate their internal competence. The more dynamic the environment is, the more firms focus their strategy on resources and capabilities (Grant, 1996). In this context, one must take into account that while some organizational resources are easy to transfer, such as processes and equipment, others, such as knowledge, an intangible asset that is usually tacit and organization-specific, are less mobile. Knowledge is a valuable, generally essential, rare and inimitable resource (Barney, 1991:112.), and it constitutes a source of competitive advantage (Grant, 1996:376). The key resource is knowledge, which is intrinsic to human capital. People are the critical creators and bearers of knowledge. Organizations do not think by themselves; they need employees to leverage their knowledge. In this particular framework, it is relevant to explore how HRM policies and practices have been designed to manage this intangible resource.

Lado and Wilson (1994, p.699) in Minbaeva (2005:126) suggest that HRM practices "can contribute to sustained competitive advantage through facilitating the development of competencies that are firm specific, produce complex social relationships, … and generate organizational knowledge." Managing HR to achieve better knowledge-related outcomes means "retaining personnel, building their expertise into the organizational routines through learning processes, and establishing mechanisms for the distribution of benefits arising from the utilization of this expertise" (Minbaeva, 2005:126).

As emphasized by Huselid (1995), HRM practices influence employees' skills and competencies through the acquisition and development of a firm's human capital. The competitive advantage of a firm is dependent on the existence of HR with relevant competence profiles. An analysis of the competencies needed for different positions, along with an analysis of a firm's current pool of employee competencies, helps the organization hire people with the desired skills and knowledge (p. 590).

The emergence of new forms of working practices, such as flexible working practices, reflects that need. Most traditional KM systems rely on the assumption that knowledge can be conceptualized as an object that can be identified, separated from its initial context, and handled in information systems (e.g. Nabeth *et al*, 2002). Thus, managers need to understand the meaning of knowledge in order to plan knowledge handling processes and to enable them to judge how knowledge affects people, organizational culture, management activities and other processes within the organization. Managing knowledge is not the same as HRM. KM involves managing intellectual property; that is, managing the development and transfer of organizational know how. It is more multifaceted than simply managing people (Teece, 2000:147). Organizational structures and management practices are changing to facilitate the implementation of KM in organizations.

The Study and its Methodology

In KM literature, there is relatively little consideration of cultural and human issues, even when the key obstacles exposed as knowledge transfer inhibitors are those related to the "human" side of KM. The main purpose of the present study is to determine the HRM practices and policies that 1) enhance the generation of knowledge and 2) support knowledge transfer in an actual busi-

ness environment in Mexico. The present chapter explores the cultural and social embeddedness of knowledge from the evidence obtained through exploratory case study research from three Mexican firms, one in manufacturing industry and two in the service sector.

Exploratory qualitative research has been designed to investigate how HRM has had to adapt to KM initiatives in three Mexican enterprises. The case study method was used given that it fits well with the maturity stage of the theory involved and with the relative emergence of the phenomenon under study. This allowed us to establish detailed evidence and interpretation (Yin, 2009).

The three case studies were not chosen randomly; companies were selected on the basis of having innovative processes that contribute to their competitive advantage. Our interview protocol was designed around these issues: (1) knowledge generating activities, (2) knowledge transfer mechanisms, and (3) HRM practices that support KM initiatives.

The interview information was complemented with internal documentation provided by the firms. Face-to-face semi-structured interviews were held with HR managers and employees at different levels of the organization. The interviews lasted 60 and 90 minutes each and were audio-recorded. The interviews were transcribed verbatim and were circulated among all the authors in order to construct the full write-ups of each case. The interviews took place in 2008. In the following section, each case is analyzed separately.

SETTING THE STAGE

Information and Knowledge

Most traditional KM systems rely on the assumption that knowledge can be assimilated to objects that can be identified, separated from their initial context, and handled in information systems (Nabeth et al., 2002). Thus, organizations, and in particular managers, need to understand the meaning of knowledge, in order to plan knowledge handling processes and to enable them to judge how knowledge affects people, organizational culture, management activities, and other processes within the organization.

Knowledge as a business resource can be a source of sustainable competitive advantage, if it has two important properties: (1) it derives from accumulated experience, rather than specific tasks, meaning that it largely consists of tacit knowledge, which makes it difficult to transfer from one firm to another or for competitors to imitate it; and (2) it is not only connected to individuals but also to the way these individuals interact (Nonaka & Takeuchi, 1995).

Most people think of knowledge as a recipe - a predefined procedure - for dealing with a concrete, routine situation. However, in a dynamic environment few situations are repeated, which means that most situations are novel, particularly in their details. Knowledge must provide people with the ability to envision ways of handling different situations and to anticipate their future implications. Knowledge - in the form of mental models, scripts, and schemata - enables people to work in novel situations. They are thus able to assimilate not only concepts and predefined methods and judgments, but also to make connections between these and other complex concepts, meta-concepts, and mental models (Wiig, 2000).

Personal knowledge cannot be shared directly. This explains why people can carry out the same task differently from their colleagues even when a standardized process exists. The answer lies in personal knowledge, experiences, attitudes and context (Polanyi, 1962). Everyone has his or her own way of internalizing and making sense of the information received in order to interpret it and turn it into new knowledge. Knowledge is built through a complex learning process and results in highly individual mental models and associations. However, even under the best circumstances, only a small fraction of an individual's applicable exper-

tise can be articulated and shared. Frequently, only concrete, operational or routine knowledge can be communicated. Deep, broad insights are generally not available and may not even exist, except as the abstract ability to reason. Significantly, when experts disseminate knowledge openly and widely, they tend to be considered important by their peers and gain status and recognition (Szulanski, 1996).

In sum, information needs to be interpreted, analyzed and transformed by people–knowledge workers. There should be an understanding of what knowledge workers do and in what ways they use knowledge and information to create value in organizations (Davenport, 2003). Most debates on KM depart from the premise that organizations do not recognize the full value of the knowledge "created" by their employees. The following section presents our definition and view on knowledge workers.

The New Work Force: Knowledge Workers

In 1969, the definition of knowledge worker proposed by Peter Drucker sought to describe the successors of factory workers: "*The most valuable asset of a 20th century company was its production equipment. The most valuable assets of a 21st century institution (whether business or non-business) will be its knowledge workers and their productivity*". However, knowledge workers can be defined as participants in the knowledge-based economy. This definition has the advantage of being cross-sectoral but the disadvantage that it is far from specific (Brinkley, 2006:16). Brinkley (2006) suggests three ways to define knowledge workers:

- All those who work in the top three standard occupational classifications (managers, professionals, associate professionals).
- All those with high levels skills, indicated by degree or equivalent qualifications (professional diplomas and/or higher education).
- All those who perform tasks that require expert thinking and complex communication skills with the assistance of computers.

On the other hand, Rüdiger and McVerry (2007) explain that neither definition perfectly captures what knowledge workers really are about, how they differentiate themselves from non-knowledge workers or how they perform their jobs.

Today, knowledge workers comprise the majority of the work force. While at the beginning of the 20th century, unskilled labor accounted for about 90% of the work force, today that figure is closer to 20% (Spira, 2005). Taylor showed that manual work consists only of simple, repetitive activities. Knowledge, that is, the way in which these simple, unskilled motions are put together, organized and executed, can make these activities more productive.

In the context of emerging economies, the example of Mexico is presented. In 2004, 17% of the total Mexican workforce consisted of knowledge workers (Brinkley, 2006). This may sound rather high, but if we compare it with the Netherlands (48%), Canada (39%) and Spain (31%), it is not high enough. This means that in Mexico, the majority of production results from manual work rather than knowledge work.

The shift from factory to knowledge workers represents a significant challenge to managers, who manage workers in more traditional roles. The basic difference is that a greater stock of knowledge supports a higher level of productivity (Grant, 2000). Different workers use different types of knowledge; this knowledge takes different lengths of time to acquire, and without knowledge, the employee is completely unproductive.

Besides, it is difficult to compare the knowledge intensity of different occupations. For survival in competitive environments, all employees, especially HR managers, have always worked to build the best possible knowledge base within

their area of responsibility and to ensure that it can be easily disseminated to all organizational levels (Wiig, 2000:3). The HRM department has to provide a kind of storage space so that all workers can access most of the firm's knowledge. This storage space may be located within the firm's Intranet or a database containing documents that describe important processes and activities.

In Mexico, it is mostly transnational companies that use the Intranet as a space where employees can access information about the enterprise's main activities, including information about who has expertise in a specific area. For employees, the Intranet is a convenient means to establish virtual contact with other members of the organization and to keep up to date with the organization's activities. Effective KM depends on an explicit understanding of the complex ways in which people use their knowledge – their thought processes - to conduct their work. It means understanding what people have to know and how they access this information so that they can act effectively in different situations. The following section will elaborate on the knowledge management process.

Knowledge Management Process

Knowledge-based economies, which are directly based on the production, distribution and use of knowledge and information (OECD, 1996), challenge the basic processes of KM: how to create, share, transfer and store knowledge. These processes may pose a threat to traditional productive processes, and this is in part what KM research studies.

Organizations have always managed knowledge, even if they have not always talked about it in those terms (OECD, 2004). Nevertheless, there is an urgent need for KM to be seen as a corporate strategy and as a key precondition for increased productivity in the knowledge economy more broadly (Brinkley, 2006).

Early KM initiatives approached the challenge of improving knowledge workers' productivity from an organizational perspective by treating knowledge as an object. Reviewing the studies that have dealt with the theme of KM and its contribution to a firm's competitive advantage, three main aspects can be identified. First, at the individual level, it is the individual employee, who is responsible for knowledge creation within the firm (Nonaka & Takeuchi, 1995; Grant, 1996). Second, at the organizational level, the knowledge that has been created within the organization by some of its members should be transferred to other individuals so that it may be known to all. Third, once transferred and received, the knowledge generated should be integrated into the existing organizational knowledge base (Zárraga & García-Falcón, 2003:81).

Knowledge processes, such as generation, transfer and utilization, are interrelated and often cannot be separated. In the following sections, each phase of the KM process- generation, transfer and utilization- is described.

Knowledge Generation and Utilization

The knowledge generation and utilization processes are presented together in this section, given that when an organization utilizes knowledge, it can also generate it, and vice versa. Knowledge generation is mainly an institutionalized activity, so each organization must be able to establish its own creative routines and human intervention to make this process possible. The challenge is building systems that collect the learning processes acquired during projects and ongoing activities, capturing that knowledge in a database or document, and then spreading it throughout the entire organization (Grant, 2000).

Enterprises mainly create and utilize knowledge through social interaction. Socialization, as Nonaka and Takeuchi (1995) have explained, is a process of converting new, tacit knowledge into tacit knowledge through joint formal and informal activities, such as spending time together, working

in the same office and chatting. In the knowledge generation process, organizational culture, which results from experience based on tacitly shared norms of coordination and collaboration, can influence the way in which individuals interact within an organization. In fact, a culture that promotes intensive communication, accepts new ideas, and is prepared to explore new processes and activities favors the generation of knowledge (Zapata, Rialp and Rialp, 2009).

This knowledge generation process leads to increased firm competitiveness. It may be stimulated through non-hierarchical organizational structures, an active general management, and by motivating employees to innovate and learn lessons that allow them to obtain new and better knowledge (Nonaka *et al.*, 2000).

The dynamic environment, which firms are currently facing, not only provides employees with the motivation to generate new knowledge, it also gives them the opportunity to learn. At the same time, the experience that the employees can obtain and the possibility of applying their knowledge in diverse activities within the organization, motivates them to learn new tools and create new processes or ways of doing things. As it can be seen, the creation and utilization of knowledge requires human intervention. Few organizations pay much attention to the creation of knowledge, but many emphasize its utilization through information technologies.

Knowledge Transfer

For Gooderham (2007:36), knowledge transfer can be referred to as the accumulation or assimilation of new knowledge in the receiver unit. However, researchers like Minbaeva et al. (2003:587) argue that pure transmission of knowledge from the source to the recipient has no useful value if the recipient does not see the potential of the new knowledge and hence, does not utilize it in his or her own activities.

Besides reaffirming the importance of communication, this suggests that there is another important aspect that influences which tools knowledge workers choose in order to support their work; they prefer to use *personal* tools, i.e. tools that they can control and customize to their own needs. Cognitive tools, such as mind mapping software, other visualization tools or personal information management tools are designed for the solitary worker and do not address the social context of knowledge creation (Efimova, 2004). That said, one tool has become the dominant support for knowledge work–email. Email is successful because it is *personal* and *social* at the same time.

Informal communication mechanisms, such as face-to-face interaction, corridor chats and IT systems, facilitate interaction among colleagues and improve the knowledge transfer process. Meetings are another appropriate way to transmit complete messages.

On the other hand, technology alone is clearly not enough to induce a person with knowledge to share it with others. Technology can improve access and help bring the right knowledge to the right person at the right time, but this is not sufficient. Document management systems are only helpful in locating information. Using information, sharing it, making sense of it and discussing it are all done elsewhere.

There are also several important contextual dimensions of knowledge transfer. First, firms must seek to operate with an open culture that facilitates knowledge transfer. What is needed is an organizational culture that motivates the members of the organization to search for new ways of doing things and where these efforts are facilitated by flexibility and interaction among colleagues. Such a culture should be open in order to encourage employees to share their knowledge with colleagues, even in contexts where time is at a premium. Time is vital for firms that operate in dynamic environments; hence the knowledge to be transferred must be assigned a high priority

within the organization. That is, its transfer should be planned just like all the firm's other important activities (Zapata, Rialp and Rialp, 2009).

Other significant contextual elements within the organization include management support and close proximity among employees. As Cummings (2004) comments, great physical distances make communication among members of a group difficult since opportunities for informal contact are reduced.

Knowledge as part of intellectual capital is the key to a competitive advantage in the knowledge economy; hence HRM should seek to become an integral part of corporate strategy, enabling knowledge to be managed in the interests of organizational performance (Thite, 2004).

Knowledge Management and Human Resource Management

The importance of KM lies in the knowledge possessed by individual employees, even if this is an inherent social construct. The increased reliance on knowledge workers is changing the role of HRM (Beatty *et al.,* 2003). Managing knowledge is not the same thing as just managing human resources. KM involves managing intellectual property; that is, managing the development and transfer of organizational know-how. It is more multifaceted than simply managing people (Teece, 2000: 147).

In order to begin discussing the different approaches to HRM adaptation to KM projects, it is important to give an account of HRM's principal activities. HRM functions have emerged parallel to the economic shift from agrarian to manufacturing to services and now, to information and knowledge (Beatty *et al.,* 2003: 107). One factor in the changing role of HRM is the increased reliance on knowledge workers (ibid). Under this perspective, HRM involves a series of organized activities conducted within a specified time and designed to produce behavioral change. Within HRM, the most common activities are recruitment and selection, training (learning for the present job), compensation and incentives, and performance evaluation, as well as staffing, career development and internal communication and compensation (e.g. Nadler, 1994).

Organizational structures and management practices are changing to facilitate the implementation of KM in organizations. The following section presents the different configuration to recruitment and selection, training and compensation in the context to support KM initiatives.

Recruitment and Selection

Employee selection is a fundamental aspect of HRM and assumes that individual differences make a meaningful difference in job performance. Therefore, what is needed to maximize performance is a good match between personal characteristics and job requirements (Huo *et al.,* 2002). The following sections present an analysis that shows how recruitment and selection processes have changed.

Employee Profile

According to academic literature, the employee profile in firms where knowledge is relevant has been modified. Intangible skills refer to a workforce with tacit or difficult to measure capabilities, such as the ability to work in a team-based system, innovation, flexibility, problem solving capability and good interpersonal relations (Ramirez and Fornerino, 2007).

Recruitment and Selection Tools

Methods of recruiting employees can be a good indicator of management style and, at the very least, can tell us something about the formality of the employment relationship (Cully *et al.*, 1999: 60). Therefore, in terms of recruitment tools, the Internet and assessment centers were the primary means analyzed. The Internet was chosen because it has become a leading recruitment tool for po-

tential employees and employers searching for positions with a highly intensive use of knowledge (e.g. Buckley *et al.,* 2004).

Training

It is argued that training shapes the skills and knowledge of the workforce. Knowledge management projects tend to be proactive for training purposes; they try to anticipate the training needs for their workforce (Cascio, 1990). Training programs in KM tend to focus on problem solving, communication, technical skills, job rotation and mentoring relationships (Lepak and Snell, 1999; Ramirez and Fornerino, 2007).

Compensation

In a KM environment, one important policy and practice to review is the compensation system, as a function and as a motivator to knowledge sharing, especially in the Latin American context, where people are afraid to share their knowledge and, in some cases, employees may mistrust the source (Davila and Elvira, 2007). It is argued that incentives should be introduced to promote knowledge generation, effective knowledge sharing, learning and the application of the best knowledge for work purposes (e.g. Tayeb, 2005).

Other important factors include the employees' perception of freedom and their willingness to share knowledge with others inside and outside the organization. This dynamic reflects the quality of management of the enterprise as a whole (Barrett, *et al;* 2004). As Hislop (2003:185) point outs, there is an inherent tension between workers and the organizations for which they work over who owns and controls their knowledge.

MULTIPLE CASE STUDIES

In order to explore the phenomenon under study—how HRM is adapting its activities to support KM initiatives—three Mexican cases were selected. The selection was based on their innovative processes, even if they do not have a specific KM project. The first case, Systems, is a medium enterprise whose main activities are related to the implementation of telecommunication solutions and applications. The second case, Snacks, is a large firm that manufactures food and snacks. Finally, the third case, Satellital, is a medium enterprise that provides solutions and consulting services for the optimization of the supply chain.

Case Systems

Systems enterprise was founded in 1991 by a visionary Mexican, who focused on the way in which telecommunication tools facilitated and optimized processes that, at the same time, had been successfully implemented by firms. It began its operations in western Mexico with six employees and is currently a medium-sized firm (140 employees) with coverage across Mexico. *Systems* provides consulting services for projects related to the design and implementation of solutions and to advanced applications in telecommunication. Additionally, it is strongly oriented to business process optimization.

Among its services, *Systems* offers a range of solutions, from convergent network applications to complete solutions for contact centers and CRM (customer relationship management) applications. In the field of convergent networks, the main products are voice and data transfer applications in local and wide area networks, IP telephony and unified messenger. Other services are the contact centers, which range from conventional call center solutions that consist of the intelligent distribution of phone calls, to sophisticated multi-channel contact centers, where interactions via telephone, email and instant messenger can coexist and integrate into different CRM systems to provide customers with a consistent response no matter what contact channel they use. Regarding CRM business applications, *Systems*' approach

is a complete integration with the contact center to automate and improve customer service processes and increase customer retention. These services are used by universities, hospitals, public administration offices, financial institutions and manufacturing enterprises.

Systems' IP telephony solutions are used today by its customers as a competitive edge and provide appropriate flexibility and scalability across the firm.

Knowledge Generation

Organizational culture in *Systems* has played a key role with respect to knowledge generation. As the operations manager pointed out: *"employees work in a place where they feel free to innovate, to change the way they do things."* As it is widely recognized, more intensive communication along with an accepting culture opens up to new ideas, which is also prepared to explore new processes and activities, favors the generation of knowledge.

This dynamic knowledge generation process, which will improve the firm's competitiveness, is favored by a non-hierarchical organizational structure and makes visible an active role played by general management. *Systems* has four levels in its organizational structure: 1) the Board of Directors – headed by the founder, 2) the Top management team –comprising four functional areas, 3) the Middle management team – comprising the operative supervisors, and 4) the Operative team.

Systems employees' motivation to innovate and learn lessons allows them to obtain new and better knowledge. According to the interviews, *Systems´* employees describe the firm as an organization that makes it is possible to learn continually. The dynamic environment, which *Systems* has created, provides its employees not only with the motivation to create new knowledge but also with the opportunity to learn. Employees consider that they can learn a great deal about the work they carry out and from the experience achieved by applying their knowledge. This knowledge arises from the fact that they are informed about the areas in which services should be improved both for internal and external clients.

Systems has realized that its clients are the main focus of its business—its reason for being in the market. Consequently, it has initiated a strategic drive to highlight their customers' knowledge.

Knowledge Transfer

Systems' employees use different communications channels to interact and share their knowledge. One of them is a knowledge base, which makes the response time to customers (internal and external) more efficient, specifically in the area of maintenance. Employees working on a customer report first need to access the knowledge database in order to find out how the same problem has been solved in the past. The knowledge database works as a decision tree. All maintenance reports are entered into this database.

Another current communication method involves distribution lists that enable employees to interact with all members of the organization. This communication channel is frequently used to share experiences or seek assistance from another member of the firm in order to solve a problem. At the same time, *Systems'* employees have other means of sharing their knowledge, such as the telephone, messenger, face-to-face chats and formal and informal meetings. The use of formal means of communication, which facilitates interaction among employees, in addition to the informal mechanisms of physically present communication, such as face-to-face and hallway chats, can also improve the knowledge transfer process.

Effective knowledge transfer requires an organizational culture that motivates the members of the organization to search for new ways of doing things. The *Systems* case shows how culture is a relevant factor in the knowledge transfer process, especially in creating a sharing atmosphere. The employees are committed to sharing their *know-how* with their co-workers. At the same time, the

top management has committed itself to acquiring the media that makes knowledge transfer possible.

As regards the contextual factors affecting knowledge transfer, the maintenance manager pointed out,

"Here in Monterrey we do not have a problem with sharing our know-how. Our challenge has been deciding when we should share it with coworkers in other cities. Before the creation of knowledge database, we had to phone the expert to try to resolve a specific situation. IT introduction has diminished geographical distance limitations; in this case, through the knowledge database."

Another important aspect to consider is that people are often afraid to share their knowledge. They believe that they will lose the advantage that their expertise gives them among their peers and within the organization. In *Systems*, top management is attempting to introduce a commitment letter. The employee who has been given the opportunity to attend a training course outside the firm has to disseminate this new knowledge throughout the firm. The firm is clearly actively thinking about how its employees can become trainers. In this way, HRM plays an important role in knowledge transfer.

KNOWLEDGE MANAGEMENT AND HUMAN RESOURCE MANAGEMENT

Recruitment and Selection

The industrial sector in which *Systems* operates depends on the creation of specific knowledge needed for quality work in the telecommunications sector. *Systems* recruits highly qualified engineers, certified by its business partners, and graduates of Mexico's most prestigious universities. *Systems* does not have a special method for recruiting employees but believes that employee retention is related to commitment and trust. Nevertheless, in some cases, employees have left the company for a higher salary.

Training- *Systems* invests in more than 60 hours of training per employee per year. Training is primarily focused on state-of-the-art technologies developed around the world. Knowledge itself plays a tacit role, and even when it cannot be codified in the form of a written document, it can be taught by means of *mentoring* and learning. In this sense, organizations have to consider specific ways to ease the training process, for example, formal training of workers in the workplace, e.g. by their coworkers, as in the case of *Systems*.

Compensation- A high pay package with performance incentives motivates personal knowledge creation, sharing and use, and it also helps to attract and retain employees. In this sense, *Systems* is thinking of developing incentives for employees to share their knowledge among coworkers. Even though employees are committed to transferring the knowledge obtained in training courses, they will receive a bonus for this activity in the future. The employee will benefit doubly: first, by receiving the opportunity to take a course outside the firm; and second, by receiving payment just for transferring this new knowledge to coworkers.

CASE SNACKS

In 1921, *Snacks* was founded by three brothers in the northern Mexican city of Monterrey. In 1991, the company was taken over by an American multinational, turning *Snacks* into a global leader in the cookie market and into Mexico's largest cookie manufacturer. The company offers its consumers a wide variety of high-quality products for every lifestyle, producing pastries, oats, cereals and other related products. It has production facilities in five states across Mexico.

Snacks has achieved sustained growth to become the cookie market leader in Mexico, as well as consolidating its leadership in the US Hispanic market. It has also reached this market position

by being fully customer oriented, constantly offering innovative, high value-added products and anticipating its customers' needs.

Its accomplishments include one of its greatest sources of pride: its people. *Snacks* has always taken an interest in its employees' well-being. Consequently, the company obtained the highest level of employee satisfaction of all the companies that comprise the international corporation to which it belongs.

In March 2005, *Snacks* was certified as one of "The Top Ten Places to Work in Mexico," awarded by the Great Place to Work Institute México.

Knowledge Generation

For *Snacks,* external professional consulting is a highly important source of knowledge generation. It resorts to these services in two very specific situations: to deal with a situation that is unusual for the organization and to anticipate changes in the environment. An example of the former situation is described by the human resources coordinator,

"From the bird flu to the current influenza crises, we have had to have a contingency plan in place. Consultants shared their knowledge on how the viruses are transmitted, the medical side, the consequences of the virus, how long it takes to transmit the virus, the different stages of an epidemic and a pandemic, the WHO website. All of this information has been useful for organizing informative workshops and defining alternative strategies. In human resources, in particular, we had to decide which positions were indispensable for the organization to continue its operations and how employees could work remotely from home."

A source of internal knowledge creation stems from the corporation's and employees' own initiatives. The company is currently focusing on promoting a culture of innovation. In fact, the organization has named this year the Year of Innovation. *Snacks* has allocated funds specifically to highlight and support this initiative. At the beginning of the year, all the employees, regardless of their organizational level, could disclose any innovation idea they had for the products and/or processes. HRM sends graphs every month on their progress and the contributions to innovation made by each area, and an award ceremony is held every three months. The employees who have contributed the strongest innovation ideas receive the innovation bracelet.

At *Snacks*, the organizational culture and the support of the senior management are fundamental to the generation of knowledge. Moreover, one of the coordinators interviewed commented that the customers themselves are an indispensable source of knowledge generation; "*I believe that since our organization is 100% market-oriented, our only boss is the customer. We always focus on thinking about what the customer is thinking.*"

Knowledge Transfer

Even though *Snacks* is a large international company, knowledge transfer is possible with formal, informal and technology-based communication mechanisms. For example, when the company's values were made official, this was shared in a cascade, from one hierarchical level to another, from one boss to another in person. Human Resources trained and empowered directors from all areas, and they, in turn, trained their managers and collaborators in person, face to face. Since the information being transferred was related to values, it was important that it be carried out face to face, so that the boss could share his or her vision of and commitment to said values.

When the new compensation system was designed by the external consulting firm, this new knowledge was transferred in person with the area heads and their work teams. The program was called "Ticket to a Safe Future."

Technology-based communication media is predominantly used when the company wants to share new knowledge that does not involve all of

the organization's employees or when it does not entail a radical change in operations.

The commitment shown by the senior management to informing employees about new ways of operating is an organizational component that facilitates knowledge transfer. This commitment is reflected in the attendance by every single employee when specific sessions are held to transfer new knowledge, such as the "Ticket to a Safe Future" program. Moreover, all the relevant information that was shared in person was documented and disseminated through the organization's Intranet.

Knowledge Management and Human Resource Management

Recruitment and Selection

Since the philosophy of permanent innovation to compete in the marketplace and the start of the "Year of Innovation" at *Snacks*, modifying the recruitment and selection practices has been imperative for this organization. As one of the *Snacks* employees mentioned, "It would be illogical for a group of directors, managers and collaborators to have certain initiatives but not the personnel to support them in their implementation because they lack the competencies to do so. Moreover, the creativity assessment that has been included is very important."

Training. In a continually transforming organization, training is a critical topic for *Snacks*. As mentioned in the knowledge transfer section, any new knowledge that arises in the organization, either as the result of consulting or an internal initiative, is shared with employees through training so that they can understand and use the same knowledge. HRM has technological mechanisms as protocols so that training can be face-to-face, in person.

Compensation / performance evaluation. The year of innovation at *Snacks* has resulted in employees, who have participated with initiatives, being rewarded and recognized. There is even a bonus for each idea implemented. Moreover, one of the variable compensation bonuses was redesigned to ensure that almost 10% of an employee's total compensation is related to performance-related innovation.

"For example, the percentage of the innovative products sold out of the total sales. So, of all the products you sold, how many were innovative products? You can see that we are committed to innovation as far as possible. We even link it to compensation."

CASE SATELLITAL

Satellital is a medium enterprise that is part of an international group headquartered in Monterrey, Mexico. It was created from the merger of three strategic business units as a solution integrator for the supply chain. *Satellital* concentrates on services based on satellite telecommunications. It provides services in two main fields: remote asset monitoring and mobile satellite telecommunications. Additionally, *Satellital* develops high value-added business solutions based on the integration of information and wireless telecommunication technologies, which are aimed at optimizing its customers' core business processes in Mexico, North America and Central America.

This enterprise has instituted a philosophy with guiding principles and values that leads its personnel towards achieving clear objectives and fosters daily interaction and the development of each individual. Its mission is to develop high-growth business services based on information and telecommunication technologies.

Its main activities are: (1) Solutions for controlling and optimizing the logistics of land and sea mobile assets through remote monitoring. (2) Reliable solutions for mobile satellite communications (radio, telephony, broadband) for work teams operating in remote locations where conventional

means of communication are inadequate. (3) Technological solutions to drive automotive financing through enhanced risk control and better portfolio management. *Satellital* offers concessions to exploit the transmission and reception rights of frequency band signals associated with the foreign satellites MSAT and Inmarsat. Furthermore, it also has the concession to install, operate and exploit a public telecommunications network using those satellites. All the equipment used for the provision of satellite services that it offers under its public network has been approved, which currently, makes it the only company in Mexico that has these authorizations, as granted by the Ministry of Communications and Transport.

Knowledge Generation

External knowledge stems predominantly from the supplier through its equipment and training in the use of the same. Nevertheless, *Satellital* has sometimes discovered faults in the supplier's equipment and, when this occurs, it conducts a diagnosis, documents it and shares it with the rest of the organization. It also shares this new knowledge with the supplier.

The customers offer another form of external knowledge as they too identify faults, and *Satellital* undertakes to share this knowledge with the supplier. As one of the area coordinators said,

"We all learn from mistakes. However, we don't exactly change the world; we leave that to the supplier. So, the supplier has to make changes and then generate new documentation and this documentation is valid and we retrain on the basis of said documentation."

Likewise, customers offer *Satellital* feedback on improvements to their systems and processes. A clear example of the creation of internal knowledge is the development of its own software.

"In terms of software applications, we have developed software that offers a point on the map, so to speak, in very simple terms... that involved numerous functions. There is a whole series of reports stating that it generates value for customers, ranging from those who exclusively request the location of their equipment to those who require more detailed information, such as arrival time estimates, productivity, fixed-asset location and trip start dates and times."

The development of applications implies training all the members of the organization in their use. This ensures that all the members of the company participate in the new knowledge.

An important component in *Satellital* that facilitates the creation of knowledge is the prevailing organizational culture. The creation of knowledge and innovation are encouraged and must be presented in writing for authorization. In this document, designed to request new ways of doing things, employees must notify why they want to do it, how they will do it and whether it can be feasibly done in the company.

Furthermore, a high level of self-directed learning exists. The company has to keep up to date on telecommunications and value-added legislative topics, particularly since customers always want to be on the cutting edge of this field.

Knowledge Transfer

Document processes, or descriptions of equipment technical, are the main formal communication media used at *Satellital* to transfer its knowledge throughout the organization. An area coordinator commented,

"Personally, I have had to create documents that offer a technical description of certain services or pieces of equipment so that we can all have the same vision of what we are offering."

Training is another medium for transferring knowledge. This practice comprises two components that clearly inhibit the transfer process: technical language and people's attitudes. With regard to the language, one of the members of the company commented,

"I have realized that it's very hard for everyone to reach the same level of understanding. I need to bring what I know as a technician down to a common language, where a person from the retail area with no technical knowledge and who manages customer services can understand the advantages of the technology, in order to assist customers."

In relation to people's attitudes, employees do not feel comfortable asking questions if they have a query. "*Handing out documents is very easy, but you have to have the humility to say I don't understand it and come and ask.*" Gaining people's trust has been very difficult.

Organizational culture, rather than being a component that facilitates knowledge transfer, as mentioned in the literature, limits this process at *Satellital.* With all the changes in the organizational structure, it is not clear what the positions entail and which managers should direct and foment training or knowledge transfers. One of the coordinators said,

"We haven't been able to generate a knowledge transfer and assimilation methodology. It's not that we don't have enough systems, and even though the knowledge is in a computer ... the computer won't transfer it per se. A culture should be created for this."

Knowledge Management and Human Resource Management

Recruitment and Selection

As a result of the changes in organizational structure and the dependence on headquarters in functional support areas, such as human resources and finance, *Satellital* has opportunity areas in human resource practices and, above all, in the management of its tacit knowledge.

Recruitment and selection are key practices for the effective management of knowledge. There is a high staff turnover rate in *Satellital's* customer service area. One of the possible reasons for this is the lack of job descriptions. In fact, even the coordinators do not have job descriptions. "*It's incredible. I provide services for the administrative area, the retail area; I am working on a project we have with the government. I know what I have to do and government participants ask me to do other things, but since they don't say I can't do them... it's not in writing anywhere*."

Training- Training is of utmost importance for *Satellital*. As mentioned beforehand, in knowledge generation and transfer, all the knowledge, both external and internal, generated, must be shared with the entire organization. Training is provided internally, that is to say, the employees themselves offer courses and assess learning, mainly for technical matters, value-added and returns on investment that could be obtained by the customer. Training is offered in both the retail and the customer service areas. Moreover, the headquarters offers courses, since certain competencies must be fulfilled.

External training is mainly for the telecommunications technicians who have to keep up to date on this topic. A specialist is sent to training courses and then that person is responsible for sharing this knowledge with his or her colleagues through cascade training.

Performance evaluation- Performance evaluation depends on the areas in which the employees work. For instance, field personnel are evaluated for following the established protocols. While customer service employees are evaluated by means of a customer satisfaction survey on the way in which they solve customers' queries. Customers evaluate them on their knowledge, not their attitude. In this way, customers will be more objective.

People become more aware of the relevance of training; training becomes a work tool.

CURRENT CHALLENGES FACING THE ORGANIZATIONS

There is no doubt that both knowledge and human capital are increasingly regarded as key levers of competitive advantage in today's global, dynamic and complex business environment. More importantly, people and knowledge are inextricably linked. Individual human beings are the ultimate knowledge creators and bearers. Organizations do not think by themselves, although they may have "knowledge enabling" contexts and memory systems. In fact, both people and knowledge should be regarded as having special potential as scarce and idiosyncratic resources, consistent with the premises of the resource-based approach to strategic management. Indeed, a significant amount of rigorous, resource-based scholarship exists that also deals with KM or HRM.

Figure 1 summarizes the results of our research obtained after the cross-case analysis was concluded. In the first column, the knowledge generation process is strongly supported by employees' motivation to innovate and learn lessons that allow them to obtain new and better knowledge (Nonaka et al., 2000). According to our cases, *Systems* and *Satellital* employees describe their firms as organizations that make it possible to continually learn. The role that the employee plays as the bearer of initiatives, suggestions, voluntary effort and greater commitment is very relevant. Thus, organizational structures should be less hierarchically structured and management style more participatory so that the necessary con-

Figure 1. Cross-case results

Firm	Knowledge Generation	Knowledge Transfer	KM & HRM
Systems	▪Organizational culture ▪Less hierarchical organizational structure ▪Opportunity to learn	▪Capacity to assimilate ▪Attitude to share ▪Common language	▪Recruitment and selection ▪Train the trainer ▪Performance evaluation-*customer*
Snacks	▪Top management initiatives ▪Innovation year (2008)	▪Organizational culture – *technological communication media*	▪Position profile ▪Cascade training ▪Compensation: High performance bonus
Satellital	▪Organizational culture ▪Top management support ▪Less hierarchical organizational ▪Opportunity to learn	▪Organizational culture - *knowledge base and distribution lists* ▪Physical distance ▪Afraid to share	▪Recruitment and selection ▪Training ▪Compensations

ditions are created, which allow the individual's flexibility to be preserved.

In terms of knowledge transfer, column two exposes how firms operating in dynamic environments face three main challenges pertaining to the reproduction of their: 1) internal competencies, 2) abilities and 3) collective learning developed and its *storage* within the firm over time. *Systems*' employees use different communication channels to interact and share their knowledge. One of these is a knowledge base, which makes the response time to customers (internal and external) more efficient, specifically in the area of maintenance. Employees working on a customer report first need to access the knowledge data base, in order to find out how this same problem has been solved in the past. The knowledge data base works as a decision tree. All maintenance reports are entered into this data base.

Another current communication method involves distribution lists that enable employees to interact with all members of the organization. This communication channel is frequently used to share experiences or to seek assistance from another member of the firm in order to solve a problem; this is the case of *Satellital. Systems*' employees have other means of sharing their knowledge, such as the telephone, messenger, face-to-face chats and formal and informal meetings. The use of formal means of communication, which facilitates interaction among employees, in addition to the informal mechanisms of physically present communication, such as face-to-face and hallway chats, can also improve the knowledge transfer process.

Effective knowledge transfer requires an organizational culture that motivates the members of the organization to search for new ways of doing things. Flexibility in the employees' performance and interaction is required, in order to facilitate this search (Zapata, Rialp & Rialp, 2009). This culture should be open so as to encourage employees to share their knowledge and communication among members of the firm, even when time is at a premium. The three cases under study expose how this is possible and is vital in the knowledge transfer process. For example, the *Systems* case shows how culture is a relevant factor in the knowledge transfer process, especially in creating a sharing atmosphere. The employees are committed to sharing their *know-how* among their co-workers. At the same time, the top management has committed itself to acquiring the media that makes knowledge transfer possible.

As regards the contextual factors affecting knowledge transfer, another important aspect to consider is that people are often afraid to share their knowledge. They believe that they will lose the advantage that their expertise gives them among their peers and within the organization. In Mexican organizational culture, knowledge transfer is only possible if the director or top management asks somebody to share or transfer his or her knowledge to somebody else. In some enterprises, the organizational culture supports knowledge transfer. This can mainly be observed in transnational companies. Mexicans are very possessive about what they know because a lot of effort was required to obtain it. In *Systems*, top management is trying to introduce a commitment letter. An employee, who has been given the opportunity to attend a training course outside the firm, has to disseminate this new knowledge throughout the firm. The firm is clearly actively thinking about how its employees can become trainers. In this way, HRM plays an important role in knowledge transfer.

Finally, column three summarizes how KM initiatives are beginning to be supported by HRM. Although managers are usually keen to recognize that human and social issues underpin the success of KM initiatives, a number of structural, organizational embedded factors hinder the KM efforts, and they are quite difficult to overcome, despite the initial managerial commitment to solving these problems. This has been observed in the three Mexican cases described above, specifically, how HRM is transforming its traditional activities.

In reference to recruitment and selection, firms have the possibility of generating a human capital advantage through recruiting and retaining outstanding people: "capturing" a stock of exceptional human talent, latent with powerful forms of "tacit" knowledge (Svetlik and Stavrou-Costea, 2007) by designing a competitive compensation system. The industrial sectors in which *Systems*, *Snacks* and *Satellital* operate depend on the creation of specific knowledge needed for quality work. Only *Snacks* has *a* specific method for recruiting employees, but it believes that employee retention is related to commitment and trust. *Systems* and *Satellital* are beginning to develop operational programs to select the best employees, regarding salary as a relevant method of doing so.

Training is a relevant HRM activity in our three cases that show how knowledge transfer is critical. As has been observed, these cases reveal that training is vital as a mechanism to share new knowledge throughout an organization. Depending on the size of the firm or its geographical presence, this HRM activity is supported by different media communication mechanisms, but face-to-face is still the most useful.

Concerning knowledge workers' careers, Evaggelia (2007:322) points out: *"The old career ladders are gone. The old lifetime employees are gone. If career ladders do not exist within one company, they must exist across different companies if they are to exist at all."* Here is where HRM practices have to change in order to retain or maintain employees for a long time. The most popular retention strategies are related to compensation. A high pay package with performance incentives motivates personal knowledge creation, sharing and use, and also helps to attract and retain employees. In this sense, *Systems* is thinking of developing incentives for employees to share their knowledge among co-workers. Organizations must find incentives both to encourage knowledge transfer and to generate knowledge. These incentives could be both monetary and non-monetary.

SOLUTIONS AND RECOMMEDNATIONS

This chapter shows cultural and social drivers, such as management and personal behaviors, should be changed to create environments of trust, and efforts should be made to find the root cause of problems without assigning blame. New management practices must focus on combining understanding, knowledge, skills and attitudes when assembling work teams; analyzing requirements for performing work and establishing new work settings are a huge component of tacit knowledge, or knowledge that is mainly embedded in people.

Hence, to enable successful knowledge transfer, knowledge should be taught in a more practical and appropriate manner and adapted to each firm's specific processes. The use of mentoring systems can help to minimize knowledge uncertainty by informing the members of the organization about each other's respective competencies. Besides that, the internal transfer of knowledge requires that the receivers be willing and committed to adopt the activity and that they have the capacity to assimilate, understand and adopt the recently acquired knowledge.

A central challenge for firms operating in dynamic environments is how best to manage their employees. This can be achieved by ensuring that HRM strategies facilitate the creation and transfer of knowledge. HRM strategies may therefore include: external talent acquisition, internal talent development, job rotation and action learning, and contractually binding the most desired and talented employees to the organization (Evaggelia, 2007). However, in addition to a traditional contract, a new psychological contract (Dávila and Elvira, 2009) is needed to promote loyalty and retention.

HRM deserves an explicit mention in the people-centered KM debate. In leading organizations and industries, people management is assumed to be one of the top strategic priorities. It is worth mentioning the increase in research dealing with the relationship between HR prac-

tices and organizational performance (e.g. Arthur, 1994; Huselid, 1995; Guest, 2002). Although from different perspectives and with notable differences in specific practices, empirical support for the positive impact of HRM on organizational performance can be assumed.

Finally, managers must find and develop an environment for learning, knowledge-sharing and knowledge integration procedures (e.g. Teece, 2007), given the fact that people are afraid to share their knowledge, and in some cases, employees may mistrust the source. Knowledge as a part of intellectual capital is the key to a competitive advantage in the knowledge economy; hence, HRM should seek to become an integral part of corporate strategy, enabling knowledge to be managed in the interests of organizational performance (Thite, 2004).

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KEY TERMS AND DEFINITIONS

Human Resource Management: Management of practices and activities related with the wealth of organizations' most value asset: human capital.

Informal Communication Mechanism: are methods utilized to transfer knowledge without

being scheduling or mandatory by top managers. These methods such as face-to-face interaction, corridor chats and IT systems, facilitate interaction among colleagues and improve the knowledge transfer process. Knowledge workers prefer to use *personal* tools that they can control and customize to their own needs such as informal communication mechanism.

Knowledge Generation:: Institutionalized activity, so each organization must be able to establish its own creative routines, processes and human intervention to make possible to have new knowledge.

Knowledge Management:: Process that involves planning, coordination and (KM) control of knowledge generation, knowledge transfer and knowledge utilization

Knowledge Transfer: Process that involves sharing of knowledge from a source and accumulation or assimilation of this knowledge in the receiver unit. This process could be useful value if the recipient does see the potential of the new knowledge and hence, does utilize it in his or her own activities.

Knowledge Workers:: participants in the knowledge-based economy, those persons who work in the top three standard occupational classifications (managers, professionals, associate professionals), with high levels skills, indicated by degree or equivalent qualifications (professional diplomas and/or higher education), and perform tasks that require expert thinking and complex communication skills with the assistance of computers.

Tacit Knowledge: is an intangible resource and difficult to transfer from one firm to another or for competitors to imitate it; and it is not only connected to individuals but also to the way these individuals interact. Barney (1991) has defined as a valuable, generally essential, rare and inimitable resource.

ENDNOTE

The capacity to assimilate refers to the ability of the firm to recognize the value of new information, assimilate it and apply it to further its commercial goals.

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Chapter 13
An Integrated Methodology to Detect the Evolution of Virtual Organizational Communities

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ABSTRACT

This chapter describes an integrated methodology developed to combine two analytical approaches, social network analysis and content analysis, to investigate the organizational mechanisms responsible for the emergence of social capital within virtual communities. This integration is proposed to overcome the main limitation of social network analysis: the analysis of the content of the information flows and the organizational and cultural aspects of their exchanges.

We propose a methodology applied to virtual communities operating in an organizational context. We aim to demonstrate how such an integrated approach may help understanding the way new ideas spread within and across networks, helping to recognize the emergence of informal roles, community phases and the network structure.

The proposed methodology has the potential to enable the analysis of virtual communities' overall composition, evolution and social structure, characteristics and organizational behavior of the "project related sub-communities", informal members' roles and their contribution to the development of project's task.

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INTRODUCTION

As the focus of competition moves from the firm to the network, and from rigid organizational structures to informal networks, communities are presented in literature as the most flexible governance model to build a value-creating organization. New organizational forms – such as communities of practice, communities of innovation, industry consortia, knowledge-sharing networks - are now emerging in response to new environmental forces that call for new organizational and managerial capabilities (Dyer, 2000). The success of these new organizational forms depends on the ability to behave as integrated networks, where different stakeholders gather in an open and flexible interaction, inside and outside the company boundaries (Ghoshal and Bartlett, 1997).

The diffusion of the Internet allowed communities to benefit from virtual networking, and delocalization, and to become more capable to afford the challenges of a more complex business environment (Cothrel and Williams, 1999; Hildreth et al., 2000). The effectiveness of these new forms of collaboration and knowledge creation explains the growing interest of scholars and managers to understand how communities really work, how they organize internally, how they produce value (Schultz et al., 2003; Mitchell, 2002; Burt, 2000).

The main contribution of the present work is to map the subject matter of the information flows within virtual communities, to match the community's social structure with the emerging ideas or topics. It also provides empirical evidence from the application of the integrated methodology to a "longitudinal study" looking for the organizational facets of a global, dispersed community.

A case study analysis has been conducted on a large Virtual Community developed at a global scale, involving a high number of members and a wide range of different organizations located all over the world.

The achievement of the presented goal has been conducted under the guide of the following question: *How to detect the evolutionary structure of a virtual community by following the diffusion pattern of a new project idea?*

The main limitation of the Social Network Analysis, that is to treat all the connections in the same way, without differentiating the topics of discussion, might represent an obstacle in the analysis of large communities. It would be hard to understand communications referred to friendly personal ties or projects-related ones. This can prevent the development of a more comprehensive picture of the community, making it difficult to disentangle the web of many interactions, 5431 in our case, that can provide no meaning and possibly lead to misinterpretations.

While SNA was able to point the "who" and the "how" of the social capital structural dimension, the integration with the Content Analysis revealed the "who", "how" and "what" of the social capital overall dimensions, structural, cognitive and relational. The integrated methodology provided a more complete picture of the Community, useful to improve the understanding and the monitoring of such "hidden organizations", and to offer useful insights for their management.

The main managerial implications of the outcomes of this research can be classified following some key managerial processes, related to the organizations' capability to better:

1. Understand Communities: the application of the integrated methodology showed its suitability to describe the main characteristics of a project-oriented community, identifying several aspects such as: the topics associated to emergent sub-communities, the role of the original core group in leading all the projects; the impact of a strong leadership built around few coordinators.
2. Analyze and Monitor Communities*:* the use of the methodology as a monitoring system able to detect and map:

a. the most involved actors, the way in which they interact with the others and the spontaneous emerging of unpredicted roles;
b. the trend in organizational behaviour, in density level, and centralization dynamics and the involvement of task-related subgroups, in the "operative" phase of the lifecycle.

3. Manage Communities*:* the application of the integrated methodology and the use of the frameworks and tools used to present results might be useful as a managerial tool for identifying step by step the areas of intervention for each project, helping to avoid the failure of project development activities. They can also support the activity of recognition of the best contributions to be rewarded, and the identification of knowledge experts who play a crucial role in speeding up the process of innovation.

THEORETICAL BACKGROUND

The emerging phenomenon of Virtual Communities finds its roots in the concept of Community of Practice (CoP) introduced in 1991 by J. Lave and E. Wenger in the book "Situated Learning: Legitimate Peripheral Participation." This concept was further developed by E. Wenger in 1998 in the book "Community of Practice: Learning, Meaning and Identity" and then elaborated with W. Snyder in 2000 in the Harvard Business Review. Communities of Practice are considered groups of people informally bound together by shared expertise and passion for a joint enterprise. People in Communities of Practice share their experiences and knowledge in free-flowing, creative ways that foster new approaches to problems (E. Wenger & W. Snyder, 2000). Sawhney and Prandelli (2000) propose a similar concept, *communities of creation*, representing the governance mechanism particularly crucial for the organizations operating within knowledge intensive industries.

Over time this concept was further developed and assumed different connotations depending on the properties of the groups involved. New concepts were introduced such as "Knowledge Community", "Community of Interest", "Learning Community", "Communities of Creation". Simultaneously, the explosive development of information and communication technologies and their pervasiveness in the organizational and managerial processes of the community, have enabled the introduction of a virtual dimension within the traditional mechanisms of functioning of an Organizational Community.

The diffusion of Information and Communication Technologies had a deep impact on several community features. We propose eight dimensions to characterize the nature of virtual communities in an organizational context, highlighting the main differences between virtual and physical communities.

Purpose: virtual communities, similarly to the physical ones, may emerge for several reasons, having different characteristics based on the rate of environmental uncertainty, strategy or operation management goals. Virtuality represents an important advantage when the community is formed in emergency conditions, when rapid organizational changes are required following unpredicted alteration of the business environment.

Size: Community size is widely variable, in physical as well as in virtual settings. The more the number of people increases, the more evident is the distinction between the intellectual organizational *core* of the community and the periphery, or extended community (Wenger and Snyder, 2000; McDermott, 2000). The main distinction between physical and virtual communities is that the latter grow easily and fast, facilitated by web connection and the rapid diffusion of aggregative movements on the web-sphere. They can reach very large dimensions and high dispersion, which might introduce the risk to neglect the common

goals and reduce internal motivation (Van Krogh, 2000).

Physical Proximity: in virtual communities the employment of information technology to communicate and to exchange content allows people to interact in an ubiquitous way. Although their voluntary nature that defies managerial intrusion, Virtual Communities need a strong management commitment to encourage interaction, and to coordinate common actions toward the achievement of the community's goals.

Membership: in virtual communities membership is more critical than in physical contexts, provided the low level of control exerted on the community. Selection principles can be initially shared, but they can change as the community grows. When membership is almost mandatory, the organization can establish requirements for the access. When the process is free and voluntary, a sort of natural selection may emerge making potential entrants aware of the "entrance rules" (Mitchell, 2002). Being virtual communities more fluid, membership might vary quicker than in situation of physical co-location.

Leadership: leadership creation and distribution throughout community's life cycle can change according to different factors: evolution of the community, organizational dynamics, management intrusion in the community life. Although it is common for virtual communities to have a flexible not hierarchical organizational structure, some scholars suggest to create the conditions for a more stable leadership, to provide members with the required recognition of their contribution and a precise landmark for the community identity (Lesser, Storck, 2001; Fontaine, 2001; Gretchko et al., 2002).

Diversity: The degree of diversity in the community represents the primary source of innovativeness and one of the main sources of competitive advantage created for the organization (Aral and Van Alstyne, 2007, Hofstede, 1993). The community diversity may be attributed to the individual background and idiosyncrasies of each member (e.g. cultural differences and geographical origin that shape collaboration and relationships). Another source of diversity comes from different organizational behaviours and corporate culture, which can create suspicion and difficulty of collaboration (Hesselbein and Johnston, 2002). A third source of diversity comes from the individual professional background, which helps avoid the "groupthink effect", but can create problems in interpreting individual contribution.

Lifecycle: Virtual communities have no definite boundaries, both in time and space, but they can change in composition and goals (Gloor, 2006). Though they are generally considered constant settings of knowledge sharing and collaborative work, when created for strategic purpose or to face unpredictable events, they can be planned to have a short duration to concentrate energy and efforts (Wenger et al, 2000). While several models have been developed to describe the hypothesis of lifecycle of a community (Tuckman, 1956, Wenger and Snyder, 2000) virtual communities show a high rate of variability in phases of development, depending on their vision, size, cohesiveness and goals (Gongla and Rizzuto, 2001).

Sponsorship and Institutionalization*:* the last feature of virtual communities regards the relationship with the organization, one of the most critical issues related to the creation and evolution of a virtual community (Brown and Duguid, 2001). Because of their voluntary and open nature, factors like the involvement of management, the dependence on the organizational structure, culture and practices may represent strong constraints to creativity and innovativeness for virtual communities (McDermott, 1999). This relationship can assume different shapes (Wenger et al., 2000), from total independence, to some degree of organizational support, until the total institutionalization of the community as an operative program within the organization structure.

VIRTUAL COMMUNITIES: A SYSTEMATIC TAXONOMY

In the attempt to define a systematic taxonomy of virtual communities that interact at a global scale, Peter Gloor (2006) proposed in the book "*Swarm Creativity"* three types of networks (see Figure 1):

1. Collaborative Innovation Networks (COINs): made of self motivated people that share a common vision, meeting on the web to exchange ideas, knowledge, experiences and to work in a collaborative way to achieve a common goal.
2. Collaborative Interest Networks (CINs): composed by people sharing the same interests who do not perform a common task in the virtual team; this kind of community is very frequent on the web, has a lot of silent members, who collect information from web sites, forums, and a few active members who are keen to share their knowledge and experiences within the community.
3. Collaborative Learning Networks (CLNs): a community made of people inclined to share knowledge and practice to benefit reciprocally from personal mastery and the collective knowledge accumulation of experiences.

These three types of virtual communities are intended to form what is called Collaborative Knowledge Network (CKN), a "*high-speed feedback loop in which the innovative results of COINs are immediately taken up and tested, refined or rejected by Learning and Interest Networks, and fed back to the originating COINs*" (Gloor, 2006, p.128).

COINs are the creative base of the CKN, the enabling factor for the creation of fluid organizations, characterized by organizational creativity, productivity and efficiency because of its key principles of "creative collaboration, knowledge sharing and social networking". Generally, a COIN is formed around a new interesting idea absorbed outside organizations, brought inside and discussed in a "swarm" collaborative and

Figure 1. Components of Collaborative Knowledge Networks (adapted from Gloor, 2006)

Community Type	Category	Focus	Mode of Participation	Example
COIN	Innovation	Fundamentally new insights	Peer group of Innovators	Linux kernel developers, creators of Web
CLN	Best-practice knowledge stewarding	Shared Knowledge	Active sharers of knowledge as experts; active seekers of knowledge as students	Xerox repair technicians, oneFish, Web masters
CIN	Helping	Shared Interest	Few sharers of knowledge as experts, many silent seekers of knowledge, lurkers	The Motley Fool, Internet Users

creative way to improve individual knowledge, capabilities and organizations' performance.

Virtual Communities and Social Capital

Communities began to be observed as the natural expression of employees seeking time and place to connect with others, to exchange opinions and ideas about common work, and to built a sense of identity to praise the human dimension of organizations. Over time they have been recognized as actual organizational assets (Lesser and Stork, 2001), able to:

- exploit the potential of the issues linked to the crucial passage from the slow and linear traditional hierarchies to the new fast, unpredictable and complex global economy;
- positively affect the organizational performance;
- handle unstructured problems;
- share knowledge outside traditional organizational boundaries;
- develop and maintain the organizational memory.

The difficulty in assessing their contribution is that communities are often hidden assets, appearing neither on the organizational chart, nor on a balance sheet. To understand how communities create organizational value, we suggest thinking of them as engines for the development of "social capital". Some studies indicate how social capital developed within virtual communities leads to behavioural change, change that results in greater knowledge sharing, which then positively influences business performance (Lesser and Stork, 2001, p.2).

Central to the Social Capital theory is to recognize the importance of "networks of relationships" considered valuable resources to support social business, able to provide the community members with "*the collectivity, owned capital, a credential which entitles them to credit, in the various senses of the word*" (Bourdieu, 1986, p.249).

One of the most widely recognized contributions to the theory on Social Capital is represented by the work of Naphiet and Ghoshal (1998). They move from the work of Bourdieu (1980, 1993) and Putnam (1995), accepting a comprehensive concept of Social Capital including the actual or potential resources becoming accessible through networks of relationships. Accordingly they define Social Capital as "*the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilized through that network*" (Naphiet and Ghoshal, 1998, p.248). They propose a model of Social Capital based on three key dimensions:

1. Structural Dimension: it is related to the individual capability to connect with other people; the value that derives from exploiting this capability is represented by the opportunity to reduce time and costs related to have access to new information, avoiding redundancy and dispersion.
2. Relational Dimension: another aspect related to the attitude to build connections is the personal human management of interpersonal relationships, that create trust and reinforcement in community networks; this dimension is intended to be based on four factors: obligations, norms, trust and identification, that affect the network behaviour, building rules and standards that give the group a deep sense of identity.
3. Cognitive Dimension: it regards the process of sharing information and knowledge, that create a common context, with common codes and a "common language" (Naphiet, Ghoshal, 1998, p.253), intended to be a virtuous cycle of shared practices and models that grows over time.

To avoid confusion in the wide range of definitions of Social Capital available in literature, Lesser and Storck (2001) provided a first classification of the positive impact of Communities on organizational performance. Their work has been based on the study of seven companies in which Communities had been recognized as value creating mechanisms for the organizations (Lesser, Stork, 2001). Among these benefits we recall the following:

1. Decreasing the learning curve of new employees
2. Responding more rapidly to customer needs and inquiries
3. Reducing rework and preventing "reinvention of the wheel
4. Spawning new ideas for products and services

After discussing the nature and the importance of virtual communities for organizations, it is important to answer an important managerial question: "how to monitor the evolution of social capital within virtual communities inside and across organizations?". Next paragraph refers to Social Network Analysis (SNA) as a possible first answer to address this question.

SOCIAL NETWORK ANALYSIS: AN ANALYTICAL APPROAH TO INVESTIGATE SOCIAL CAPITAL CREATION

Social Network Analysis has been defined as "*the disciplined inquiry into the patterning of relations among social actors, as well as the patterning of relationships among actors at different levels of analysis*" (Breiger, 2004). This methodology was widely employed since the 1960s to highlight the link between the network structure of communities and the creation of social capital, represented by organizations' competitive advantage.

The application of Social Network methods and tools within organizations had a great impact on the diffusion of SNA theories. Today, many scholars and practitioners refer to the field of Organization Network Analysis (ONA) as a tool that enables companies to map the information exchanges among employees and determine how to support information brokers, gatekeepers and boundary spanners, and to integrate isolated groups (Foster and Falkowski, 1999).

In general, social network analysis focuses on the relationships between people, rather than on actors' characteristics and attributes. These relationships may comprise the feelings people have for each other, the exchange of information, or more tangible exchanges such as goods and money. By mapping these relationships, network analysis helps to uncover the emergent and informal communication patterns present in an organization, which may then be compared to the formal communication structures. These emergent patterns can be used to explain several organizational phenomena (Burt, 2000). Since the patterns of relationships bring employees into contact with the attitudes and behaviors of other organizational members, these relationships may also help to explain why employees develop certain attitudes toward organizational events or job-related matters.

Network analysis techniques focus on the informal structure of an organization, which can be operationalized into various aspects. Structural features that can be distinguished and analyzed through the use of network analysis techniques include the formal and informal communication patterns in an organization and the identification of groups within an organization (cliques or functional groups). Moreover, communication-related roles of employees can be determined (e.g., stars, gatekeepers, and isolates). Special attention may be given to specific aspects of communication patterns: communication channels and media used by employees, the relationship between information types and the resulting communication networks,

and the amount and possibilities of bottom-up communication. Additional characteristics that could, in principle, be investigated using network analysis techniques are the communication load as perceived by employees, the communication styles used, and the effectiveness of the information flows.

The main benefits of applying Social Network Analysis within organizations can be summarized as follows (Cross, Borgatti, Parker, 2002, Wellman, 1996, Cumming and Cross, 2003)):

- Supporting strategic partnerships (e.g., joint venture, alliances, consortia).
- Assessing strategy execution (e.g., core competencies or market strategies).
- Improving information and decision-making in top leadership networks.
- Integrating networks across core processes (e.g., commercial lending or software development).
- Improving innovation (e.g., new product development, research and development).
- Finding and supporting communities of practice (e.g., promoting connectivity or finding opinion leaders).
- Ensuring integration post-merger or large scale change (e.g., targeting collaboration and correcting over time).

As scholars and practitioners have pointed out, social network analysis is applied in a lot of application scenarios:

- Bridging strategically important disconnects between departments or organizations
- Improving a network's ability to sense and respond to opportunities
- Aligning the organizational context to energize and support networks
- Identifying overburdened employees and redistributing workloads
- Identifying and eliminating information bottlenecks
- Recognizing and supporting key "connectors"

All the previous benefits might be merged into the unifying goal of reaching a suitable level of collaboration among people. With reference to this specific aspect, it is essential to distinguish between collaboration and interaction, since our study will often refer to the way people interact using different channels and creating different kinds of ties. According to Ramesh and Tiwana (1999), interaction refers to formal, transactional communication links, while collaboration refers to informal, cooperative relationships that build a shared vision around common objectives. In the context of this research, we will refer to "communication ties" as a concept bonding the ones we have previously mentioned: people communicate by continuous interactions trying to establish contacts functional to collaboration, so to reach a mutual benefit.

According to Burt (2000), *closure* and *brokerage* are the foundation of the Social Capital research, and the starting point for every empirical research on the organizational mechanisms responsible for Social Capital creation. If *closure* is operationalized with the social network indicator "density", *brokerage* is a concept connected to the advantage provided by the presence of "structural holes" within social structures. Structural holes are an opportunity to broker the information flow between people, and manage the project that brings together people from opposite sides of the hole (Coleman, 1988).

The great contribution given by Burt (2000) is in that his work points of the correlation between network measures and performance: although several contingency factors usually affect the network evolution and behaviour and the organizational performance, his study was able to outline the main network conditions that explain a positive performance. The *three-dimension model* of social capital was considered as composed by the structural capital, representing the connections among

members, the relational capital, embracing cultural aspect and motivation of the relationships, and the cognitive capital, regarding the content of the information flows (Naphiet and Ghoshal, 1998).

As Goodwin and Emirbayer (1999) pointed out, Social Network Analysis is a framework useful to investigate the information structure of groups. In their work, they stress how SNA is able to understand only the "structural dimension" of social capital or the connections developed, disregarding the content of relationships and neglecting the other social capital dimensions. It considers all the ties in a network as comparable, indistinguishable and homogeneous in content. In this perspective, members of large, dispersed communities, monitored over time while performing different activities, can only be observed in their interaction without differentiation of content-related clusters.

Stinchcombe (1990) expressed the need to articulate a systematic theory of social network relying on both quantitative aspects, based on SNA metrics, and qualitative aspects, in terms of content of ties or discussion topics. This perspective provides meaning to the "relational" and "cognitive" dimensions of social capital, explaining what people are doing, what they are working for, how much they are involved in a specific activity, who decides for what and who proposes a new idea.

SEARCHING FOR A VIABLE CONCEPTUAL FRAMEWORK FOR THE METHODOLOGICAL INTERGRATION

In this theoretical perspective, the proposal of a methodological combination of two different approaches aims to advance our understanding of the relationship between communities implementation and organizational performance, by detecting the organizational behavior of community members with reference to the "topic" of the ties.

To describe the content of the ties and propose an integrated methodology, we mined an email database to approximate the organizational ties within a global virtual community. In this context, different opinions emerged during the last years about the use of email datasets as unit of analysis to represent a network. Email has been established to be a reliable indicator of collaboration and knowledge exchange (Wellman, 2002, Whittaker, Snider, 1996). As argued by Tyler et al. (2003) it is a tantalizing medium for research as it provides plentiful data on personal communication in an electronic form. Different insights come from Ducheneaut and Bellotti (2002), who conducted an in-depth field study of email behavior and found that membership in email communities is quite fluid, but depends mostly on organizational context.

A recent study on Social Networks inside research and business communities (Grippa et al., 2006) identified some biases of e-mail mining methods when applied to monitor a community with a strong physical proximity. According to Aral and Van Alstyne (2007) the network study based on email databases is advisable to address a "methodological puzzle" that historically troubled network research: the trade-off between comprehensive observation of whole networks and the accuracy of respondents' recall might create a bias that impacts the research validity. (Kumbasar et al., 1994).

Finally, in the perspective of the Content Analysis, email messages seem to satisfy the seven criteria proposed by Beaugrande and Dressler to define the text to analyze: cohesion, coherence, intentionality, acceptability, informativity, situationality, intertextuality (Beaugrande, Dressler, 1981).

The case study described in this paper is an "embedded" case study, that is particularly suitable for analysis in organizational field, since it involves different ontological dimensions: the community as whole, especially in the definition of lifecycle, and trends detectable through group

centrality metrics; the different sub-communities related to the development of a project; the single members of the community observed in their role evolution and level of involvement in each project.

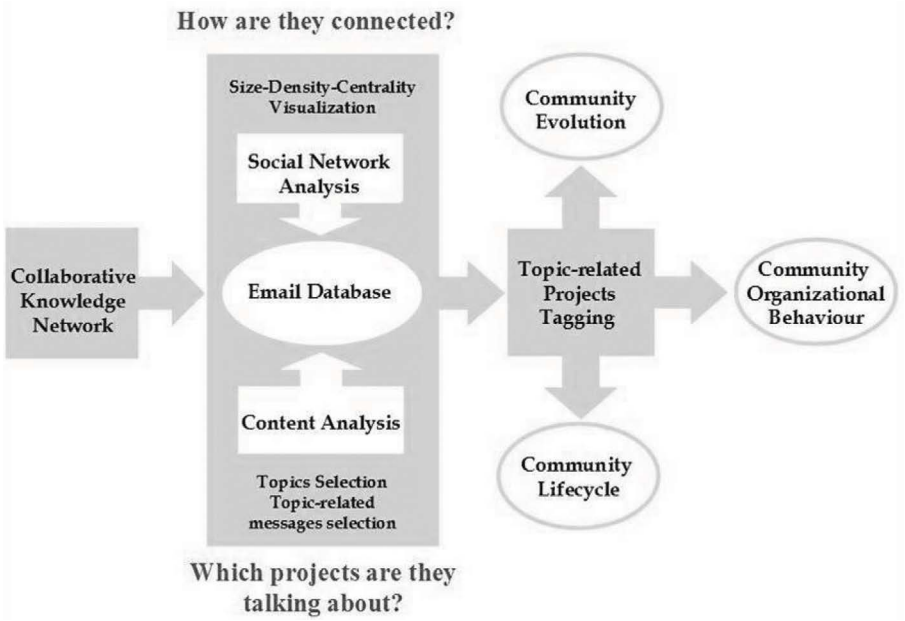
This study is based on the following assumptions:

- **Assumption 1:** The social structure of a community is detectable applying *Social Network Analysis* methods, by mapping the community members' interactions and applying the centrality and contribution metrics.
- **Assumption 2:** The email database is a reliable source of data to approximate a community's network characterized by a low physical proximity (highly dispersed community).
- **Assumption 3:** The *Content Analysis* of the exchanged messages can track the diffusion of an idea and its lifecycle within a project-based community.
- **Assumption 4:** The combination of a *Social Network Analysis* and of a *Content Analysis* of the email database of a dispersed project-oriented community allows to identify the individual role of the community members in developing each project, defining the community members that cover the central roles for the development of each project in a stated period of time analysis
- **Assumption 5:** the application of *Social Network Analysis* and of *Content Analysis* to a dispersed project-oriented community allows to define its characteristics and evolution, as well as lifecycle, organizational behaviour and informally defined roles. Based on these assumptions we propose the conceptual model represented in Figure 2.

COMBINING CONTENT ANALYSIS AND SOCIAL NETWORK ANALYSIS

Content Analysis (CA) is "a research technique for making replicable and valid inferences from texts or other meaningful matter to the context of their use" (Krippendorff, 2004).

Figure 2. Conceptual Model



Highly flexible methodology diffused in library and information science, it is conceived to identify the presence of certain words or concepts within texts or group of texts, following the basic communication model "sender/message/receiver". The concept of *Inference* is a fundamental component of the methodology: the researcher uses analytical constructs or rule of inference to move from the text to the answer to the research question (Marsh and White, 2006).

Different CA typologies are described in literature; a research developed within the project of the Writing Center at Colorado State University, clarifies the differences between two fundamental categories of CA, the Conceptual and the Relational Analysis. Both kinds of research start with the identification of concepts present in a text or a set of texts; the fundamental difference is that Relational CA, also known as Semantic Analysis, focuses on the semantic, meaningful relationships between concepts: concepts individually are considered without any inherent meaning. Indeed Conceptual Analysis, also known as thematic analysis, is designed to recognize the existence and frequency of concepts, generally represented by single words: a concept is chosen and the analysis is articulated on quantifying and tallying its presence.

To differentiate ties on the basis of their discussion topic, and provide meaning to the "relational" and "cognitive" dimensions of social capital, we chose a Conceptual Analysis, focused on the analysis of Manifest Content, that resides on the surface of the communication. The CA applied to Manifest Content presents some advantages: it is easily observable, sufficiently formalized to be operationalized in an automatic way, and needs few interpretative efforts from coders (Rourke et al., 2000). "*The requirements of scientific objectivity dictate that coding be restricted to manifest content*" (Holsti, 1969).

In 1979 Tichy, Tushman and Fombrun stated that Network Analysis represents an underutilized framework for analysing and conceptualizing organizations. In the last two decades, an increasing interest towards application of SNA application to study inter and intra organizational relationships followed the identification of the community dimension of actors working in a collaborative way for reaching common goals (Wenger and Snyder, 2000; Gloor, 2006).

Some important measures at a Group level like distance and density (Wassermann and Faust, 1994), as Betweenness, Closeness and Degree Centrality (Borgatti and Everett, 1999) give a quantitative description of the social network structure, while the same measures of centrality at the Individual level identify the most prominent actors, extensively involved in relationships with other network members. Using these measures and a network representation, (Krackhardt, 1994) is a reliable way to obtain the identification of the network structure. As for the representation, Social Network Analysis rests upon the development of the Graph Theory, a complex framework able to translate in formal language the characteristics, dimensions and peculiarities of a network. The main elements that form a graph are nodes, representing actors, and the lines, or edges, representing their relations; the sociogram, or the graph of networks, describes the qualitative patterns of connections among actors as a translation of the data contained in a matrix, drawing a representation of each row or column in a visually simple and intuitive way.

A recent classification of the individual roles of members within virtual communities has been recently proposed by Gloor (2006) who identified four different role patterns inside the networks: creators, in a position that allows them to see the entire knowledge flows; communicators, whose network role is to link external members to the rest of the community; collaborators, who have the task to coordinate others' activities; and knowledge experts, usually the subject matter experts in certain domains. The author suggests this classification by utilizing a social network metric defined Contribution Index (Gloor, 2006).

The contribution index is +1, if somebody only sends messages and does not receive any message. It is –1, if somebody only receives messages, and never sends any message, and 0 if somebody has a balanced communication behavior, sending and receiving the same number of messages.

Recently the concept of density has been associated to the concept of cohesion (White, Harary, 2001): a group is intended to be cohesive "*to the extent that the members are pulled together when confronted with disruptive forces*" (Kadushin, 2004). To evaluate the level of cohesiveness of a network it is sufficient to remove one or more members and to report the emerging dynamics in terms of disconnectedness.

Density is a core concept and metric to the objective of the present study. Following the findings of Burt's research (2000), the identification of the clear negative correlation between density and performance makes its evolution a relevant indicator of the performance evolution of the network.

In our contribution, we referred to the trend in density evolution to discover the organizational change in the community as related to the most evident change in density value. The assumption that "as density decreases the community performance improves" might drive the observation of the periods in which the network assumes a clear and effective organizational structure.

THE METHODOLOGICAL INTEGRATION

The proposed methodology is articulated in three main phases:

1. Initial audit to acquire contextual information on the case study. It may consist of an interview to a community member, preferably in a strategic network position to behave as a key informant. This information must be integrated with other documents and data, to guarantee the differentiation in terms of sources of evidence.
2. Content analysis of the exchanged messages within the community, with the general goal to divide large communities in sub-groups, differentiated on the basis of the project they are working on. It consists of processing the overall messages stored in a database to associate each project to a unique word, or a set of words, unequivocally representative of the project itself. The final goal is to "tag" the communication flow for each project.
3. Social Network Analysis: Starting from the results of the content analysis, each "project-related sub-community" can be observed under the Social Network Analysis view. The outcome of this process is twofold:
    - Identify each sub-community boundaries, by investigating the network structure (i.e. network size, number of organizations involved, overall density/cohesiveness, core-periphery structure); the project Initiative features (i.e. project idea appearing date, promoters, project development temporal length); the emerging characters and positions for each project, mainly through the application of the actors contribution index.
    - Recognize the sub-community evolution over time, choosing a temporal unit, based on both the quantitative evidence (i.e. network growth, number of organizations involved and density/cohesiveness evolution by month) and the qualitative visualization (i.e. actors positions, centrality; emerging roles and hierarchies; organizational dynamics).

The application of both Content and Social Network Analysis required the support of an automated system. For the purpose of the study we adopted the Condor software, formerly known as

TeCFlow, a tool developed over the last 5 years at the MIT Center for Collective Intelligence and the Dartmouth Tuck Center for Digital Strategies (Gloor and Zhao, 2006).

This research posed the challenge to use the applications of Condor software in an original way, rather different from its original use. Our study helped refine and improve the functionalities of a software tool designed to observe only the information flow emerging from the network position of actors exchanging emails. Our research was able to illustrate the benefits of implementing improved functionalities within the Condor software in order to integrate structural and semantic observation of the network.

Consistently with the construct validation strategy, the present work relies on the convergence of multiple sources of evidence (Patton, 1987): archival records, that is the email database; documentation, such as articles, deliverables and reports about the community events.

The use of open-ended systematic *interviews* to a key informant, who was one of the leading coordinators in the community, allowed tracking a path of evidence during the development of the study and the design of the methodology. The final audit with this strategic member was the final test of the study.

THE CASE STUDY

The described methodology was applied to a large virtual Community, shaped as a Collaborative Knowledge Network (Gloor, 2006), created in 2001 by a global consulting firm. This organization is composed of 70 firms distributed in 140 Countries, providing professional services in several areas of expertise, like accounting, consulting and other professional services. Today it is one of the Big Four auditor firms, and a very important advisory company. With a strong culture of cooperation, it employs about 95.000 people, has customers in about 150 Countries, and a large number of partners with whom it develops consulting services, IT solutions, methodologies and products to maximize shareholder value.

In October 2007 the company reported a record financial performance on a global scale, showing a general growth in all the service fields, in all the geographic areas. Consulting services, that are the core areas of the Company overall services offer, recorded a growth of 16.5 percent, suggesting the CEO to plan and increase in the number of employees of a whole 50.000 units, in four years, recruiting them in 140 Countries. This positive trend started in 2002, a crucial phase of changes within the Company life, marked by important international awards like:

- *SAP America Services*, leader in business software solutions, awarded the Company with the "*Partner Award of Excellence*";
- *Workforce Magazine*, leading US human resource publication, awarded the Company with the "*Workforce Optimas Award for the Global Outlook Category"*;
- *Fortune*'s ranking included the Company in the prestigious list of "*100 Best Companies to Work For*".

The Company performance during the period 2000 – 2002 was the result of a Company project aiming to create a cross-boundary community, recognized as a good practice to support their customers and partnering organizations.

The company's top management considered the "Collaborative Knowledge Network" the most suitable shape for a community to be developed: a very large group spanning geographical and organizational boundaries to embrace several communities of practice linked electronically in the same circuit.

The idea to create and support a CKN was shared among two promoters, namely the key informant and a colleague in the same Company, who met while working on a new service development.

Emails, and rarely virtual meetings, were the main channels of communication within the virtual community. The language was primarily English, sometimes German.

CKN could count on a Knowledge Management Portal and a repository, that constituted the basic infrastructure to make it possible to store data, and to provide an "organizational memory" for all the production of the community.

Some relevant positions and roles naturally formed during the CKN life cycle: for each service, product or practice developed, at least one coordinator, one consulting manager and a group of volunteers emerged. None was ever appointed for any role.

This community was a suitable setting for testing the methodology because of the following features:

- the actual amount of messages: 5431
- the size of the community: 1141 actors
- the diverse involved organizations: 85
- the wide geographical distribution: 100 different countries
- the length of the period of observation: 19 months
- the availability of a key informant to test step by step the reliability of the research findings

The Content Analysis Phase was articulated as follows:

1. Direct observation of the sample messages: 30 messages over 5431 were read to understand the main characteristics of the language used in the email exchange, and to facilitate the developing of "inference rules" aimed to identify project-representative words.
2. Development of "Inference Rules": the "coding schema" derived from the recognition that in the exchanged messages the projects were identified always by their "proper names" or "titles" and by the recurrent common features of these terms: never common words; always expressed in English independently from the conversation languages, English or German; generally composed by two terms merged; sometimes composed by a letter (e.g. "e") and a common word (e.g. "ehome").
3. Coding process: It was the result of a semi-automated process, consisting of two phases:
    - Data collection and refining through the Condor software
    - "Preview terms" selection through the human involvement

The use of the two "stopword lists" in the automated data processing let us to extract from 5135 messages 3807 words to be analyzed. The analysis was conducted "by hand" on the basis of the developed Inference Rules, and articulated in an iterative process. Five iterations were made, with a continuous further selection, obtaining a gradual reduction from 3807 to 652, 141, 62, 27, 11 words. The extracted 11 words were supposed to be the "topics" representative of the projects, products, services, methodologies, that the community had developed during the period of observation. From a second interview it resulted that 9 out of the 11 terms were the searched tags, that is to say that each tag was unequivocally representative of a project.

The Social Network Analysis was used to monitor the large community composed of the 9 sub-communities, each one represented by the topics extracted through the Content Analysis. These topics were employed as "tags" to differentiate in the software aided analysis the community in subgroups.

The Condor software was used to select the communication flows related to each topic, to highlight the network nodes "talking about" the chosen project. To each of these sub-communities the intended set of measurements and visualizations of the analytic approach were applied, on

a monthly scale, to give an approximation of the development of each project.

While the only application of Social Network Analysis would have provided the picture of the community evolution and its network structure as a whole, the integrated methodology allowed us to discover the 9 sub-communities, and to analyse each of them separately and in comparison with the others.

The analysis of each "project-related sub-community" and the cross-project analysis comparison allows to recognize the overall community evolution in terms of four dimensions: size, organizational chart, project initiative and organizational dynamics.

Size: the overall community made of 1141 actors carried on 9 projects over a period of 19 months. The 9 project-related sub-communities varied in size from 16 to 605 actor. Project 3 with 605 actors was the most participated, involving more than half of the overall community's members. It has been defined by the key informant "the most complex and important one". The monthly distribution of actors per project is summarized in a "Actor–Projects Table" (Figure 3).

Organizational Chart: while the application of SNA could have provided only the identification of the most central actors, through the application of indices like Betweenness Centrality and Contribution Index (Gloor, 2006), the integrated methodology allowed a segmentation of the community in 9 sub-communities associated to 9 projects. This helped to recognize an emergent "organizational chart" of the community, a hidden organizational structure of the Collaborative Knowledge Network, with the localization of the central actors across all the projects, and those central only in few projects. Combining CA and SNA brought to define a five levels organizational structure, as represented in Figure 4.

Project initiative: the first five projects were the most important ones, and also the most successful, as showed by the density trend of the study. They were developed under the proposal of the two leading coordinators, probably because of their relevance for the leading organization, and the temporal distribution of the proposals. The first four projects are attributed to the same month, August 2001, the fifth one to October, two months later. The others came out from the con-

Figure 3. Monthly distribution of Actors per Project (Actor-Projects Table)

Months	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9
1	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0
3	5	8	4	5	0	0	0	0	0
4	2	4	8	6	0	0	0	0	0
5	26	2	50	24	12	0	0	0	0
6	8	4	36	16	9	0	0	0	0
7	23	10	116	31	7	28	21	0	0
8	11	13	95	83	41	32	25	6	0
9	19	11	91	99	24	34	24	18	0
10	**151**	25	86	97	33	**171**	**194**	12	3
11	13	9	102	78	21	57	50	15	2
12	14	17	85	**189**	28	77	34	5	**12**
13	4	13	**218**	111	**184**	96	26	9	9
14	3	**36**	135	119	58	116	20	18	2
15	0	3	146	127	55	102	13	19	0
16	0	0	52	23	31	20	0	**24**	0
17	0	0	0	8	4	0	0	0	0
18	0	0	3	0	4	0	0	0	0
19	0	0	19	19	0	0	0	0	0

Figure 4. The hidden organizational structure of the CKN



tribution of other actors but always within the 10 most central ones.

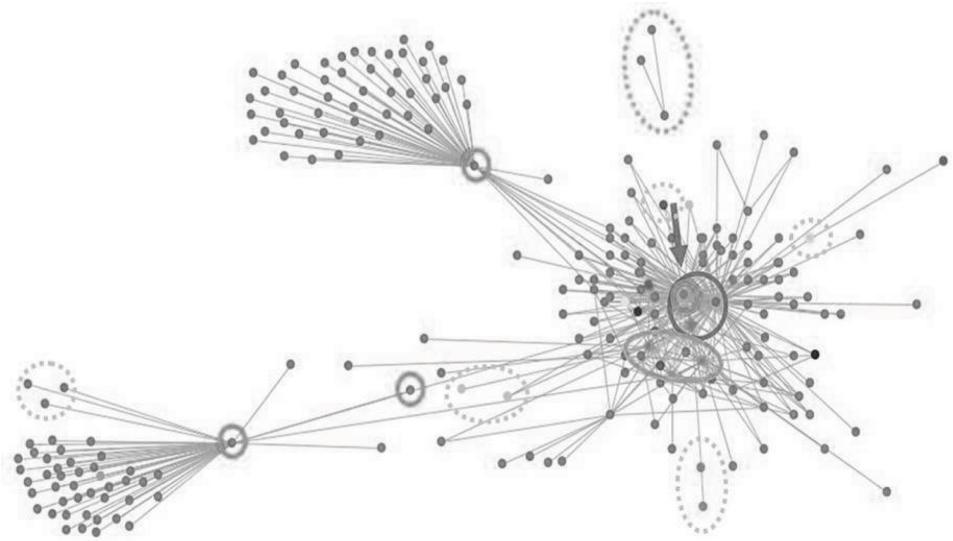
Figure 5 shows in detail the Cross Project Analysis Matrix, where the nine projects conducted by the community and identified through the Content Analysis are matched with cross-project factors like Network Structure, Project Initiative and Network Evolution and behaviour.

Organizational dynamics: the community showed evidences of a clear trend in maintaining a fixed core group of actors, coordinating the CKN, and a wide variety of consultants, engineers, researchers, marketing experts who contributed in different ways to the projects' development, justifying the *high rate of turnover* of the different groups. When the goal was clear to the whole community and the project activities started, the involvement of new resources was generally concentrated in few months. This has been observed by the trend in *size* and *density* values, by

Figure 5. Cross Project Analysis Matrix

	Cross Projects Analysis	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9
Network Structure	Size	206	86	605	437	295	281	268	71	16
	Organizations	4	2	18	9	11	6	9	4	1
	Density	0,01	0,05	0,01	0,01	0,01	0,02	0,01	0,05	0,22
	Core-Periphery	N	N	N	N	N	N	N	N	N
Project Initiative	Project idea starting date	Aug 2001	Aug 2001	Aug 2001	Aug 2001	Oct 2001	Dec 2001	Dec 2001	Jan 2002	Marc 2002
	Project idea promoters	Char 1 Char 2	Char 1 Char 2	Char 1 Char 2	Char 1 Char 2	Char 1 Char 2	Char 2	Char 5	Char 1 Char 5	Char 1 Char 2 Char 3
	Project length	12 months	13 months	17 months	17 months	14 months	10 months	10 months	9 months	5 months
Network evolution and behaviour	Not operative months	1,2 15,16,17,18, 19	1,2 16,17,18,19	1,2 17	1,2 18	1, 2, 3, 4 19	1,2,3,4,5,6 17,18,19	1,2,3,4,5,6 16,17,18,19	1,2,3,4,5,6,7 17,18,19	1 – 9 15 – 19
	Max centralization months	5, 9, 10, 12	8, 10, 14	From 5 To 16	From 8 To 15	8, 13, 14, 15	From 10 To 15	10	9, 14,15,16	12,13
	Average actors	11	10	45	48	25	44	26	14	2
	Max actors	151	36	218	189	184	171	194	24	12
	Subgroups	2	0	5	2	2	1	1	0	0
	Central secondary organizations	N	N	Y	N	Y	Y	N	N	N

Figure 6. Project 2 Community Sociogram (Month 13)



analyzing for each project the months in which it decreased under the value of 0.1.Figure 6 provides an example of organizational dynamics in a low density month.

The Community Lifecycle

The SNA implemented through the utilization of the Condor software makes it possible to draw the Community lifecycle starting from the evaluation of the trend in *centrality metrics for the overall Network*; the result is a sort of "structural" lifecycle, based on the shifts in the structural features of the network, but without any further investigation on the reasons that could give meaning to the identified structural shift.

Applying the integrated methodology we have been able to recognize what changed in the community evolution when the trend in the *Group Betweenness Centrality, Group Degree Centrality, Average Weighted Contribution Index Value* indicated a shift.

The information flows detected through the application of Social Network Analysis indicated a cycle in the CKN life: it was evident from the evolution of the community size, launch and

Figure 7. Cross Project Analysis. Average Size

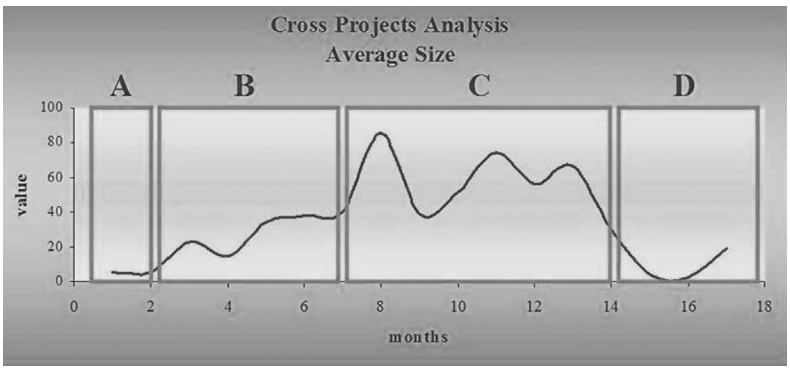
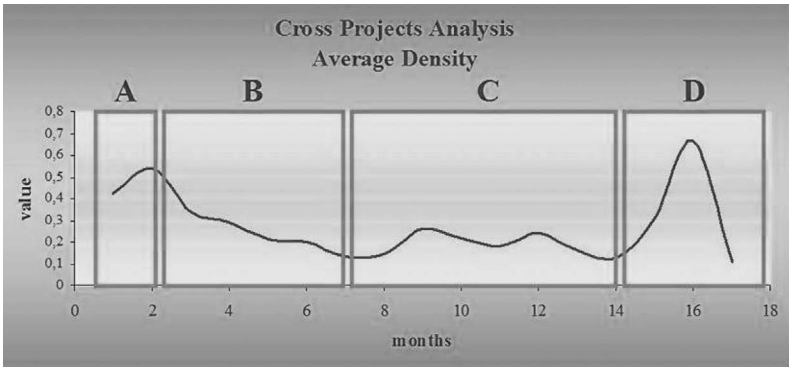


Figure 8. Cross Project Analysis. Average Density



ending with no more than 10 actors (see Figure 7 and 8).

As illustrated in Figure 9, four stages of development have been recognized thanks to the application of the integrated methodology:

- **Stage A:** the period from June to August 2001 was an *introductory phase*, where no project was proposed, started or carried on.
- **Stage B:** from August to December 2001 it was a period of intense interaction, marked by an "*idea generating*" activity: it saw the emerging of almost all the project-ideas and the launch of the most important projects (i.e. projects 1, 2, 3, 4, 5, 6, 7).
- **Stage C:** from January to July 2002 the group changed completely in shape and organization, working on different topics, realizing the first results of the first projects. We called this the "*operating*" phase. March 2002 was the most intense month: all the projects were activated, and the CKN core group decided to start with a marketing campaign to launch the services and products that the community was developing.

Figure 9. Community Lifecycle compared with Cross Projects Average Size and Density, and with Actors-Projects Table.

	Months	Project 1	Project 2	Project 3	Project 4	Project 5	Project 6	Project 7	Project 8	Project 9
A	1	0	0	0	0	0	0	0	0	0
	2	0	0	0	0	0	0	0	0	0
	3	5	8	4	5	0	0	0	0	0
B	4	2	4	8	6	0	0	0	0	0
	5	26	2	50	24	12	0	0	0	0
	6	8	4	36	16	9	0	0	0	0
	7	23	10	116	31	7	28	21	0	0
C	8	11	13	95	83	41	32	25	6	0
	9	19	11	91	99	24	34	24	18	0
	10	**151**	25	86	97	33	**171**	**194**	12	3
	11	13	9	102	78	21	57	50	15	2
	12	14	17	85	**189**	28	77	34	5	**12**
	13	4	13	**218**	111	**184**	96	26	9	9
	14	3	**36**	135	119	58	116	20	18	2
D	15	0	3	146	127	55	102	13	19	0
	16	0	0	52	23	31	20	0	**24**	0
	17	0	0	0	8	4	0	0	0	0
	18	0	0	3	0	4	0	0	0	0
	19	0	0	19	19	0	0	0	0	0

- **Stage D:** from August to December 2002 was the "*organizational memory*" period; all the projects came to their conclusion, the results were evaluated, best practices were collected and knowledge for the organizational memory of the community was stored.

MANAGERIAL IMPLICATIONS AND RESEARCH LIMITATIONS

The concurrent application of the experimented "tagging" system and of the Social Network Analysis allowed to identify within the global virtual community 9 sub-communities, one for each of the projects that over time had been proposed.

The main limitation of the Social Network Analysis, that is to treat all the connections in the same way, without differentiating the topics of discussion, might represent an obstacle in the analysis of large communities. It would be hard to understand communications referred to friendly personal ties or projects-related ones. This can prevent the development of a more comprehensive picture of the community, making it difficult to disentangle the web of many interactions, 5431 in our case, that can provide no meaning and possibly lead to misinterpretations.

The application of the integrated methodology represents a useful attempt to evolve from a structural analysis of the community toward a more complete understanding of the community dynamics, merging the observation of the social capital's structural dimension with the cognitive dimension of the common interest or objective shared through their interaction

However this research presents some relevant limitations to be overcome.

The first is related to the applicability of the same methodology to other kind of virtual communities. The successful application of the presented methodology relies in some parts on the features of what we have defined a "virtual community operating in organizational context", by which we can identify different project-oriented activities and groups, and count on the email as the main kind of message to be analyzed. In particular the email message is particularly suitable to be the unit of the Content Analysis, since it presents characteristics like directionality, timeline, clear definition of sender and receiver, and structured text content. Other kinds of virtual online communities, as the community of interest developed around a common and abstract focus changing over time, made of ever new people, and interacting through different kind of media are a different context to which this methodology could be hardly applied.

Secondly, the application of this methodology to this kind of communities requires the intervention of an analyst for the observation and the interpretation of the elaborated data.

The third limitation to take into consideration is related to the cognitive and relational dimensions of the social capital analysis. The application at the document-level or at the sentence-level of a sentiment analysis (Wilson et al., 2005) could improve the quality of the findings of this research helping to identify positive and negative opinions, emotions, and evaluations, and to map the learning path of the community during the development of the project-based activities.

Another critical point of the research is related to the application of the Content Analysis, as it is a very flexible and inferential approach. Since the *direct observation* of the sample messages could be affected by some degree of subjectivity, it is recommended to involve multiple researchers in this phase. Moreover, the analysis of the social capital of a community requires attention to the cultural, relational and organizational context, which means the involvement of an internal actor, preferably one of the central members, to better frame the dynamics and emerging behaviour of the community.

Managing Communities is a peculiar task, and a strange game: the self-organization principle,

the spontaneity of their nature, their being non-hierarchical structures make them something difficult to be mandated into action until they are not effective, traditional approaches to implementation and deployment don't work with them (Gloor et al., 2002).

Understanding and recognizing the emerging communication dynamics represented an important element for the observed virtual community. These dynamics, with all the managerial implications that might follow, were still in the "black box" for the sponsoring companies, hidden in a large, spontaneous flow of information exchange among the actors.

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KEY TERMS AND DEFINITIONS

Virtual Organizational Community: Virtual community developed within or across the boundaries of an organization, characterized by a mission, objectives and organizational culture.

Social Network Analysis: Analytic methodology that views social relationships in terms of network theory consisting of nodes and ties (also called edges, links, or connections): nodes are the individual actors within the networks, and ties are the relationships between the actors. Social networks operate on many levels, from families up to the level of nations, and play a critical role in determining the way problems are solved, organizations are run, and the degree to which individuals succeed in achieving their goals.

Content Analysis: Methodology in the social sciences for studying the content of communication. It is generally referred to as the study of recorded human communications, such as books, websites, paintings and laws; it is also considered a scholarly methodology in the humanities by which texts are studied as to authorship, authenticity, or meaning.

Social Capital: Sociological concept, which refers to connections within and between social networks. For this research, it is followed the definition provided by Naphiet and Ghoshal in 1998, by which it is considered as the sum of the actual and potential resources embedded within, available through, and derived from the network of relationships possessed by an individual or social unit. Social capital thus comprises both the network and the assets that may be mobilized through that network". They propose a model of Social Capital based on three key dimensions, Structural, Relational and Cognitive.

Collaborative Innovation Networks (COIN): Networks created from the interaction of like-minded, self-motivated individuals who share the same vision. An innovative idea is pushed forward by charismatic leaders, who assemble a group of highly motivated collaborators. These people share a common vision, and want to be part of the innovation that "will change the world." They typically bring a broad range of skills and expertise to the COIN and are not necessarily related in terms of the corporate hierarchy, as they work outside of the formal organization.

Collaborative Knowledge Network (CKN): According to the taxonomy provided by Peter Gloor (2001) it is an ecosystem of interconnected communities that shaped as COIN (COllaborative Innovation Networks), CLN (Collaborative Learning Networks), and CIN (Collaborative Interest Networks).

Community Lifecycle: The sequence of the phases of evolution of a community, whose map is based on the shifts in the structural features of the network according to the change in the values of the centrality and density measures. This research considers the lifecycle of the community as a four stages development: an introductory phase, an idea generating phase, an operating phase, and an organizational memory phase.

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Chapter 14
A Statistical Analysis of Priority Factors for Local e-Government in a Developing Country:
Case Study of Yogyakarta Local Government, Indonesia

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ABSTRACT[1]

This chapter presents findings of a study devoted to investigating the factors that influence successful implementation of e-Government at a local level in a developing country context. The study is based on the case study of Yogyakarta Local Government, Indonesia. Using qualitative methods of data gathering, the study developes a conceptual model with 27 items that were used for developing the questionnaire distributed into conducting in-depth interviews with 200 government officials in Yogyakarta, who adopted Information and Communication Technologies (ICTs) as a platform for their daily work activities. The study also conducted desk research that explored many documents on ICT implementation in the public sector. The results reveal that the most significant factors that influence success in e-Government projects are corporate culture and e-Governance competency. The other factors, in order of importance were users' willingness and competency in using ICTs, Information quality and human resources competency, and system quality, which was moderated by information quality and human resources competency.

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INTRODUCTION

ICTs influence the way government and citizens interact throughout the world. Even in developing countries, many governments have been trying hard to implement ICTs in order to meet the needs of citizens. In developing countries, the impact of ICT projects, especially in the public sector, is not commensurate with the amount of ICT infrastructure investment (Heeks, et al., 2002; Ferran, et al., 2005). Even, recent survey reports on e-Government readiness also place many developing countries in the lower ranks compared to developed countries (UNDESA, 2008; EIU, 2009).

A lot of approaches designed to improve implementation of ICT projects in the public sector in developing countries have been developed. But most of these approaches are based on the experiences of developed countries where the technology was developed. Heeks (2002) has revealed that there are gaps, related to infrastructure, information culture, procedure, management and human resource competence between developing and developed countries with regards to ICT project implementation. This has correspondingly negatively impacted on the level of penetration of e-Government in developing countries.

In developing countries, success in implementing an ICT project will not be achieved if the focus is on just making improvements to the technology (Ferran, et al., 2005; The Local Government of Yogyakarta, 2006).The approach developed by Mcconnel International (2001) shows that many factors including e-Leadership, human resources competence, business climate and ICT infrastructure influence the success of ICT implementation in developing countries. Similar findings in Indonesia, in 2007, show that although a lot of local governments have invested a lot to improve the ICT infrastructure, the quality of public services did not improve significantly (Kompas, 2007). Futhermore, other studies conducted in Indonesia emphasized that there were many factors, similar to the findings of the study conducted by Mcconnel International (2001), that influence the uptake and effective development of e-Government (Wijaya & Surendro, 2007). It is for this reason that this study sought to take a different approach in developing a framework that can be used to study factors that may influence successful implementation of ICT projects from the perspective of developing countries. The chapter attempts to address the question: Why does the implementation of e-Government in developing countries not improve the public services significantly?

This chapter is organized as follows. The first section is the introduction of the study. The second section presents the context of the study by outlining the Jogja Cyber Province Initiative, an e-Government initiative implemented in Yogyakarta Province. The third section presents the relevant literature related to e-Government in a developing country context. This section is followed by an outline of the research methodology and data gathering techniques. Our empirical findings and discussion are presented in the fifth section, and finaly, the last section, describes the limitation of the study and provides some recommendations for future research.

LITERATURE REVIEWS

Although the implementation of ICTs in developing countries has increased over the years, there is very little literature about ICTs in developing countries compared with experiences of developed countries. There are many research studies that present factors related to e-Government success (EIU, 2005; Liu, 2001). These studies have posited that e-Government development mostly depends on the organizational and institutional readiness to adopt ICTs to the core of the available business value chains or activities. For an organization to derive optimal benefits from implementing ICT projects, the organizational environment should be ready to adopt ICT (Chang & Kannan, 2002;

UNDESA, 2005). Chang & Kannan (2002) argue that optimal benefits of ICT implementation are influenced by organizational readiness and quality of the technology deployed. According to the United Nations Department of Economic and Social Affairs (UNDESA, 2005), e-Readiness can be defined as relating to factors that influence ICT implementation success. UNDESA (2005) identified indicators that can be used to measure e-Readiness that is necessary to attain e-Government success. These include Web Measure Index, ICT infrastructure and Human Capital Index. Other indicators of e-Readiness include leadership, ICT quality, human resources competency, and business climate (McConell International, 2001; Bridges.org, 2004; Ferran, et al., 2005).

The Government of Indonesia has decided to improve other factors cited above when implementing ICT projects to enhance public services (President Law, 2003). But empirical studies show that although many local governments in Indonesia have invested a lot in technology to improve public services, this has not resulted in adequate and appropriate improvement in service delivery (Kompas, 2007).

E-Government success can be defined as the use of ICTs which readily culminates into positive impact of technology on the organization. Delone & Mclean (2003) have developed a model for Information Systems (IS) implementation success using 6 indicators. These include quality of system, quality of information, frequency of use, user satisfaction, individual impact, and organizational impact. In this study, we measure e-Government success using 4 indicators including frequency of use, user satisfaction, individual impact and organizational impact. In our derived model, we combined quality of system and quality of information (ICT Infrastructure) as constituting part of factors which influence e-Government success (UNDESA, 2005; McConnell International, 2001; President Law, 2003). Based on the short analysis above, we developed an interdependency model which relates three factors and e-Government success. In detail, beside quality of the technology, we propose that e-Government success is influenced by organizational e-readiness and user readiness factors. Our model can be postulated as follows:

1. ICT infrastructure quality can be measured by user's perception related with the quality of system and information. Whereas, organizatinal awareness and competence with ICT implementation influence the quality of system and information in entire the organization. In this chapter, organizational readiness can be defined as organizational awareness and competence related with ICT implementation. It can be seen that the orientation or awareness of the organization is related with the awareness of the IT user and the benefit of the technology will influence ICT implementation (Pasuraman, 2000). Then we develope a hypothesis that:
   - There is a strong relationship between organizational readiness and ICT infrastructure quality.
2. ICT implementation success can be measured by use, user satisfaction, individual impact and organizational impact (Delone & Mclean, 2003). Chang and Kannan (2002) stated that there is an interdependency between e-readiness and ICT success factor. Then we hypothesise that:
   - There is a strong relationship between organizational readiness and e-Government success.
3. ICT infrastructure quality can be measured by the user's perception related to the quality of the system and information. On the other hand, logically, user willingness and competence in using ICT influence the quality of information produced by the technology. In this chapter, we defined user e-Readiness as the safety and comfortable perception of the user when using the technology. Then we hypothesise that:

- There is a strong relationship between user e-Readiness and ICT infrastructure quality.

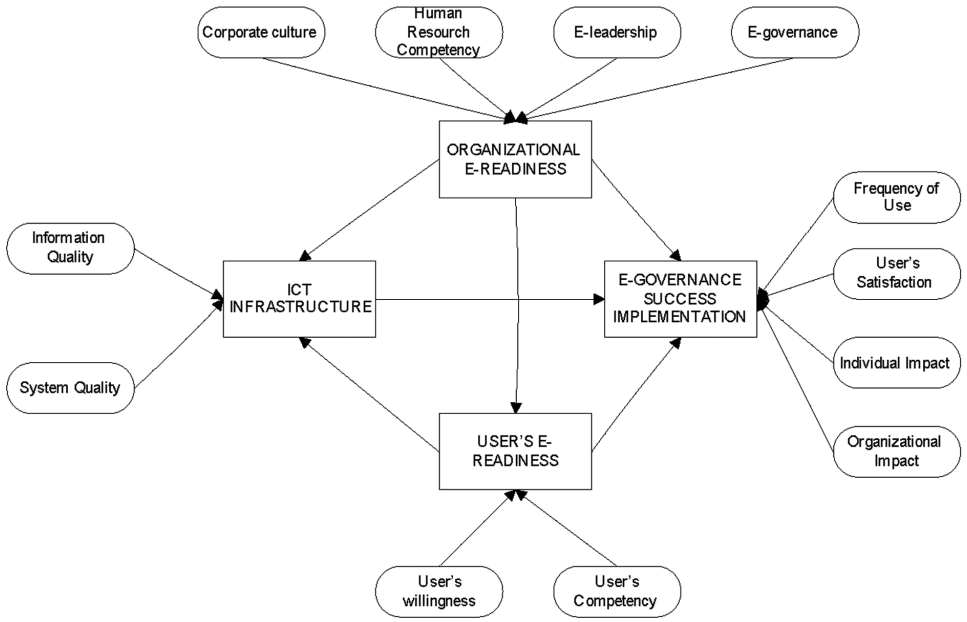
4. The user's acceptance the technology influences the actual use (Davis, 1989) and logically influences the impact of the technology into every user and organization. It can then be hypothesised that:
   - There is a strong relationship between user e-Readiness and e-Government success.
5. Findings of an empirical study employing a competing value framework, which sought to identify the organizational culture of the Yogyakarta local government, revealed that its organizational structure is hirarchical (Wijaya, 2007). In hierarchically ordered organizations, the relationship among employees tends to become very formal and structured where procedures govern what people do. This finding led this study to hypothesise that organizational orientation has a strong relationship with how the employees conduct their work. We therefore argue that:
   - There is a strong relationship between organizational e-Readiness and user e-Readiness
6. The better the quality of ICT infrastructure, the better of utilization and impact on the individual and the organization (Chang & Kannan, 2002). In the words, ICT infrastructure quality is a tool to attaining e-Government success (UNDESA, 2005). It can be concluded from this that:
   - There is a strong relationship between ICT infrastructure quality and e-Government success.

The proposed conceptual model is presented in Figure 1.

The conceptual model has four pillars as follows:

- Organization e-Readiness: the overall capacity of the organization to accept glob-

Figure 1. Proposed conceptual model



al usage of ICTs in their business value chains;
- ICT infrastructure: The availability appropriate communication and technology platforms aimed at encapsulatin the various business opportunities;
- User's e-Readiness: the willingness of the individuals to utilize ICTs at a global scale in their daily activities; and
- E-Governance success implementation: the degree to which the laid out e-Government strategies and initiatives translate into actual implementation endeavors.

Organization e-Readiness

Organization e-Readiness is the state of preparedness by the organization to implement an ICT project. Organization e-Readiness is influenced by four factors: corporate culture; human resource capacity; e-Leadership and e-Governance. Corporate culture relates to how the organization conducts its business—where success or failure is dependent on whether there is an enabling organizational culture for successful implementation of an ICT project; human resource capacity, in terms of ICT skills of the organizational personnel, will also determine the level of readiness of the organization to successfully implement an ICT project where the presence of ICT skills among staff will enhance chances of success; e-Leadership has been defined as "…a social influence process mediated by advanced information technology to produce a change in attitudes, feelings, thinking, behavior, and/or performance with individuals, groups and/or organizations. (Avolio, Kahai, & Dodge, 2000, p. 617). This entails having people in the organization who have the vision for ICT and requisite ICT skills and capacity to drive the process in the organization.

UNESCO (2005) has defined E-Governance as "… the exercise of political, economic and administrative authority in the management of a country's affairs, including citizens' articulation of their interests and exercise of their legal rights and obligations... via the electronic medium in order to facilitate an efficient, speedy and transparent process of disseminating information to the public, and other agencies, and for performing government administration activities…" Success of e-Government will be determined by the extent to which e-Governance is entrenched in the organization.

ICT Infrastructure

The state of ICT infrastructure is determined by two major factors: robustness of its design and/or deployment, including the percentage of tailor-made applications it can accommodate on its platform, and the capacity of the infrastructure to accommodate openness (heterogeneous access) and other non-functional requirements (such as scalability, allowing concurrency access, heterogeneity, reliability, and availability). These factors are further measured by factors such as system quality and information quality (content of the services). System quality envelops the responsiveness of the designed ICT applications to the specific needs of the users, its reliability and availability within a specified period of time. Information quality entails the level of accuracy and integrity of the different information resources obtainable or its amenability to manipulation by the available ICT infrastructure.

User's e-Readiness

E-Readiness of the users is crucial to successful implementation of e-Government. User's e-Readiness is influenced by two major factors: user's willingness to use the technology and user's skills (competencies to use the technology) and the perceived usefulness and usability of the technology applications.

Successful e-Government Implementation

The success of e-Government implementation can be measured by four major indices: frequency of use of e-Services, user's levels of satisfaction with e-Services, impact of e-Services on the individual, and the impact of e-Services on the organization.

RESEARCH DESIGN AND METHOD

The main objective of the study was to develop a causal model which can be implemented to attain e-Government success in developing countries. In order to achieve this objective, we conducted the following steps of analysis:

1. The first step was aimed at exploring and investigating factors influencing e-Government success by comparing literature on ICT implementation as described in the preceding section. The findings from the literature review were reinforced by interviews with government officials and policy makers;
2. Based on the findings from the first step, we proceded to the second step - that is developing an interdependency model which relates to the three factors that influence e-Government success;
3. The model linking four (4) latent variables namely ICT infrastructure, Organizational e-readiness, User e-readiness, and E-governance success implementation was developed. Because latent variables are, by definition, unobservable, their measurement must be obtained indirectly by using some indicators; and
4. Then, we developed a questionnaire based on seven (7) Likert scale which consists of the following items:
    - Latent variable *ICT infrastructure quality* is measured by system quality and information quality perception. The first measurement uses five (5) indicators including adaptability, availability, reliability, responsivenes, and ease of use. Whereas the second measurement used seven (7) indicators including effectiveness, efficiency, integrity, confidentiality, availibility, compliance, and reliability of information;
    - Latent variable *organizational e-Government readiness* is measured by organization culture, e-Leadership, e-Governance, and human resources competency;
    - Latent variable *user e-Readiness* is measured by willingness and competency in using ICT; and
    - Latent variable of *e-Government success* is measured by frequency of use, user satisfaction, individual impact and organizational impact.

The questionnaire also had questions about respondents' background, namely; education and their experience of using ICTs. To estbablish the validity and reliability of the instrument, we conducted a pilot study where the questionnaire was distributed to a sample of 20 respondents. This step aimed to check the degree of instrument consistency or repeatable instrument competency (Kerlinger, 1991). We used the Cronbach Alpha as reliability test method which is based on the correlation between each item in the research instrument or questionnaire. The results of the pilot study are presented below:

1. Reliability testing with 31 items was 0,978 Cronbach Alpha. Based on George and Mallery criteria, this value shows very good internal consistency.
2. Validity test results all of items were valid, with validity value ranging from 0.638 until 0.869. Based on both values, we concluded

that the research instrument could be applied to the larger sample size.

The final questionnaire was then distributed to more than 200 government officials of Yogyakarta Local Government. In order to minimize the possibility of errors, researchers assisted respondents in completing the questionnaire. The result of this step, was then used to test the reliability and the validity of the instrument.

Structural Equation Modelling (SEM)

Structural equation models are models of relationships among constructs that encompass and extend regression and factor analysis procedures (Hayduk, 1987). Why was SEM selected for the data analysis in this study? There are at least three main reasons. First, this study uses measures to represent constructs because this research has a corresponding interest in measurement and measurement techniques. SEM casts factor analysis in the tradition of hypothesis testing, with explicit tests of both the overall quality of the factor solution and specific parameters (e.g. factor loadings) composing the model. SEM deals directly with how well the measures reflect the intended constructs. Second, this study was principally interested with questions concerning the relationships among the measures. The focus of this study is on the mediational relationships (rather than the simple bivariate) and the causal processes that give rise to the phenomena of interest. Thirdly, SEM provides a flexible and powerful means of simultaneously assessing the quality of measurement and examining the predictive relationships among constructs.

Exploratory Factor Analysis (EFA)

As part of SEM, Exploratory Factor Analysis is used to test 27 items (indicators) in the questionaire that are part of the three (3) latent variables including ICT infrastructure quality, organizational e-Government readiness, and user e-Readiness. The goal of EFA is to describe and summarize data by grouping together variables that are correlated. EFA proves useful for consolidation of numerous variables (construct validity). Therefore, by using factor analyses we may test whether the given indicators are a good measurement for the three latent variables. If so, the indicators must be grouped as independent factors or variables which were included in the three postulated latent variables. From the factor analysis we defined a factor structure which underlines the ICT infrastructure, Organizational e-Readiness, and User e-Readiness. When the necessary calculations were completed, we obtained the result that shows the degree of importance of each indicator to the related factor.

Path Analysis

After the factor structure had been defined from the previous steps, we then conducted the Path Analysis. In other words, the proposed structural relationship model (Figure 1) was now providing the underlying structural model which relates the three latent variables: ICT infrastructure, Organizational e-Readiness, and User e-Readiness to the latent variable e-Governance success implementation through a regression-type relationship. Before applying the Path Analysis, we conducted reliability tests by using the new sample size (212 respondents) to make sure that the instrument was still reliable. Reliability refers to the property of a measurement instrument that causes it to give similar results for similar inputs. From the Path Analysis we hoped to obtain the priority factors influencing e-Government implementation success.

RESULTS

The findings of the study are presented under the relevant sub-headings in the sctions that follow below. These include:

- Profile of respondents
- Structural analysis

Profile of Respondents

Yogyakarta Local Government has an ICT department which coordinates and manages ICT implementation in every Local Government's department. Although it has a central ICT departement, each department has a small ICT unit which is directly responsible for the management of its ICT implementation process. In order to arrive at a representative sample, we decided to choose respondents who work in the central ICT department, each IT unit, and other units that have adopted ICT in their operations.

The total number of respondents was 217 computer users in Yogyakarta Local Governments. These were ICT workers and managers. The findings show that the gender and education backgrounds of the respondents are generally good. It can be seen that 60% of the respondents were males and 40% were females. ICT workers and managers' educational backgrounds are dominated by bachelors and masters degrees, representing 47% of the respondents. The number of respondents who have diplomas was 12% of the respondents, while 41% of the respondents had attained junior and senior high school education. Figures 2 and 3 provide a summary of educational backgrounds and gender of the respondents.

Figure 3 shows the respondents composition of gender.

The levels of ICT literacy among respondents were high. Most of the respondents (60%) had been using ICT since 2003. In addition, they had also been trained to use the Internet; many information system applications such as human resources information system; Windows application, MS Office, Oracle and had been exposed to the e-Government concept and policy. In general more than 50% of the respondents had used Websites and human resources information system; 56% had received training on use of the Internet, Windows, Microsoft Office, and Oracle; and 45.2% had been trained on e-Government. It can be concluded from this information that most of the sample respondents could comfortably use ICTs in undertaking their work.

Structural Testing

Structural testing entailed transforming the conceptual model presented in Figure 1 into a path model presented in Figure 4. The structural model wastested using the Structural Equation Modelling (SEM) which employed factor analysis and path analysis measures.

Figure 2. Educational background of respondents

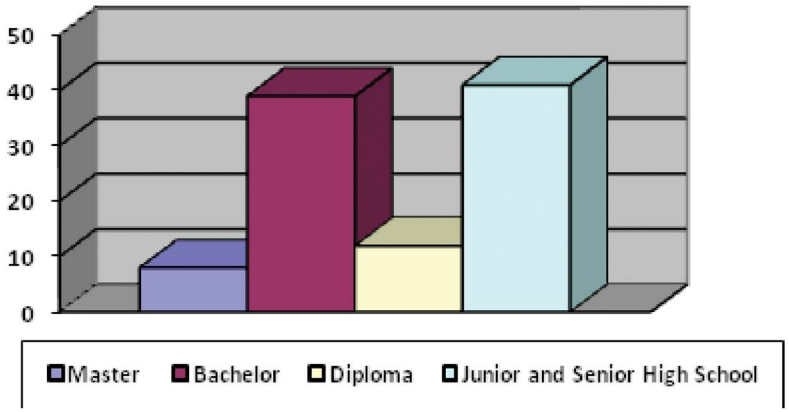
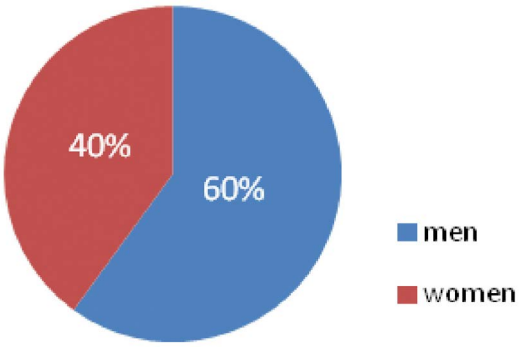


Figure 3. Respondent's gender composition



The path model shows the different factors that were considered on each particular attribute.

Factor Analysis

In order to determine the dimensional structures from different instruments, a factor analysis was performed using SPSS version 11.0 for Windows. The loading rule was, choose a loading number greater than 0.5 on one factor, and less than 0.5 on all others (Hair, Anderson, Tathan, & Black, 1995). The result of factor analysis using 217 respondents is presented in Table 2. A summary of the factor analysis is shown in Table 1.

The results of factor analysis were used to analyze latent variables. It can be seen from Table 3 that Factor 1 is dominated by information quality items, including items INFO1, INFO2, INFO3, INFO4, INFO5, INFO6, and SYSTEM6, and human resources items including HR1 and HR2. We call *Factor 1 as Information Quality and Human Resources Factor*. Factor 2 is dominated by corporate culture items and e-Governance competency. Although Culture 2 has high factor loading on Factor 1 and Factor 2, this was done for the purposes of interpretation. We call *Factor 2*

Table 1. Summary of factor analysis

FACTOR	Initial Eigen values		
	Total	% of Variance	Cumulative %
1	16,564	61,347	61,347
2	1,430	5,297	66,644
3	1,217	4,508	71,152

Figure 4. Path model

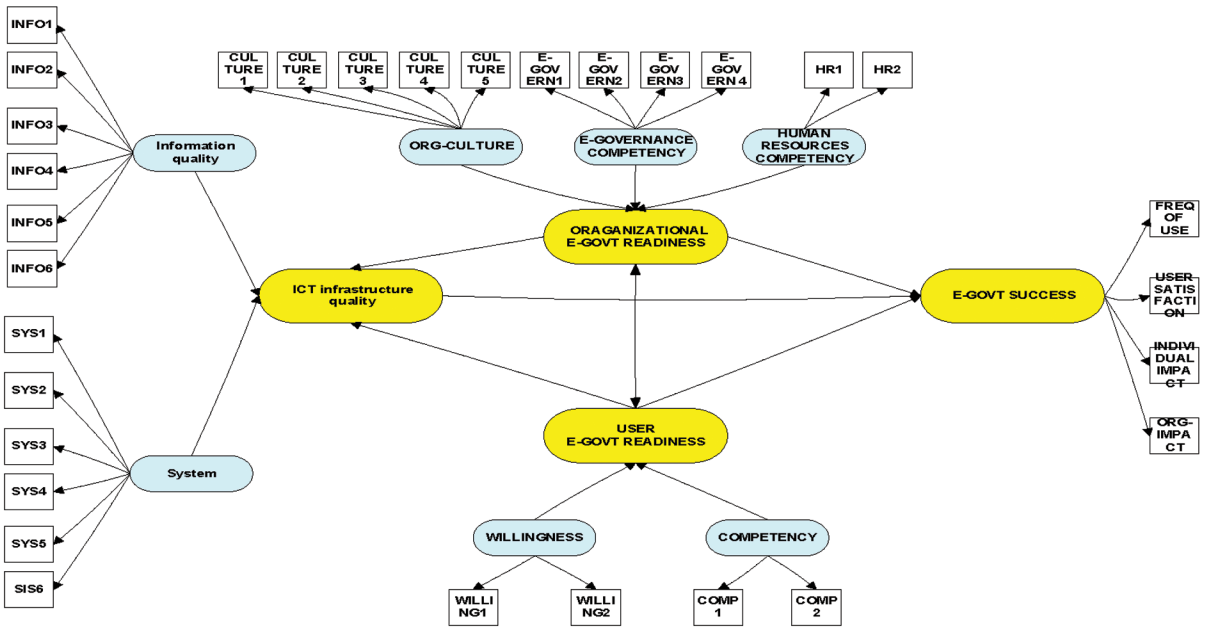


Table 2. Result of factors analysis of ICT infrastructure quality, organizational e-government readiness, and user e-readiness

No	INDEPENDENT VARIABLES	FACTOR			
		1	2	3	4
1	SYSTEM1	0.362	0.175	0.748	0.081
2	SYSTEM2	0,197	0.321	0.799	0.243
3	SYSTEM3	0.324	0.300	0.687	0.394
4	SYSTEM4	0.423	0.488	0.519	0.266
5	SYSTEM5	0.402	0.400	0.586	0.266
6	SYSTEM6	0.677	0.130	0.223	0.281
7	INFO1	0.566	0.318	0.378	0.351
8	INFO2	0.649	0.334	0.381	0.251
9	INFO3	0.796	0.236	0.289	0.146
10	INFO4	0.732	0.361	0.203	0.272
11	INFO5	0.701	0.214	0.332	0.293
12	INFO6	0.657	0.309	0.124	0.257
13	CULTURE1	0.499	0.570	0.349	0.140
14	CULTURE2	0.635	0.507	0.209	0.193
15	CULTURE3	0.162	0.785	0.389	0.162
16	CULTURE4	0.220	0.821	0.273	0.189
17	CULTURE5	0.217	0.786	0.269	0.173
18	E-GOVERN1	0.483	0.683	0.197	0.237
19	E_GOVERN2	0.454	0.651	0.053	0.258
20	E-GOVERN3	0.451	0.711	0.153	0.325
21	E-GOVERN4	0.481	0.693	0.256	0.227
22	HR1	0.620	0.426	0.248	0.169
23	HR2	0.599	0.389	0.276	0.184
24	WILLINGNESS1	0.332	0.428	0.367	0.602
25	WILLINGNESS2	0.388	0.393	0.281	0.595
26	COMPETENCY1	0.222	0.268	0.223	0.807

Table 3. Reliability test

Factor	Number of items	Cronbach Alpha
FACTOR 1	9	0.940
FACTOR 2	9	0.957
FACTOR 3	5	0.917
FACTOR 4	4	0.898

as culture and e-Governance competency of organization factor.

Let us take a look atthe factor for *ICT infrastructure quality*. From the results of factor analysis, it can be concluded that most of the items can be used for the ICT infrastructure factor. Therefore, we call *Factor 3 as ICT infrastructure quality factor*. Whereas, if we take a look at Factor 4, we find that this factor is dominated by willingness and competency of user items. So, we call *Factor 4 as user e-Readiness factor.*

Path Analysis

Using the results from the factor analysis above, we conducted a Path analysis. The path model which is shown in Figure 5 was transformed into a path diagram as can be seen in Figure 6. This path diagram was used to analyze the interelationship among factors.

Before doing the path analysis, we conducted a realiability test using the 212 completed questionaires which had been filled by the respondents. The result shows that the Cronbach Alpha score reached more than 0,89. Therefore, it can be concluded that all the items of the instrument were reliable. This result was also similar to the pilot testing based on 20 respondents. The summary of the result can be seen in Table 3.

The Path Analysis was done by using AMOS 5 to examine the interrelation between the factors as shown in Figure 5. The results of the path analysis were as follows:

- The Model has chi square statistics 0.000 (df=4, p=1.000), GFI = 1.00, dan RMSEA = 0.000).

This data shows that the model has a significant degree of fit. The result of the path analysis among the factors can be seen in Table 4.

Table 4 shows that each of the factors has a direct influence on the e-Government success factor. Although the model has significantly fit,

Figure 5. Path diagram

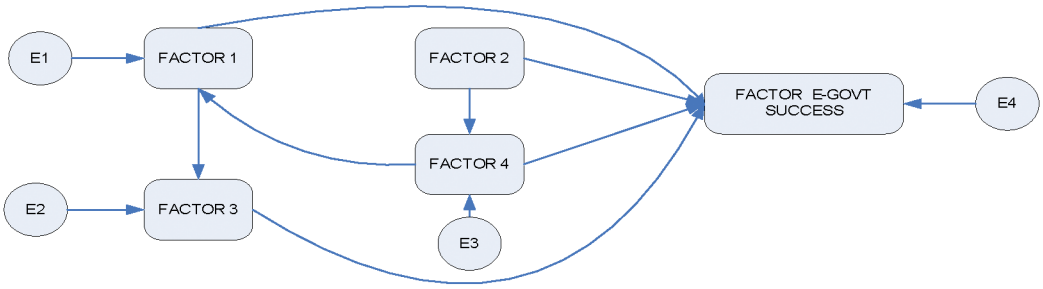


Figure 6. The simplified model of path analysis

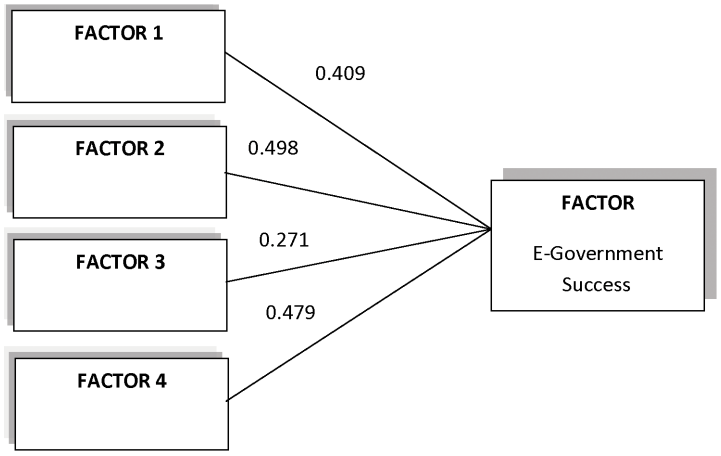


Table 4. Path analysis among factors

			Estimate	S.E.	C.R.	P	Label
FACTOR4	<---	FACTOR2	0.000	0.069	0.000	1.000	ns
FACTOR1	<---	FACTOR4	0.000	0.069	0.000	1.000	ns
FACTOR3	<---	FACTOR1	0.000	0.069	0.000	1.000	ns
FAC_E-govt Success	<---	FACTOR2	0.498	0.037	13.622	***	s
FAC_E-govt Success	<---	FACTOR1	0.409	0.037	11.176	***	s
FAC_E-govt Success	<---	FACTOR4	0.479	0.037	13.112	***	s
FAC_E-govt Success	<---	FACTOR3	0.271	0.037	7.408	***	s

ns = not significant, s = significant ----> = the direction of the causal effect

there is no interdependency among the factors (see the first three rows of Table 5). In summary, the above result can be simplified as Figure 6.

Based on the value of the estimates shown in Table 4, we conclude that Factor 2, namely corporate culture and e-Governance competency, is the most influential factor in reaching e-Government success compared to the others. The second highest ranked element is Factor 4, namely user's willingness and competency in using ICT. This

Table 5. Result of regression method

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0.856	**0.732**	0.723	0.52619719	**1.968**

factor influences e-Government success less than factor 2 but more than the others. Factor 1, namely information quality and human resources competency, influences e-Government success less than Factor 2 but more than Factor 3. Finally, Factor 3, namely ICT infrastructure quality, has the lowest score which can be interpreted as having less influence in attaining e-Government success. It can also be seen that the four factors are independent of each other (the value of the estimate was 0).

After the Path analysis, the moderating variables (factors), including Factor 1, Factor 2, and Factor 3, that influence e-Government success, were examined. Using a schematic diagram (Figure 7), Factors 1, 2, and 3 can be assumed to strengthen or weaken the relationship between Factor 3 and Factor e-Government success.

To examine the assumption, we adopted an absolute deviation model which was proposed by Frucot & Shearon (1991) in Ghozali (2001). According to Frucot and Shearon, this model can be used to examine the interaction between Factor 3 and moderating variables including Factor 1, Factor 2, and Factor 4. This model can be used to reduce the impact of multicolinearity diagnostics when adopting a regression method. Examining a model using a regression method requires a number of assumptions such as no multicolinearity (evident when the variables are strongly correlated [r = 0.9 and above]), no otocorrelation, normality distribution of the error, error variant homogeneity, and homoscedasticity. Based on the results of the test, it can be seen that all of the assumptions can be satisfied at5% significance. Therefore, the regression method is assumed to be valid for examining the interaction.

From Table 5, the model has 0.732 determination coefficient. It means 73.2% the variance of the dependent variable (e-Government succsess) can be explained by the independent variables (Factors 1 to 4 and the interactions). Table 6 provides the result of the regression analysis.

From Table 6, it can be concluded that, according to the relation between Factor 3 and Factor e-Government success, Factor 1 has an important role as a moderating variable. Factors 2 and 4 have no important roles in influencing the interaction between Factor 3 and Factor e-Government success. Based on this conclusion, the final model is presented in Figure 8.

Figure 7. Moderating table

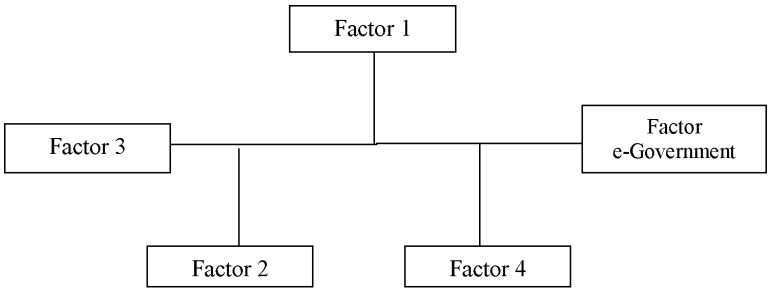


Table 6. Regression analysis

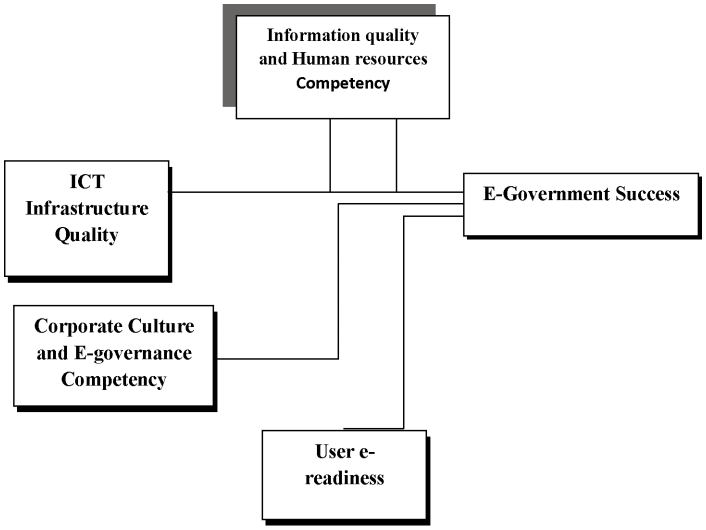
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Label
	B	Std. Error	Beta			
Constant	-0.072	0.064		-1.134	0.258	ns
Factor 1	0.441	0.039	0.441	11.294	0.000	s
Factor 2	0.499	0.037	0.499	13.408	0.000	s
Factor 3	0.258	0.036	0.258	7.069	0.000	s
Factor 4	0.477	0.037	0.477	12.960	0.000	s
Interaction of Factor 3 and Factor 1	0.143	0.047	0.136	3.030	0.003	s
Interaction of Factor 3 and Factor 2	0.010	0.042	0.010	0.244	**0.808**	**ns**
Interaction of Factor 3 and Factor 4	-0.083	0.045	-0.079	-1.841	**0.067**	**ns**

ns = not significant, s = significant

As a result of the multi-variate analysis performed in the study and shown above, the different factors that impact on positive development of e-Government in Indonesia are shown in the proposed e-Government development model shown in Figure 8. It can be seen that only five (5) factors have been identified as having a direct impact on the development of e-Government and these account for 73.2% variance ($R^2 = 0.732$) impact on e-Government development for the case study of Indonesia.

The factors highlighted here can be one and the same factors that may impact on e-Government in developing world countries with a contextual environment as that of Indonesia. To conclude the discussion of the factors, the following section succinctly presents an in-depth discussion on the factors impacting on e-Government development in Indonesia.

Figure 8. Proposed model



DISCUSSION

The findings of this study show that four factors including corporate culture and e-Governance competency, user e-Readiness, human resources competency and information quality, and ICT infrastructure quality influence e-Government success in the Local Government of Yogyakarta, Indonesia. This finding is in accord with other findings which used similar factors to measure e-Government readiness (Mcconnell International, 2001; UNDESA, 2005). Although Mcconnel International (2001) does not provide statistical analysis to prove the relationship between the factors and e-Government success, this study has provided the statistical proof.It can therefore be logically argued that these factors influence e-Government success.. It can be seen that enhancing the ICT infrastructure alone does not siginificantly improve the impact of ICT implementation success in the public sector. As observed by Feran and Salim (2005), technology on its own is not enough to improve the quality of e-business. Governments implementing ICT projects should prioritize other factors including corporate culture and e-Governance competency, user e-Readiness, and human resources competency and information quality. The result also supports the policy of Yogyakarta Local Government in enhancing their digital government services which emphasizes the role of other factors discussed above to attain e-Government success (Governor Regulation, 2006).

According to Zlatko (2005), national culture influences e-Government success. The need to imbed organizational culture in e-Government projects should be taken into consideration as this will enhance chances of successful implementation. One of the strategies that can be used to align organizational culture within e-Government projects is through organizational awareness campaigns in using ICT. In addition, the role of e-Leadership is crucial in achieving e-Government success. COBIT (2000) has emphasized that competence in planning, executing, delivery and support, and monitoring should be developed by the organization to reach ICT implementation success. In the public sector, it can be seen that these competences play important roles when adopting digital government services.

The second important factor in this study, user e-Readiness, influences e-Government success. According to Pasuraman (2000) and Davis (1989), user's perceptions in using ICT have a close relationship with the willingness to accepting and using ICT. In this study, user perception, including safety and comfortability played important roles in promoting the adoption of the technology. Besides that, easy of use and easy of innovation when using ICT influences the e-Government success.

The study has also shown that information quality and technical competence among the ICT workforce were the third most important factor that influences e-Government success. This finding is in line with the findings of Mcconnell International (2001) and President Law (2003), where information quality was found to have a close relationship with ICT implementation success. On the other hand, competence of the ICT workforce plays an important role in the maintenance and implementation of the technology to resolve daily work problems which ICT users may face.

This study has shown that ICT infrastructure quality plays the least factor in influencing e-Government success. This finding is in agreement with the findings of similar studies by Feran and Salim (2005) and Heeks (2002). Statistical analysis shows that this factor is moderated by information quality and ICT workforce competence. It can be concluded from this finding that better ICT infrastruture without better quality ICT workforce and better information quality, is not enough to attain e-Government success. In other words, to ensure e-Government success, the quality of ICT infrastructure must be combined accompanied with better information quality and ICT workforce.

CONCLUSION AND FUTURE RESEARCH DIRECTIONS

Successful implementation of e-Government projects requires careful planning that takes into consideration a number of factors besides the technology. It can arguably be stated that most of the e-Government projects that have failed have taken a technology-centric approach where technology has been seen as the main driver for e-Government development. Studies, including the present one, have shown that other factors including corporate culture, e-Governance competence, ICT workforce, and information quality should also be prioritized to ensure e-Government success. In addition, e-Leadership that drives the implementation process through planning, execution, delivery, supporting, and monitoring the ICT adoption, should be prioritized when adopting ICT in the public sector.

For further research, we propose that similar studies, at local government level, should be conducted based on this model to measure its efficacy as a tool for measuring the factors that may influence e-Government projects success.

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KEY TERMS AND DEFINITIONS

E-Government: The use of ICTs in government business processes in a view to interact with the citizens and business in the realm of business opportunities exchange and for e-Inclusion in the government processes.

Information and Communication Technologies (ICTs): Used as an umbrella term for all the technologies and platforms used in the generation, storage, retrieval, access, manipulation and transmission of information in various scientific, technology, socio-economic, and political frameworks.

Jogja Cyber Province: Provincial model which transformed its services into citizen-centric service delivery to reach based on business process, information, and knowledge by using ICT as a development accelerator to reach better competitive advantage, convenient, independent, efficient, and effective.

Structural Equation Modelling (SEM): A new concept employed in factor analysis and multivariate analysis in situations where the impact of multi-dimensional factors on a concept is being investigated.

ENDNOTE

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Chapter 15
The Competency-Based Human Resource Management Model

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ABSTRACT

It seems appropriate and coherent to start this study with a detailed description of the basic analysis unit in the human resource management model that constitutes the study object of this chapter: competency. With this aim in mind, the first section in this chapter is dedicated to three tasks the authors consider basic and introductory: (a) defining the concept of competency through the different approaches made by some of the most outstanding authors in this field; (b) dissecting that concept in its various elements or components so that it can be better interpreted; and finally (c) presenting a number of classifications thanks to which the treatment of certain competencies can be prioritised.

1. DEFINITION OF COMPETENCY, ELEMENTS, AND TYPOLOGY

Defining the concept of competency is a crucial aspect when it comes to implement a competency-based human resource management model; not only because it represents the analysis unit for the set of integrated policies within that functional area but also because a wrong interpretation or definition of the term might lead to fundamental errors with important consequences for the whole organisation. For example, an incorrect definition of the competencies that can describe a job hinders the promotion possibilities of the individual who holds that job (Kydd & Oppenheim, 1990). The definition of competency traditionally given by the literature presents it as an action tool but, in fact, the integration and development of the model into the firm can only be achieved if competency is understood as a decision tool, and not merely as an action tool (Rausch, Sherman & Washbush, 2001).

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Since this is a model that encourages strategic cohesion with the rest of the organisation, the negative consequences derived from a bad definition of the model would not only extend to the area of human resources –where all staff-related policies would be affected because the model is comprehensive– but also to the company as a whole.

Nevertheless, no unanimous agreement exists in this respect despite the importance given by all the literature to the definition of the competency concept.

Searching for the origins of this model and, therefore, for those on which the definition of the term 'competency' is based, allows us to state that, although McClelland pointed out already in 1961 that it was necessary to identify the attitudes of individuals that lead to business success, the first definition of competencies as achievement components associated with "groups of human behaviours" appeared in 1973, when the same author published his pioneering work "Testing competencies rather than intelligence" (McClelland, 1973). Of course, the aforementioned achievement components are not present in all individuals but only in those who are able to reach a successful performance in their professional activity. But, what are those components? It is important to highlight an idea in this respect: competency is not the sum of a series of factors but their synergic combination. In other words, these components are related to each person's reasons, features, values, skills and knowledge, but only their adequate combination can lead to the development of a competency at a certain level. A competency is relatively stable over time; that is, competencies do not usually evolve in a natural way –specific development programmes for those competencies are often needed instead. From this moment, these ideas represent the starting point for the preparation of 'ideal' competency-based professional profiles for the management of recruitment and training policies.

The methodology for the preparation of these 'ideal' professional profiles consisted in drawing a comparison between two types of individuals: those who reached a normal performance in their professional activity and those who had an excellent performance. As a result, competencies start to be defined as a set of knowledge, abilities, skills and other characteristics which distinguish medium performance from high performance.

The reflection made by Le Boterf (2000) on the conceptualisation of the term 'competency' deserves a special mention. In his opinion, those definitions which refer to competency as a sum of knowledge items –'knowing how to do' or 'knowing how to be'– and their application are weak. Such definitions cannot be the basis for the establishment of a good competency-based management system, as the fragmentation of competency in its definition inevitably destroys it. There is more into a competency than a mere addition of individual attributes. In short, competency is a multidimensional concept; it is not an isolated attitude, knowledge item or skill, but the integration of them all in the context of a specific profession and its sphere of action. Each observable behaviour taking place in the performance of a specific competency results from the combination of knowledge, skills and attitudes associated with it.

Along these same lines, Córdoba (2004) claims that the concept of 'competency' has suffered an evolution which makes it become an effective performance catalyst, as it permits to adapt the knowledge, professional experience and attitudes of individuals towards the company's goals, and not as a mere aggregation of elements, but as an integrated, intertwined and synergic management of those elements at the implementation of the different human resource practices.

Le Boterf additionally draws a clear distinction between the concepts of 'resource' and 'competency.' Whereas 'resources' would be the attributes or elements of competencies (knowledge, talents, skills, behaviours, etc.) and even the sum of them all, the 'competency' would be something more complex, since the different individuals build

their competencies through the combination of the different attributes they own –which are not the same in all individuals and also evolve over time. In short –quoting this same author (Le Boterf, 2000)– "competency is a disposition and not an elementary gesture or an operation. A competency resides in the chaining or linking, combination and implementation of a sequence."

However, a conflict of interests arises at this stage regarding the definition of competency: unless a breakdown of the term is carried out, it will turn out to be too ambiguous and difficult to manage and, consequently, inoperative; and if, however, the fragmentation is excessive, we run the risk of applying a taylorist approach to competency. Therefore, finding that balance in the competency breakdown makes it absolutely necessary to deepen more into each one of the elements that it comprises. With that aim in mind, and taking as a reference the definitions previously formulated by different experts in this field, our conception of competency will from now on correspond to a set of patterns formed by characteristics which are underlying to individuals (knowledge, skills, disposition, conducts, etc.) and permit them to achieve an effective or higher performance in an activity or a job.

Once the term 'competency' has been defined, our next task will consist in dissecting this concept in order to identify the different elements it contains, so that they can allow us to clarify and specify the approach adopted for its definition.

In this respect, there are various typologies of elements and attributes which shape competency according to different authors. For instance, Pereda & Berrocal (2001) refer to knowing, knowing how to do, knowing how to be, wanting to do, and being able to do; for Arce, (2000) the elements or attributes in question are knowledge, attitudes and skills; in turn, Losey (1999) mentions intelligence, education, experience, ethics and interest; finally, Dirube (2004) speaks about a compendium of knowledge and skills, values and habits, and reasons. Nevertheless, most of them can be summarised in a single category on which nearly all the authors agree: knowing how to act, wanting to act and being able to act.

In principle, knowing how to act would include the knowledge (knowing) and the individual's experience (knowing how to do) and would consequently be a resource incorporated into the person. Knowing is a highly volatile element from the competency-based management perspective (Bacq, 1996), as the instruments used to validate this element (diplomas, degrees, certificates, etc.) reflect a variety of knowledge items and capabilities acquired at a particular moment which can become obsolete –and even turn out to be insufficient– with the passing of time if they are not recycled. On the other hand, having all the knowledge required to act competently becomes useless if the individual is unable to use it properly. For this reason, the organisation's main role regarding this first element would definitely consist in ensuring its development through different means, as is going to be explained later on in this chapter.

In other words, this knowledge and experience must be complemented by a second component of competency: wanting to act. Our focus at this point is going to be on a number of aspects which are inherent to the individual's personality and, therefore, much more subjective than the previous ones; in short, we are speaking about what is known by some scholars as 'knowing how to be.' However, this component appears as the most important one within the 'knowing how to act' context from the competency-based point of view, since it becomes the differentiating element between individuals who perform the same roles with the same knowledge and the same experience.

We can find the individual's 'attitudes' as an emotional element, along with 'behaviours' as a conduct-related element, within 'knowing how to be'. Attitudes are directly related to knowledge. The more we know about a competency, the more positive the attitude shown towards it. In turn, behaviours appear as a result of the combination between knowledge and attitudes; that is,

we will adopt a behaviour that expresses greater acceptance or rejection depending on the degree of knowledge that we have about a certain issue and the attitude that this knowledge generates inside us (Arce, 2000). In other words, our way of thinking as well as our technical knowledge about the work to be performed will strongly influence our behaviour.

Therefore, as shown in Figure 1, there are specific circumstances where the configuration of individuals' behaviour will depend on their motivation and their conduct, the latter being in turn dependent on their attitude –as a personality feature– before certain situations as well as on their more or less thorough knowledge of those situations.

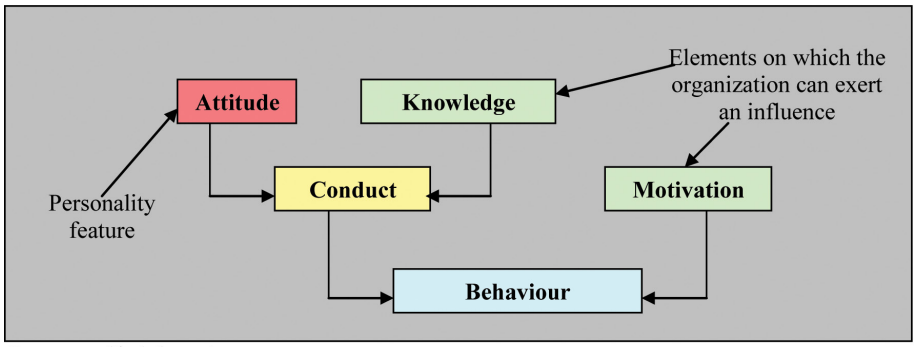
Other authors, such as Sagi-Vela (2004) add a fourth element –or rather, the combination of the preceding elements: the 'why' (Figure 2)– to the triangular competency system. This 'why' represents the purpose which gives sense to competent action on the part of the individual, and is closely linked to 'wanting,' since having a deep, detailed knowledge of the reason which leads us to perform a certain role and knowing what we expect to obtain with it will influence the individual attitude, which will eventually materialise in a specific behaviour. Therefore, even though the 'why' may indeed be linked to all three elements of competency, in our opinion, that link is closer with one of them: 'wanting.' On the other hand, this same author highlights that 'being able to act' does not constitute a competential element in itself, as it would be formed by the resources and instruments that the organization places at the individuals' disposal so that they can exercise their competencies and would thus fall outside the worker's voluntariness and personal action capacity. It is consequently an organisational element, and not a competential one.

After having defined the different competencies and analysed each one of their components, we are in a good position to classify them according to different criteria with the aim of relativising their importance and contextualising their application within the organisation. Our classification will start with one of the most frequently used typologies in the field of competency-based management, the one which draws a distinction between generic competencies and specific ones.

Generic Competencies vs. Specific Competencies

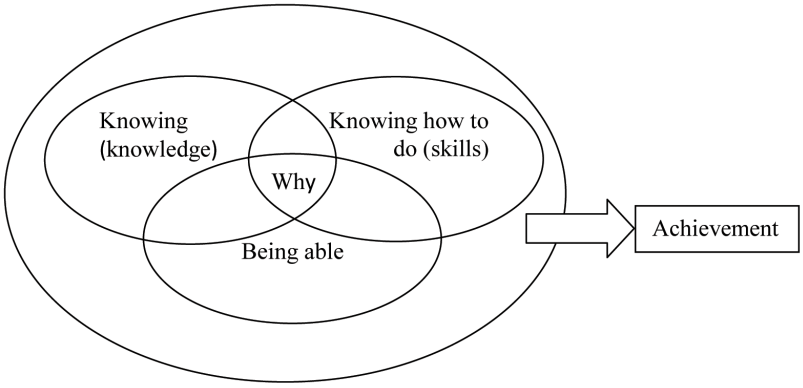
In this case, the classification criterion lies in the degree of relationship that the competency may have between different firms, sectors or even jobs. Generic competencies are those common to several organisational units. They coincide or are close to the concept of 'talents' used for selection and recruitment policies in the context

Figure 1. Configuration of behaviour



Source: self-elaboration

Figure 2. Elements of competency



Source: Sagi-Vela (2004).

of traditional human resource management (Levy-Leboyer, 1997).

On the other hand, specific or 'technical' competencies comprise the professional knowledge and talents needed to carry out the technical contributions defined for a particular profession; they are in keeping with the correct performance of functions within an organisational unit.

Generic Competencies vs. Vocational Competencies

Other authors contrast the generic competencies described above with vocational competencies, the latter being derived from a specific training acquired by individuals during their educational stage. In this respect, Heijke, Meng & Ris (2003) establish a model where an organisation's human capital availability is determined according to the vocational and generic competencies of its individuals.

They infer from this model that the exercise of generic competencies is not confined to a particular context or work post; in fact it allows individuals –through their learning capacity– to develop the competencies required within a wide range of jobs or functions. On the other hand, vocational competencies favour the connection of individuals with the work posts that belong to the area of knowledge where they have been trained and on which they will be able to develop a competitive advantage. Generic competencies consequently permit the adjustment of vocational competencies to the specific job requirements. We are therefore referring to two complementary –and not substitutive– competencies (Heijke *et al*., 2003).

Threshold Competencies vs. Differentiating Competencies

A third classification allows us to draw a distinction between threshold and differentiating competencies, according to the performance level stemming from the use of those competencies. Thus, threshold competencies permit a normal or adequate activity performance. They are typical of traditional staff selection processes and seek an adequate performance at the work post –not an outstanding performance.

Differentiating competencies are those personal characteristics which distinguish a normal performance from an outstanding or successful one. This type of competencies justify why one person with the same training and in the same circumstances as another is able to perform the tasks inherent to a job more satisfactorily.

Primary Competencies vs. Secondary Competencies

Following this typology, primary competencies would be formed by basic personality features of the individual, attitudes and talents which suffice to shape a competency for the efficient performance of the functions associated with a work post. Instead, secondary competencies would arise from the combination of several primary competencies; in other words, they would be constructs of individual basic competencies which enable a person to exercise a secondary competency –if they are developed at a certain level. For instance, whereas self-confidence and emotional stability are primary competencies, they could simultaneously form part of a secondary competency such as leadership capacity (Sánchez de Dios & Valldeperes, 1998).

Simple Competencies vs. Combinatory Competencies

We can finally distinguish between simple and combinatory competencies depending on the degree of development and complexity reached by the competency within the organisation. In this sense, simple competencies would be the individual ones, no matter if they are generic or specific, threshold or differentiating; as for combinatory competencies, they arise from the interaction of different simple competencies that result in new competencies which are much more complex and, consequently, much harder to copy or imitate.

2. INSTRUMENTS FOR COMPETENCY-BASED HUMAN RESOURCE MANAGEMENT

The second section in this chapter has as its main aim to study three of the main instruments –recognised by the authors who are well versed in this field– for human resource management and its different practices related to the concept of competency: the dictionary, the map and the balance of competencies.

The competency dictionary is a human resource management tool which contains both the definition that the company can conceive for all the competencies that it regards as being relevant and their progression at its different levels.

Competency levels represent a scale-based gradation in the individual's execution of a competency according to the achievement of its elements (knowledge, skills, attitudes, talents, behaviours, etc.). As the *Confederación Española de Organizaciones Empesariales* [Spanish Confederation of Business Organisations] (C.E.O.E., 2002) has explained, competency dictionaries will include the behaviours associated with those competencies which can be directly observed. Therefore, the different levels for each competency, usually between 4 and 7, fulfil a twofold purpose. On the one hand, they describe the levels of achievement reached by the individual in the competency under assessment and, on the other hand, they represent the demand profile for a specific work post in that competency.

In any case, the aim sought is the adjustment of levels between the candidate's evaluation and the demand profile for the post. The comparative assessment of these two elements (the candidate's profile and the demand profile for the post) will provide the basis for the subsequent development of different human resource systems, such as selection, promotion, training, career planning, pay, etc.; or to put it in another way, of the three competency-based management dimensions that will be presented in chapter 3, namely: acquisition, stimulation and development of competencies.

The competency dictionary undoubtedly appears as one of the most important instruments for model management. However, there are others which, despite not having that basic and elementary character, actually turn out to be very helpful when managing the model. In this respect,

the importance assigned to the competency map derives from its geographical representativeness.

Competency maps are referential elements associated with specific work areas, posts, roles or occupations which become a highly useful reference framework and instrument both for the organisation and for the worker (C.E.O.E., 2002). It is advisable to show a small example that can help to clarify the process through which these maps are created.

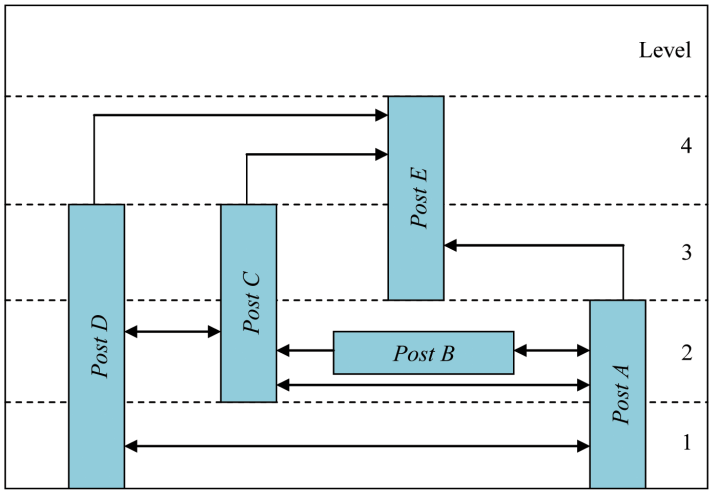
The example shown in Figure 3 allows us to see the map of one competency, group leadership, which could belong to the human resource management role. In this map, the organisation includes the definition extracted from the dictionary, both for the competency and for the different levels used to grade it. Thus, the different jobs shaping the role –5 (A, B, C, D and E) in this case– are placed in a graph so that they can grasp the different competency levels required by the demand profile for the post. Finally, the relationships between the different jobs are established using arrows, thus clearly identifying the possible ways of promotion available to an individual within one particular role. This map –prepared for different posts within the same role under a competency– could also be

Figure 3. An example of a competency map for a specific role

Competency: Group leadership

Competency definition: Guiding and leading a group, as well as establishing and maintaining the group spirit needed to achieve the set aims.

Role: Human resource management.



	Level definition
Level 1	Establishing the group's objectives in a clear and balanced way, especially when those objectives affect their organisation
Level 2	Encouraging everyone's participation in reflection and decision-making processes
Level 3	Paying attention to enterprise external factors with the aim of detecting opportunities
Level 4	Exerting an unquestionable influence on the whole organisation, being recognised as a qualified opinion for decision-making in any issues related to their area or even in issues from other areas. It is perceived as a 'guide' and inspiration for strategic decisions in the organisation as a whole.

Source: adaptation based on De Ansonera (1996).

adapted to the different roles that share a specific competency within the organisation.

The present section is going to finish with one of the instruments that have received the least attention in the literature on competency-based management: the competency balance. Despite the limited importance assigned to this instrument, its validity regarding previsional management and competency development matters is hugely relevant.

The purpose of this management instrument is to favour the identification and assessment of the competencies developed by individuals in the different jobs and roles that they have performed throughout their professional career.

The orientation towards individuals is one of the essential competencies for any human resource manager. Competency balances appear as one of the main orientative instruments for that purpose, since they permit not only to orient the professional career of individuals but also to carry out a periodical follow-up of that career (Joras, 1996). The balance consequently becomes a starting point (initial balance) for the design of a professional career, and a compass that permits to locate the individual's professional 'north' at all times, so that policies about training, promotion, pay, etc. can be oriented in the right direction (periodical balances) (Le Boterf, 2000).

3. APPROACHES TO COMPETENCY-BASED HUMAN RESOURCE MANAGEMENT

The specialised literature offers us two competency-based management approaches (Herranz & De la Vega, 1999): the Anglo-Saxon one and the Francophone one, the characteristics of both being presented in Figure 4. The most outstanding features in this dual approach are the focus of the model on generic or specific competencies depending on whether we adopt the Anglo-Saxon or the Francophone approach, respectively.

The first one of them is based on the assumption that, because generic competencies are the most widely used among companies, they will be more present in the strategic profiles of organisations than in the tactical or operational ones. This is so because the specificity of profiles increases as they go down the hierarchical ladder. Therefore, these are the competencies on which the attention

Figure 4. Anglo-Saxon approach vs. Francophone approach

Anglo-Saxon approach	*Francophone approach*
The main objective is to increase individual or group performance.	Oriented towards the person. It acts as an audit element for individual capacity and the efforts made by the enterprise to keep its workforce in optimum employability condition.
It is based on qualitative measures.	Competencies are an inseparable mixture of work-related knowledge and experiences.
It is focused on generic and universal competencies, presupposing that any organisation in any country needs very similar competencies. Competencies represent the links which unite or connect individual conducts and organisational strategy.	Competencies must be developed *ad hoc* for each organisation; it is impossible to identify generic competencies.
The fundamental competency is flexibility.	Use of mega-competencies, such as learning capacity and the different learning strategies.
Focused on job contents, as well as on their relation to the global strategy.	It focuses more on learning processes than on people.

Source: Canós, Valdés & Zaragoza (2003).

of the model must be focused for the purpose of achieving the organisational flexibility that has been set as an objective. This Anglo-Saxon approach is also known as 'conductist approach,' as it starts from the idea that there will be no competency unless we can prove the existence of an effective and/or superior performance. The most representative supporters of this approach or school are McClelland (1973), Boyatzis (1982) and Spencer & Spencer (1993).

In turn, the Francophone approach –also known as 'contingent approach'– defends the idea that specific competencies are the ones which must have a strategic character and weight within the model, since these are the competencies which can eventually become a differentiating element and a possible source of advantage precisely because of this specificity which is likely to make them exclusive to the organisation. Therefore, according to this approach, firms have to design their competencies *ad hoc*, which would leave generic competencies –worthless because they have not been exclusively designed in accordance with the characteristics of the organisation and its environment– out of the picture. This approach –also referred to as 'constructivist approach' due to the belief that competencies can ultimately be built giving individuals an opportunity for development even if they have not shown a successful performance yet– has its most representative supporter in Levy-Leboyer.

In this same sense, Mansfield (1996) draws a distinction between the two most common ways to develop and use competency-based management models: individualised for each job or common to all of them. However, in this author's opinion, neither of these approaches permits to differentiate the requirements for several posts or fit in the competencies for an individual profile with a wide range of jobs or tasks. In this way, a differentiation is made between the model based on specific competencies and that based on generic competencies.

- **The model based on specific competencies.** It was the first competency-based management model to be created and it is still quite widely used for its advantages, among which stand out the following:
  - It makes the key competencies in a post easier to identify and describe.
  - It informs workers about what they have to do to achieve better results.
  - The participation both of workers and of their superiors in the model favours their motivation.

Nevertheless, this model presents some inconveniences as well:

- Its cost –financially and also in terms of time– and the effort required to develop the model make it applicable to a small proportion of jobs in the organisation.
- Due to the constant changes suffered by work posts at present, the applicability of the model for a specific job does not usually exceed a two-year lifecycle.
- Sometimes it shows inconsistencies with the other organisational programmes implemented by the firm due to the emphasis placed by the model on the specific characteristics of each post.
- Also due to this individual character of the model, it is difficult to compare the competencies required for a post and those needed for another.
  - **The model based on generic competencies.** It has as its main aim to identify and define a set of competencies for a large number of jobs within the organization. Its advantages are listed below:
- They involve a high number of employees.
- There is consistency in the description of the effective conducts that describe the competency.

- The model is in keeping with the values, the mission and other key concepts for the organisation.
- The competencies of individuals managed with this model can be compared.
- Its cost is modest considering its scope and impact.
- Because it is not based on individual posts, the model does not need to be updated every time a job is redefined.

But it has some drawbacks too:

- It does not clearly define the needs for a specific post.
- Workers have to see competencies as a presentation of values rather than as the skills needed to obtain results.
- It is not useful to guide the selection process for specific posts.
- It ignores the skills and knowledge which are essential for the fit between individuals and job tasks.

Therefore, seeing the advantages and drawbacks of a model based on specific competencies –according to the Francophone or contingent approach– and those of the Anglo-Saxon-inspired model focused on generic competencies, the authors of this chapter suggest a model which can cover a multiplicity of posts within the organisation. This 'model for a multiplicity of posts' permits the construction of different models from a common set of competencies. These sets, which are going to include both technical or specific competencies and generic ones, will make it easier to compare jobs for assessment purposes and also to achieve a better fit between individuals and competential profiles as well as more efficient training and development processes.

4. DEVELOPMENT OF THE COMPETENCY-BASED MANAGEMENT SYSTEM

4.1. Objectives and Uses of a Competency-Based Management System

Competency-based management permits to work from people, with people and towards the strategies and objectives determined by the organisation. One of the most significant advantages and contributions entailed by competency-based management is actually the achievement of a greater degree of proximity and convergence between the organisation's interests and those of its workers.

For Le Boterf (2000), this concurrence of interests constitutes a necessity rather than an organisational advantage. It is necessary to have more trust in workers –and less trust in procedures– because outcome achievement as well as the building of competitive advantages lies in the former, whereas the latter are mere instruments placed at the service of the organisation. Along these same lines, Bayón (1994) mentions three premises about the importance that human resource management has for the organisation: human capital is an firm's greatest asset, the decisive factor is the human team who applies the processes and not the processes themselves, the growing superposition of work as opposed to the capital. This same author implicitly refers to the main objective in the competency-based management model, the convergence and integration of interests between workers and the organisation, when he defines the human resource management function as "the one which has as its aim to adapt the company's interests and goals and those of the worker so that the unity and integration of attitudes, along with the work-related, professional, human and economic development can take place simultaneously (Bayón, 1994).

In short, if the model permits the convergence of interests between the staff and the company, the implementation of that model will supposedly imply a number of advantages, uses and requirements for both parts.

We can consequently distinguish three sets of benefits (Figure 5) brought to the firm by the adoption of the competency-based management: uses of a strategic nature, those related to human resource management improvement, and the ones associated with savings and cost reductions in processes.

As for strategic uses, we can firstly mention a greater strategic orientation towards the model, since it permits to identify and cover the key functions in an organisation successfully. Another of the strategic benefits brought by competency-based management is a greater capacity to anticipate and adapt to changes in the environment by means of a more proactive approach; this is so because the model favours this type of behaviours through continuous training, greater professionalism among the staff, competency development, etc. Thirdly, there is the necessary flexibility which has to accompany competency-based management in order to permit human resource mobility and the adaptation to the above-mentioned changes in the environment. The strategic character adopted by the human resource function through the identification of behaviours which lead to excellent performances in functions is clearly one of the most important benefits that the organization can obtain from the model at a strategic level. Finally, a cultural change –along with a change in leadership style– becomes necessary for the implementation of the model. Indeed, the organisational culture must be more open and participative in order to permit the management and development of competencies as a strategic unit for the analysis of human resources. Similarly, the leadership within the organisation has to assume competencies in the areas of evaluation, motivation and development, but above all, in those of communication and dialogue with collaborators.

Regarding the uses provided by the model to the human resource management function, these are obvious because the model was born precisely to improve the management of this functional area and to give it a more strategic character. Although these benefits are going to be repeatedly mentioned throughout this theoretical presentation, we will briefly comment on them here. Firstly, an improvement is achieved in training and motivation practices. Human resources can only become a strategic element in the organisation through an increase in their added value if they receive a kind of training that makes it possible to reach that performance level along with a subsequent development: a polyvalent training –thanks to the flexibility described above– which is also conducive to the stimulating professional acknowledgement

Figure 5. Strategic, management-related, and process-related uses of the competency-based management model

Strategy	**Management**	**Processes**
Greater strategic orientation	Greater training, polyvalence and training	Time saving
A more proactive approach	A flatter organisational structure	Reduction of organisational costs
Higher flexibility	Achievement returns on labour costs	Reduction of 'non-quality' costs
Greater HR added value	Greater internal promotion	Savings in subcontracting
Cultural change and change in leadership style	Management and administration simplification	

Source: our adaptation from Sagi-Vela (2004).

of a successful performance. Internal promotion is another of the human resource policies bound to experience an improvement after the adoption of the model. Thanks to workers' polyvalence, together with their higher professional qualification, they will be ready to occupy posts of various kinds within the organisation with a broad business vision. On the other hand, exhaustive and rigid control mechanisms become less necessary thanks to the consideration of technical or specific competencies in an adequate combination with generic ones, thus favouring the increasingly common tendency to the reduction of hierarchical levels in the organisational structure of firms. Yet another improvement in human resource management would stem from making the most of labour costs, since the return on investment in this area increases, not because costs decrease but because there is an increase in productivity; a productivity which has to expressed in terms of added value on the part of the human factor –and not of productive volume– to the organisation's goals (Dalmau & Baixauli, 1989). The model ultimately permits a liberalisation of tasks in the human resource department, simplifying its management and administration, which in turn allows this area to focus its efforts on other functions with higher added value.

Finally, the implementation of the competency-based management model equally brings cost reductions and time savings in the corporation's activity processes. Thus, we can firstly observe a reduction in the process cycle due to the greater degree of professionalism and polyvalence among workers, which allows them to reduce wasted time periods, to simplify activities or to perform some of them simultaneously. Coordination costs will be reduced too, because the self-control that workers have in relation to a set of activities that they develop competently and with an overall vision of processes permits to simplify coordination mechanisms in the design of the organisation. For the same reason, the mistakes made due to the inability to reach a certain quality level in products and processes will be downplayed. Finally, it will be necessary to resort to the subcontracting of activities which are considered particularly relevant to the organisation. Workers will be sufficiently qualified to develop these processes efficiently, eliminating the lack of profitability that might have previously occurred if the organization had not decided to outsource those activities.

4.2. Design of Competency-Based Work Profiles and Model Implementation

In the first place, and as a step prior to the preparation of competential profiles for the different posts, it is important to carry out a good information and communication campaign addressed to employees (Pereda & Berrocal, 2001). This informative action pursues a double objective. On the one hand, achieving workers' involvement in the model design and implementation process, as they would represent the basic informative source both to identify and to define the organisation's generic competencies along with the specific competencies associated with their respective work posts; on the other hand, a good informative campaign undoubtedly helps to soften the environment before potential expressions of distrust among workers towards the new model, conceptualising it as a motivating instrument and not as a tool used to monitor their performance at the work post. A situation of rejection and lack of credibility may arise if the model is not accepted by all organisation members, both in relation to the model itself and regarding the work team that has implemented it, a situation that is very hard to correct in the short run –or even in the medium run.

After obtaining the acceptance and collaboration of workers, the first step in the design of the competency-based management model consists in identifying the competencies, describing them, cataloguing them and elaborating the reference profiles for the firm. It will be possible to establish these profiles for each professional role or even for

each specific job (Gick & Pallares, 1997). These profiles comprise the set of competencies which the individuals occupying a work post have to own in order to perform their professional activity effectively, safely and satisfactorily (Pereda & Berrocal, 2001). Later on, workers will be evaluated with respect to the above-mentioned referential profiles, and the different human resource policies will be structured around the evaluation results, using the different instruments articulated by the company for these purposes, such as the competency dictionaries, balances and maps that we have referred to above.

As for the methodology used to define the competencies that will form part of each profile, two methods stand out as the most often used: top-to-bottom and bottom-to-top. In the first case, the decision-makers will choose the specific characteristics they want for each post; in the second, they will observe what the best people at each post are capable of doing and that information will serve as a reference to identify and define the competencies. In any case, working with a competency dictionary will make the task easier and will also permit to use more tools. Along these same lines, the III International Conference on Competencies, held in London at the end of 1998, highlighted the different methodologies for the identification and description of competencies and profiles depending on the management style applied by each firm. On certain occasions, competencies are actually defined by the top management; on others, they start taking as a reference what excellent employees do and associate their competencies with those corresponding to that post and that entity (control groups). In the first case, the imposition of competencies by the management over the rest of the organisation runs the risk of making them fall into clichés that will make their implementation more difficult. In the second case, the induced competencies may lack a future vision and fail to consider the foreseeable changes. Therefore, an intermediate methodology which takes both extremes into account and makes the most of the advantages brought by both is most likely to achieve the best person-post fit (Dirube, 1999).

A variety of techniques can be used to identify the competencies that the organisation really needs. Thus, we can mention the interview about critical incidents, panels of experts, labour climate studies, analyses of areas and functions, the Delphi technique, benchmarking and databases elaborated by external consultants specialised in these matters, (C.E.O.E., 2002), surveys, direct observation, self-evaluation, 360-degree evaluation, etc. (Parry, 1996). Of all those, Gick & Pallares (1997) highlight work groups, panels of experts, interviews about critical incidents, surveys, dictionaries and databases elaborated by external consultants as the most frequently utilised ones. Of course, the gradual development and acceptance of the model has led to the proliferation of competency identification and management service offers by consultancy agencies (Bartlett & Goshal, 1997).

In effect, the identification of competencies can be carried out through the definition of the workers' most outstanding characteristics, starting at the executive levels of the organisation and going down through the hierarchical structure, or resorting to the use of work or control groups. These work groups make it possible to analyse the conducts shown by excellent individuals at a specific work post when compared to those developed by other individuals who only achieve a normal performance. In any case, if the corporation aspires to achieve trust in the model on the part of individuals, to trigger the appearance of informal communication about the project and reach model efficiency, the best way to define competencies is to permit the participation of workers.

Now we would like to focus on studying two of the most widely utilised methodologies, depending on the case: the panel of experts and the interview about critical incidents.

In principle, the panel of experts may represent an alternative to control groups. If a work post is new or does not have a number of workers high

enough for its analysis to be representative, the delegation of responsibility for the identification of competencies to a panel of experts seems to be the most advisable option. Furthermore, this methodology also permits the active participation and involvement of managerial levels in the competency identification and profile creation process.

In any case, a number of considerations must be taken into account when it comes to adopt this instrument. Firstly, it is necessary to ensure realism and functionality in the result obtained. In other words, the parameters according to which the panel of experts is going to identify competency profiles must be observable, measurable; otherwise, they will be impossible to assess and will therefore lose their functionality as instruments for the articulation of a comprehensive human resource management system. Similarly, if the profiles are excessively idealistic, they will create a demand for unreal performances with too high –or even unreachable– competential levels. On the other hand, this lack of realism in relation to competency profiles may derive from the lack of consideration towards the organization's values, beliefs, mission, objectives, etc. This means that, if the panel of experts does not take into consideration the firm's strategic plan and organisational culture, the outcome will be a set of competency profiles which remain distant both from reality and from the company's goals. For example, we cannot identify teamwork as a key competency for the organisation if the latter basically structures its pay policy around individual incentives.

Nevertheless, these inconveniences can be mitigated if the organization has previously created a dictionary from the observation and identification of the behaviour shown by excellent workers, or if it has acquired an external dictionary, always making sure that it is suited to the firm's organisational characteristics. In this way, the task for the panel of experts will be confined to choosing from the conducts and behaviours collected in the dictionary those which define the functions and responsibilities inherent to a job, but without needing to define and catalogue them.

As a final comment about the panel of experts' composition, it is worth highlighting that this panel can include a manager from the area corresponding to the competency profile that is going to be articulated, one or two direct superiors of the individuals who cover those profiles, three or four workers who develop their professional activity at the post around which the profile is going to be built, an expert or technician in human resource matters, a consultant, internal customers who receive the outcome produced by the job for which the competency profile is being designed and a representative of the works committee. The contributions made by each one of these panel members are the ones reflected in Figure 6.

Figure 6. Composition for a panel of experts

Member	**Contribution**
Area manager	An overall vision and connection with the organisational strategy and culture
Direct superior	Limiting the competencies defined to real behaviours
Worker	Completing the realistic vision of the post with the direct experience of daily work
Human resource expert	Vision of the work post from the formal organisational point of view
Consultant	Methodology for the definition of competencies
Internal customer	Establishing the requirements to be fulfilled with competency performance
Union representative	Making the subsequent negotiation of the model easier

Source: our adaptation from Sagi-Vela (2004).

Another of the most widely utilised instruments, not only for the identification of competencies but also in selection processes is the interview about critical incidents. The "Behavioural Event Interviewing" (B.E.I.) also known as "Competency-based interview" or "Critical Incidents Interview" is an instrument created by David McClelland in 1978 for the purpose of detecting the behaviours, feelings and thoughts which are typical of individuals and characterise their conduct (Donovan-Wright, 2002), avoiding opinions and hypothetical cases in order to prevent subjectivity-related biases in the information obtained. After all, the aim is to find out what leads people to act and not what they think or say that is encouraging them to act. These incidents are identified and registered by means of interviews, from which a pattern will arise that collects the most outstanding aspects in the performance of a competency that permit to distinguish a successful result from a failure result (Horton, 2000). With this aim in mind, the candidate goes through an in-depth interview structured around the individual's experience and training as well as the responsibilities assumed at the different work posts. The interviewees will have to specify three or four importance situations of successful results in their job, so that the competential elements related to 'knowing how' and 'wanting' to act competently can become visible, as well as others where the results obtained were unfortunately not as expected.

The conducts gathered through this type of interviews can be generalised by means of descriptions which reflect the main patterns, thus establishing a dictionary which facilitates a subsequent tabulation. However, if we already have at our disposal a good description of the competencies previously identified in the organisation, it will only be necessary to recognise the behaviours in the dictionary definitions, as it happened with the panel of experts. Moreover, as it allows the interviewee to make an open narration, the critical incidents interview makes it possible to reveal those competencies which, despite not being included in the dictionary, could turn out to be important for the organisation by complementing and improving this competency-based management instrument.

Although the competency-based interview and the traditional psychological interview are not mutually exclusive –as is pointed out by Alles (2000)– some differences do exist between them. The most important one lies in the fact that, whereas the traditional interview tries to elucidate the individual's behaviour through a battery of tests with the assistance of a psychologist, the competency-based interview extrapolates observable behaviours from past professional situations experienced by the individual to new work approaches, without the need for the intervention of a psychologist. In addition to this, traditional interviews do not permit to identify a person's competencies, since most individuals are not fully aware of the performance level they can reach at a work post, and not even of the behaviour they are going to develop in relation to those functions. On the other hand, when people face a traditional interview, they give answers about what they regard as socially desirable, about what they assume that the interviewer wants to hear, and not about what they really do.

Anyway, the identification of generic competencies for the company must take as a reference the definition of the organisation's strategic model, its mission, its values, etc., even though the behaviours described in each one of them will be different depending on the demands posed by the jobs. It is worth highlighting in this respect that not all generic competencies are equally relevant in all the corporation's functional units; not even in all the work posts belonging to the same functional area (Pereda & Berrocal, 1999).

The report prepared by C.E.O.E. (2002) indicates that, as the model evolves within the organisation, and as a result of successive revisions, there is a growing tendency to reduce the number of competencies and to simplify their content.

Returning once again to the methodology for the identification of competencies, it is worth highlighting the study carried out by Wustemann (2003) among various UK companies as an example. This research study revealed that work groups were the method most frequently used to identify the most representative behaviours in each competency. Seeking to achieve this aim, a decision was made to create transversal work groups formed by workers from different departments but with the same hierarchical position who were consequently going to share a considerable number of competencies in the performance of their functions.

Another method for the identification of competencies –though from a different perspective– can be mentioned: control groups. As we explained in the previous chapter, this methodology consists in drawing a comparison between two groups of individuals belonging to the same role, some with a medium performance level and others who achieve a high or excellent performance. This is the way in which the behaviours, attitudes, knowledge, etc. which serve to distinguish an outstanding function performance from a merely satisfactory one can be identified.

On the other hand, interview-based surveys among the organisation's collaborators are another widespread method for the identification of competencies, especially for specific competencies.

4.3. Competency-Based Management Dimensions

Seen from the perspective of the competency-based management model, the objective sought by the firm's human resource management is to have available the adequate competencies at the adequate level and at the right time and place. It is important to highlight that a specific competency level will exist for each post; high levels are not always advisable, what we really need is levels suited to the post circumstances. For instance, individuals who are excessively enthusiastic in the performance of their functions may prove to be particularly reckless in the decision-making process when they have to face highly complex and turbulent environments. That is why, although enthusiasm can be seen as a desirable primary competency for a managerial post, its development level will depend on the job to be occupied and its particular circumstances.

Competencies are a human resource management tool. If the organization is able to identify and define them in terms of conduct, they will make it possible to build a model that includes –under the same management system– the (internal as well as external) selection of people, the training and development of professionals, the preparation of succession plans, favouring a culture change, defining and assessing work posts, evaluating performance or even establishing pay criteria.

In order to achieve those aims, the company must pay attention not only to the staff acquisition or hiring for the preparation of a competency inventory but also to the set of policies that can contribute to their development, activation or deactivation depending on the organisational needs.

Competency-based management is therefore articulated in three basic dimensions which permit the integration of the different human resource management processes taking the concept of competency as the analysis unit (Ordóñez, 1995). Ramírez (1996) identifies a series of human resource management systems within each one of these dimensions which are collected in Figure 7.

We can place under the "*competency-based acquisition"* dimension those human resource management systems that we consider predominantly acquisitive; that is, which imply the selection of the competencies marked by the company's strategy (Cantera, García-Morán & Gómez, 1996). "*Competency stimulation"* –that is, how the pre-existing competencies are mobilised and motivated seeking to reach the corporation's goals– has as its aim to focus on the management of performance and pay according to the competencies. Finally, "*competency development*" pursues as its

Figure 7. Basic competency-based management dimensions

	Competency-based management		
	Acquisition	*Stimulation*	*Development*
Human resource management systems	Recruitment, selection and hiring	Pay and incentive policy	Training management
	Short-, medium- and long-term previsional management	Work post assessment	Information and communication
	Career plans	Performance assessment	Promotion system
	Succession planning	Motivation and integration	Assessment of potential

Source: Canós, Valdés & Zaragoza (2003).

ultimate aim to develop formative itineraries taking as a reference not the work post –as it has traditionally been done so far– but the prediction of future competential needs.

Regarding Figure 7, it is worth highlighting that the membership relationships between human resource management systems and the human resource management dimensions described in them are by no means unique and pure relationships. Each one of the systems can contain aspects from more than one of the dimensions. Thus, for instance, the staff selection system, despite being a predominantly acquisitive system, may consider the candidate's professional potential, which means that it would include nuances typical of the competency development dimension.

Gick & Pallares (1997) also want to make one thing clear about this table. In their opinion, not all competencies have the same capacity for development; whereas some can be used as selection criteria (acquisition), others are more appropriate for the detection and identification of training needs (development).

In turn, Ulrich *et al*. (1995) simplify all these human resource practices in 6 categories: selection and hiring, development, evaluation or assessment, pay, organisational design and communication. This same author explains in another of his works (Ulrich, 1998) that these 3 competency dimensions can be developed by means of 5 instruments: external recruitment, internal recruitment, 'outsourcing' through consultants, dissociation of those individuals who are unable to reach a certain performance level in the exercise of their competencies and retention of those workers who own critical competencies for the firm through motivation or stimulation policies.

Among all these policies, pay is without a doubt the most controversial one when it comes to implement a competency-based management model. Most authors think that linking workers' salaries to their competencies raises serious problems both from an ethical point of view and in terms of productive efficiency. For these reasons, this human resource policy has traditionally been relegated to the last place when the time has come to implement a competency-based management model, choosing instead others such as performance assessment, training or career planning. A large number of authors –among them Whiddett & Hollyforde (2003); Zingheim & Schuster (2003) or Rankin (2001)– see this discrimination of the pay policy within the overall competency-based human resource management model as something obvious, the reason lying in the fact that this policy is not usually considered essential for the design and implementation of the model. Nevertheless, as is pointed out by Blanco Prieto (2007), the necessary flexibilisation of organisations should be extended to pay policies nowadays. Going even further, Rábago López (2010) claims that, although most current organizations have not incorporated

competencies into their pay policies yet for reasons related to caution, this position prevents them from taking advantage of all the potential offered by the comprehensive implementation of the competency-based management model.

On the other hand, as is suggested by Fernández López (2005), the pay pack should be broken down into three basic concepts: what the employee is; what the employee does; and what the employee achieves. The first one of these elements would possibly have to do with belonging to a specific professional group; the second one would be related to an occupational pay band; and the third one, to the variable part of pay.

In other words, performance assessment and pay are the most important human resource practices when it comes to trigger and reinforce desired behaviours among individuals and, consequently, to achieve the organisation's strategic goals. In fact, quite a few empirical studies have revealed the causal relationship existing between the human resource pay system and the strategic orientation of the firm (Collins & Clark, 2003). As is pointed out by Alles (2010), one of the main concerns among executives has to do with managing the company's organisational values so that they can be harnessed for practical purposes. In this sense, the adhesion of competencies to those values permits to turn them into real management indicators.

In any case, it is important to ensure that all these human resource practices, whether they are considered individually or grouped together around the three previous dimensions, are consistent with one another. On the one hand, this consistency will allow individuals to better understand what is expected from them and what they can obtain from the company and, on the other hand, it will give a response to the correlation of preferences, conducts and, of course, competencies shared by a group of individuals within the organisation, thus providing coherence to their treatment and favouring the formation of work teams (Baron & Kreps, 1999).

In short, employees' competencies are created and supported on these human resource practices (Wright, Dunford & Snell (2001), which contain important nuances in relation to the way of identifying and managing competencies.

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KEY TERMS AND DEFINITIONS

Competency: The underlying characteristics of an individual (a motive, trait, skill, aspect of one's self image or social role, or a body of knowledge) which underlie performance or behavior at work.

Competency Model: Set of integrated Human Resource Practices (recruitment, assessment, compensation…) which takes the "competency" term as the basic analysis unit.

Human Resource Management (HRM): Is the function within an organization that focuses on recruitment of, management of, and providing direction for the people who work in the organization.

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Chapter 16
The Financial Related Analysis on Sales Management and Human Resources by Means of BI Type Solutions

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ABSTRACT

All companies need information in order to make decisions. There is usually too much data spread in the IT systems of the company, but transforming the data into information that can be analyzed in order to make decisions is a difficult process. Considering the demands imposed by the knowledge society, each organization strives to become an intelligent organization and, by the means of new and innovative Business Intelligence(BI) strategy, to gain a market competition advantage. The new BI era integrates information into the decision process through the means of decision services, relates business processes to business rules that may be changed at any time, and integrates BI benefits to capabilities provided by teamwork, cooperation, and business process management. In this article, the authors present a BI solution, implemented through QlikView Application, thanks to which it is possible to analyse the employee expenses and for management sales.

INTRODUCTION

Valuable information has been registered in operational databases, as those of the accounting information system. But usually this information is difficult and almost impossible to use. To perform the managerial duties of an organization (forecasting, organizing, coordinating, training and controlling-evaluating) on terms of competition and uncontrolled change of market parameters, means to use some information products able to meet the requirements of time in making decisions,

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as well as to identify some possible decisions from which to choose the optimal one. Because the existing reporting systems did not cover all fields of interest within an in-depth analysis of a business process, some business intelligence solutions were developed.

The goal of BI solutions is to offer customized analyses to the right users, at the right time, enabling them to make better business decisions. The companies need to implement analyses to hundreds or even thousands of users, assuring, at the same time, that they all have access to the latest operations.

The demand for dynamic multidimensional systems used to support the intelligent and predictive decision making processes, has determined the development of the systems of BI type (Buytendijk, 1999). These systems become more and more complex, being able of a multidimensional analysis of data and display real abilities of statistics and predictive analysis in order to serve much more to the decision- assisted systems.

Business intelligence represents the assembly of the activities of researching, collecting, treating and transmitting useful information to the economic agents, with a view to get competitive advantages, by its exploitation in a defensive or/ and offensive way (Biere, 2003). The BI applications of assisted decisions facilitate a great number of activities, including the multidimensional analysis, data mining, the predictable capacity, the business analysis, the inquiry, reporting and graphics designing facilities, the geo-space analysis, the knowledge management etc. (Turban, Aronson, Liang, & Sharda, 2007).

Business intelligence (BI) is a powerful instrument that the companies can use to improve the organizational performance offering valuable information for all the parties involved in the business. BI has become such a comprising concept that we must take a few minutes to revise it. Firstly, BI includes disciplines that are connected to each other, yet divided. Thus BI can be divided into four basic zones (Moss & Atre, 2003):

1 Data integration refers to the modality that allows data from different business processes, programs, platforms and systems to be assimilated so as to create consistent information that can be trusted an easily used.
2. Data management means creating a central deposit to stock data in a form and location that makes them more accessible to the analysis engine.
3. Analysis is a term used for mining, modeling and optimizing data to estimate the tendencies that will be communicated to the decision makers.
4. Reporting allows final users to see and show the results in a personalized form.

BI comes with a tempting offer under the form of a platform meant to bring together and to interrogate information in due time helping users to anticipate changes and to act accordingly.

The BI concept represents an architecture and a collection of applications and integrated operative databases, as well as of systems based on decision assistance, that provide to the business community easy access to the data on the respective business (Kimball, Reeves, Ross, & Thornthwaite, 1998). The BI concept represents a series of marketing techniques and analyses which can be fulfilled with the help of a special software. By means of this system, the experts analyse the internal data of a company. The BI concept focuses on the interdepartmental activities of a company, the analysis of material and informational flows as well as the improvement strategies of the activities inside of the company (Brannback, 1997.).

Because of the large amount of data and of huge processing needs, both the dynamic reporting solutions and the data mining require a powerful informational infrastructure designed to enable storage, interconnected, processing and huge correlation capacities (we can talk here not only about the hardware but also about the software capacities, including here the specific parameters for every organization).

The central warehouse that shelters the totality of the collected data from the computer systems represents the central part of the system. It is best known under the name of Data Warehouse (Adelman & Moss, 2000). In order to collect data in the data warehouse from more computer structures, that can be later correlated, even if they come from other systems, it is usually necessary a computer layer to collect, clean, filter and transform the ultimate data of the operational systems (Zillman, 2010). Usually, this task is fulfilled by the ETL services (Extract, Transformation, Load) of BI systems.

BI integrated systems offer data extraction, data analysis removes irrelevant information, the risk management and offers support for managing decisions at high speed and with almost perfect relevance (Rasmussen, Goldy, & Solli, 2002). Business is run through IT systems within BI and do not depend on the computer department.

BI Tools

The need of Business Intelligence solutions is obvious, especially in those companies where the top-management realizes they cannot make tactic decisions in due time based on the existent information under certain forms inside the company, they cannot harmonize the strategies in order to reach the aims and the are dangerously heading towards a competitively risky situation on the market. Taking the current dynamics into account, the data a company holds must be used 100%. They must be translated into information which can answer the critical questions of the management. In the cases where the reports still represent the main support for decision making, presenting all the necessary data but not an analysis or interpretation of these, the need for a Business Intelligence software will, sooner or later, impose itself in a clear way (Loshin, 2003). That is because the current business environment does not accept anything else but well-founded, fast and based on reliable information decisions which, once taken, gain credibility and extra value for the company.

The Organizational Management considers Business Intelligence to be a vital means of activity improvement, gaining of competitive advantage and meeting the strategic goals (Vitt, Luckevich, & Stacia, 2002).

In Romania, the market of Business Intelligence solutions, together with that of ERP solutions (Enterprise Resource Planning), experienced an impressive evolution due both to the national economical development and to meet the need of companies to remain competitive on the market.

The work instruments which Business Intelligence applications offer give the managerial department of the company the possibility to get involved and to begin analyzing data, without having to wait for the IT departments to hand in complex reports (Bălăceanu, 2007).

The use of a Business Intelligence solution should not be limited to a single department or group within a company. Each department may use specific capacities of such solution (Dresner, 2010):

- The IT department provides the necessary operational systems for the other departments. Report generation has been the IT departments' traditional responsibility, but they should be released from this burden and provide, in exchange - with minimum time, information resources or outfit – an analysis and reporting solution for all the other departments, so that they get quickly the necessary information.
- The financial department uses the Business Intelligence capacities to analyze data, generate reports and financial statistics, and make financial decisions with them.
- The logistics department may anticipate demands and estimate inventories.
- The marketing and sale departments may estimate sales, profitability and analyze the market behaviour on brands (groups

of products) and distribution channels (groups of customers).

To stay competitive, businesses need tools to take advantage of opportunities and avoid risk, in real-time. As a result, business-intelligence and related business-reporting tools are going through a transformation, driven by business leaders and their need for visibility into day-to-day operations (Raisinghani, 2004).

Business intelligence tools, when combined with your operational data, enable you to:

Increase sales using fact-based selling tools.

Several age-old issues encumber the sales process:

- Sales reps traditionally don't know what's selling in a particular account or what should be selling based on a comparison with similar accounts.
- When making appointments, sales reps frequently don't have a substantial "business reason" to see the customer.
- Although building a customized, timely message for each account is a powerful sales tool, traditional marketing methods make this difficult. Consequently, many face-to-face meetings are bland and non-productive. Casual chatter about your products or your company is not a sufficient competitive differentiator - not enough to engage the customer's attention or complete a sale. Fact-based selling is all about delivering a crisp, customized, fact-based message that compels a face-to-face meeting with an attentive prospect or customer. A fact-based message contains key information your customers can use to increase their efficiency and profitability.

How can you overcome these obstacles? With business intelligence tools, you can analyze why a product sells in one account and not well in a similar account (Hoberman, 2001). You can spot inventory problems in a particular store and suggest moving its overstock between stores, or show how changing the product's in-store placement might stimulate sales. In addition, BI data allows you to identify cross-selling opportunities.

What's more, sales reps with laptop access to facts are equipped to make compelling sales propositions in real time. Often, this means helping customers make product or quantity decisions based upon on-the-spot analysis of similar accounts(Howard-Jones, 2000).

Finally, great companies are building loyalty by providing Internet access to information (White, 2000). Your customer also needs fast access to solid information, a factor that can become an incremental advantage for your organization.

Build profits by targeting profitable activities.

Here are some common sales and marketing issues which often act as barriers to higher profitability (Krizan, 1999):

- While profit is the ultimate goal in most organizations, understanding the impact on profitability of an individual product, customer, channel, or sales representative is beyond the reach of most organizations.
- If we don't understand what's driving our profit, how do we focus our efforts and resources? The answer is that we often guess, or adopt a "flavor of the day." In extreme(but not uncommon) cases, there's no focus and we simply react to the next phone call.
- Because credible profitability information may not exist, most sales organizations are driven by revenue. The push is to increase sales, with the hope that profit will follow. However, revenue-driven models treat each dollar of revenue equally, whether it

comes from a high-profit or a low-profit sale.

To break down these barriers, you require information that allows you to direct your team toward profitable targets (Anandarajan & Srinivasan, 2004). This same information enables you to steer your product mix toward increased profitability.

Increase customer loyalty and retain customers for life.

Increasing your customer base and retaining those customers involves several issues:

- Customer retention is problematic. A key to maintaining your customers for life is to make certain they're satisfied. The ideal, albeit difficult, solution is to spot problems early and correct them.
- Losing a high-value customer is a huge setback because these customers often purchase products with a high profit margin. These high-end customers also require less "maintenance" and don't require the high costs associated with customer acquisition and start-up.
- When customers are unhappy, word gets around. Studies show that, on average, each unhappy customer relates his or her experience to nine other customers. On the other hand, many customers never openly complain to the vendor. They just suddenly go elsewhere.

Obviously, customer loyalty is built on customer satisfaction. The strategy that is needed, but rarely in place, includes developing processes that monitor leading satisfaction indicators and feeding that information back to you in time for action (Lowenthal, 2003).

What should you measure? First, late and incomplete shipments are generally regarded as the primary cause of customer dissatisfaction. Despite the importance of timely and accurate delivery, few firms have a clue about their record in this area, either overall or with respect to any specific customer. You'll likely want to start here, by measuring days between promised and actual delivery dates, for example. Similarly, you'll likely want to monitor customer claims, disputes, complaints, and returns. Be aware that you also have data enabling you to monitor any changes in order frequency.

Once you've identified problems in any of these areas, you'll be able to prioritize your process improvement initiatives according to the areas of greatest customer concern.

The Implementation of BI Solutions with the Qlikview Application

In order to design the reports on analysis we used the QlikView application, which is an excellent tool in analyzing the critical information on a business. QlikView is a complex and powerful BI software package and data analysis which offers a better way to work with the data of a business. The graphic interface offers an increasing interaction to the users. With a few clicks on the mouse, they have immediate access to information that goes from the general level to the level of the slightest details. The organizations, thus, succeed in discovering still unsuspected information, in understanding better what is going on in their current activity and, as such, in making the best decisions for their development.

The extensive facilities on personalization and visualization of information, combined with advanced capabilities in collaboration and implementation work, make the QlikView application easily adaptable inside the organizations (companies or public institutions) that intensively use electronic stored data. The QlikView applications are developed rapidly, they are easily administered by the IT department within a company, and they offer to the final users an unlimited freedom of

queries, at any level of database (QlikTech International, 2008).

From the point of view of the final user, the application ensures two important functions: free surfing through the database in search of relevant information and varied possibilities of displaying data. These functions are closely linked and it is difficult to distinguish between the two.

Searching through the database is performed by specifying the selection criteria. The user can express simple criteria or criteria combining logical operators in search for information. The application allows access, at the same time and on the same screen, to all information in the database, the selection being done with a simple "qlik" and the search by writing the corresponding criteria.

Specification of the display mode must allow the analyst to find optimal modalities to turn to a god account the extracted data. Beside the typical graphical possibilities of presentation, it is important for the user to visualize multidimensional data in a tabular form. Thus complex table can be used to group columns and lines expressing different dimensions and different aggregation levels.

The strong engine Business Intelligence of QlikView analysis uses the revolutionary technology AQL (Associative Query Logic), which accesses structured information from various sources in an interactive and dynamical way, propelling the selections of analysis throughout the entire available data basis in order to build an associative, non-relational and extremely efficient data basis (QlikTech International, 2008).

AQL offers QlikView the possibility to work with millions of data cells and yet to answer the questions within less than a second. By replacing the classic relational technology with AQL, QlikView replaces the need of pre-aggregation of data.

Furthermore it gives the possibility of connecting to any source of data (ERP, CRM, Microsoft Excel, logs, Access data bases), thus achieving the gathering of the pieces of information generated by the multitude of independent applications used within a company.

Any objective in QlikView – from lists to graphics and tables – is accessible through a "click". QlikView enables the users to find their own way towards the analysis and understanding of things.

Qlik View is the business intelligence solution that extends the concept of simplifying the analysis for everybody, further than ever (Swoyer, 2008). The extended facilities for personalizing and visualizing information, combined with advanced co-operative work abilities make QlikView easily adapted within organizations (companies and public institutions) that use intensively electronic data stocks.

Qlik View offers (Manohar, 2008):

- Personalized dashboards;
- A powerful reporting engine – fast and easily combines and distributes data from multiple sources;
- Flexible solutions - Qlik View users can connect to the internet;
- Personalized applications – the possibility to develop very fast 100% personalized solutions.

Case of Study A: Example of Sales Management

To give an example we considered a company that deals with product distribution. The company has got several warehouses situated at different addresses and furnishes products to several clients from all over the country. The used information refers to:

- *Articles* characterized through: Product Code, Product Name, Weight, Product Group, Group Type;
- *Customers* defined through: Customer Code, Customer Name, Location Code, Customer Location Name, Customer

Group, Customer Group Type, Department, Town, Invoicing Code;

- *Invoice heading* which comprises: ID, Invoicing Code, Date, Warehouse Location, Warehouse and Bill
- *Invoice lines* consisting of: ID, Product Code, Quantity and Price.

The most important operation that can be done very easily with QlikView is the "*Filter*" spreadsheet. This allows visualizing several pieces of information at the same time. The operations that can be made on this page are:

- The simple or multiple selection: for example if we select a certain product we can visualize information about the name, the customer's type and location to whom the product was distributed, about the group of product to which the particular product belongs, the warehouse, the delivered quantity and the price of the product, about the bills released for the sell of the product.
- The search: for example, if we want to find a bill number in order to see the information comprised in this particular bill (sold product, date of release, quantity, price), we have to select the thing corresponding to the bill and introduce the number of the bill. As the numbers are being introduced, all the bills that have the specified values comprised in their number are selected (see Figure 1).

A very important thing for the drawing of all the spreadsheets is the dimension established as representative for them. Thus we used as dimensions: time, location of warehouses, customers, products, etc. These can be selected and altered on each sheet and we can use combinations of these dimensions in order to define groups.

Using the information taken from the database described above we made the following spreadsheets:

A.1. Sales map: where the sales in each warehouse are graphically represented for the selected

Figure 1. Filter page

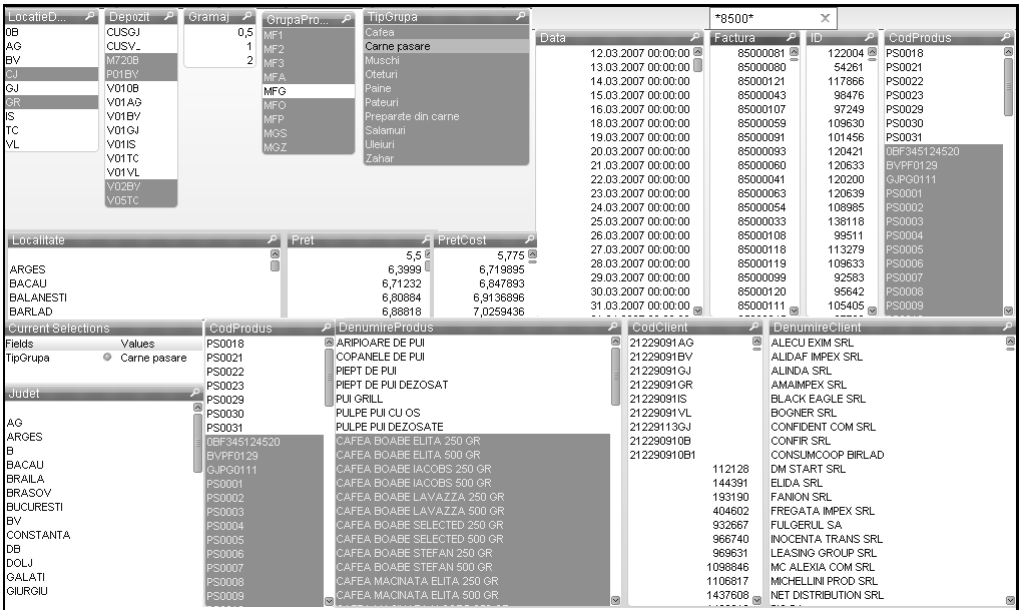
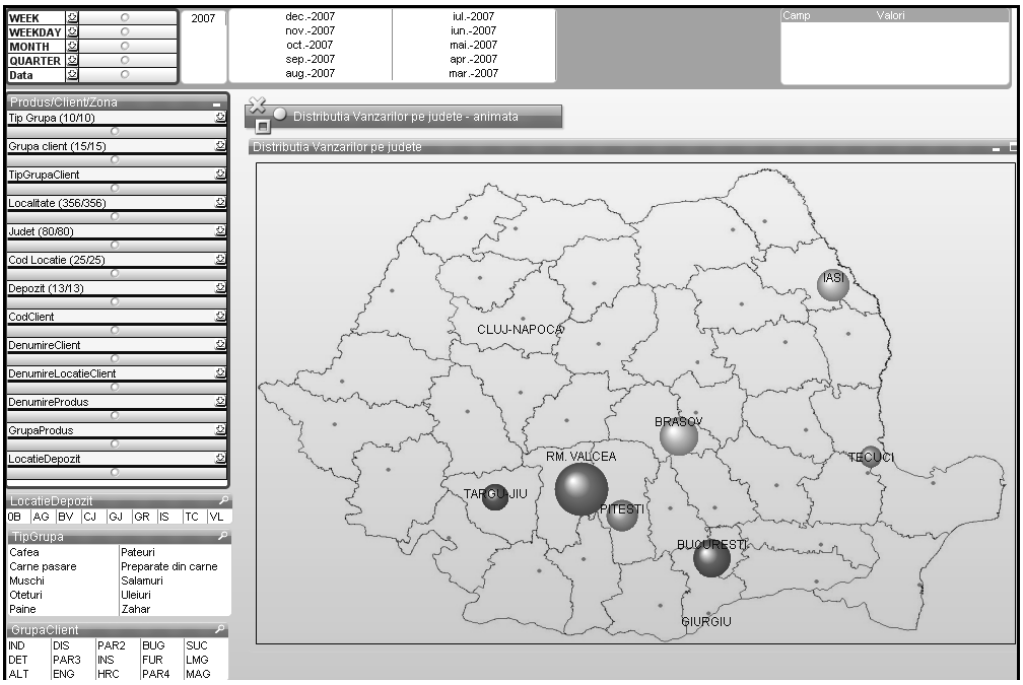


Figure 2. The sales map



period. We can get a clear picture of the sales from each day, week or month, for a certain group of products, or for a certain group of customers. (see Figure 2)

A.2. The periodical evolution of the sold quantity. In this chart, it is presented a detailed analysis on sales by determining the evolution of the sold quantity from a group of products every month of the year. The dimensions of this chart can be changed so that the sold quantities can be displayed on another period of time (on weekends, weekly, daily, yearly, etc.). At the same time, the evolution of sold quantities can also be displayed, from different groups of products or, simultaneously, from two or more groups (Figure 3).

A.3. Customers' Evolution. In this chart, for every type of customers, there are presented the groups of products and the values corresponding to them, for quantity and value, as well as the evolution of prices (how many times the price has been modified), the low, average and high price for sale of the products from the respective group and the standard deviation. (see Figure 4). All these information can be displayed for every customer partly, for every product or warehouse, or by means of selection, for different values.

A.4. The report with reference to the evolution of the number of clients, of the number of distributed products and sales turnover. From the report an analysis of the monthly evolution of the sales can be done. Figure 5 shows the evolution of the sales turnover, but by choosing from a menu there can be drawn diagrams for the number of customers or for products.

From the table adjoining the diagram other selections can be done, for instance we can choose to draw the diagram for a certain product group, for a certain customer, for a certain geographical

Figure 3. The evolution of the sold quantity from a group of products

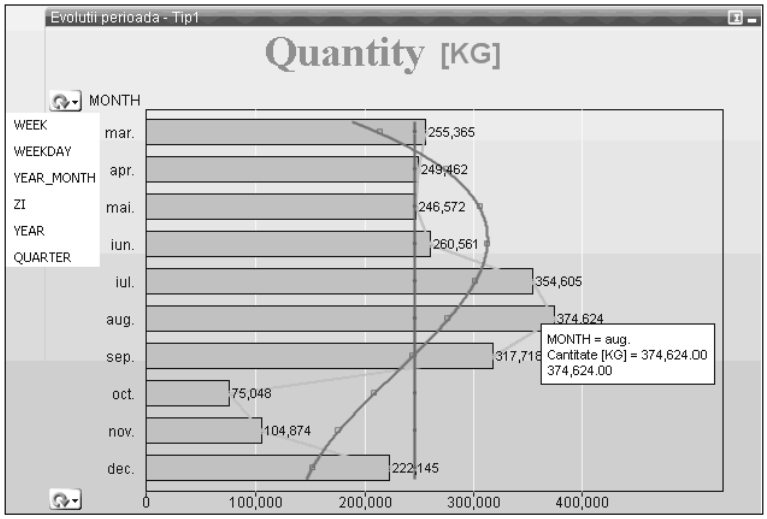
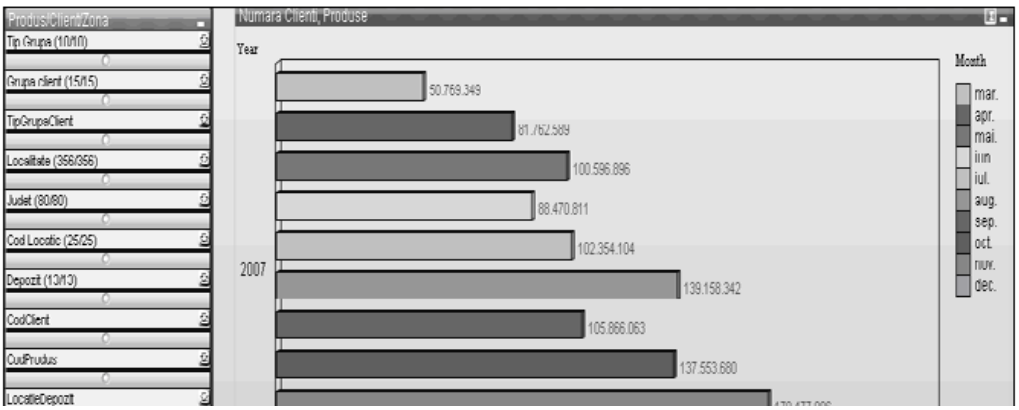


Figure 4. Customers' evolution

Evolutie client - valori pret pe bucata

Type Customer	Groups of products	Value RON	Quantity BUC	Quantity KG	Number of prices	Hight Price	Low Price	Average Price	Price KG	Standard Deviation
		1,138,217,229	**137,536,726**	**137,541,314**	373	**1,129.0500**	**0.0000**	**8.2757**	**8.2755**	**7.2984**
Non Parteneri	Cafea	13,301,784	2,073,125	2,073,125	60	120.0000	0.6000	6.4163	6.4163	6.6972
Parteneri	Cafea	2,894,027	388,099	387,849	51	1,129.0500	0.8000	7.4569	7.4617	70.3701
Parteneri	Carne pasare	283,218,731	31,873,428	31,870,135	58	28.0000	6.7123	8.8857	8.8866	1.9755
Non Parteneri	Carne pasare	50,324,460	5,820,968	5,820,340	43	12.5000	5.5000	8.6454	8.6463	1.4838
Non Parteneri	Muschi	19,481,694	1,943,499	1,943,523	40	26.0000	7.0000	10.0240	10.0239	1.5635
Parteneri	Muschi	6,538,474	701,437	710,172	34	31.6000	6.9479	9.3215	9.2069	5.3502
Non Parteneri	Oteturi	28,161,029	2,894,180	2,894,180	47	12.8000	7.4000	9.7302	9.7302	1.7172
Parteneri	Oteturi	3,608,085	385,950	385,950	26	12.0000	6.7150	9.3486	9.3486	1.5307
Parteneri	Paine	63,036,901	7,280,711	7,280,711	57	10.8080	6.6283	8.6581	8.6581	1.4588
Non Parteneri	Paine	22,789,789	2,537,115	2,537,115	52	12.1000	4.2000	8.9826	8.9826	1.8452
Non Parteneri	Pateuri	438,766,715	57,515,541	57,515,541	142	12.8000	0.4000	7.6287	7.6287	2.3347
Parteneri	Pateuri	118,223,664	14,307,485	14,307,485	92	11.0975	0.0000	8.2631	8.2631	2.1887
Non Parteneri	Preparate din carne	24,176,516	2,890,248	2,890,248	52	16.0000	6.0000	8.3649	8.3649	2.0358
Parteneri	Preparate din carne	16,725,977	1,945,035	1,945,035	45	10.9045	5.7000	8.5993	8.5993	1.1608
Parteneri	Salamuri	9,556,077	1,092,004	1,092,004	78	19.3000	4.8250	8.7510	8.7510	2.1145
Non Parteneri	Salamuri	4,005,182	370,310	370,310	49	18.0000	5.0000	10.8158	10.8158	2.6393
Non Parteneri	Uleiuri	8,784,916	794,443	794,443	57	14.3000	6.8000	11.0580	11.0580	1.9058
Parteneri	Uleiuri	24,622,964	2,723,133	2,723,133	54	11.8695	6.9619	9.0421	9.0421	1.7192

Figure 5. Monthly evolution of the sales turnover



area, for a certain group of customers, etc. In fact these selections can be done within any spreadsheet built with the aid of QlikView application.

A.5. Variations on sales. In this chart, there are determined the differences between two days in different months. Thus, to exemplify, I considered a day in August and at 20days' distance, a day in July (see Figure 6). There can be noticed the differences between the sold quantities, the products value, and the price for every product which is found in the existing group of products.

This chart can be modified easily by changing the dimensions, in this way, visualizing the same information grouped differently. For instance, we can find differences in the quantities, values and prices for a group of products, or for other customers or types of customers (partners or non-partners), or from certain warehouses, or from a locality, etc. Selections can also be made, for example, we can choose to draw a statistics only for a certain group of products, for a certain customer, a certain geographic area or for a certain group of customers etc. In fact, these selections can be made in all accounting papers built by means of this QlikView application (Figure 7).

A.6. Comparative evolution where we make a detailed analysis of the sales following several dimensions graphically represented on one axis or two. Here we can establish if there is or not logical correlation between the chosen dimensions, on certain periods of time, for example between the average price and quantity (we can study what happens to the quantity if the average price rises, or the other way) (see Figure 8)

A.7. Comparisons on certain periods such as:

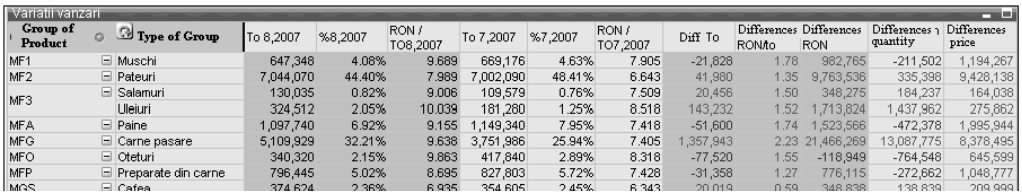
- *Comparisons between the days of the week.* We build the evolution on a certain day of the week of the value, average price and sold quantity. For example, establishing the date of 01.08.2007 we get specific data for the three dimensions only for the day of Wednesday from the current or previous month (we take in account the last 4 weeks) and we compare these days to one another in order to

Figure 6. Variations on sales

Variatii vanzari

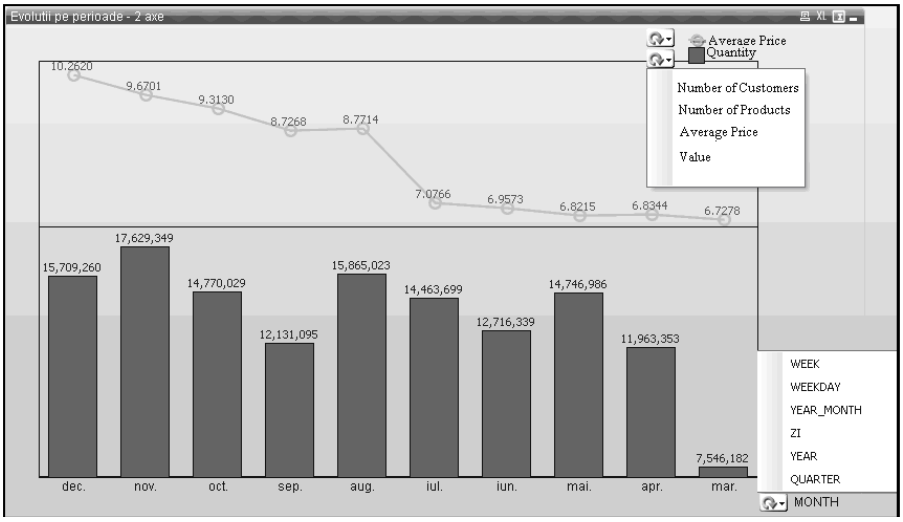
Group of Product	Product Name	To 8,2007	%8,2007	RON / TO8,2007	To 7,2007	%7,2007	RON / TO7,2007	Diff To	Differences RON/to	Differences RON	Differences quantity	Differences price
MF1	MUSCHI FILE ALDIS	538	0.01%	13.049	3,124	0.04%	9.700	-2,586	3.35	-23,282	-33,746	10,464
	MUSCHI FILE CAROLI	11,660	0.13%	12.660	12,812	0.14%	9.800	-1,152	2.86	22,060	-14,585	36,645
	MUSCHI FILE CRIS-TIM	32,800	0.37%	10.533	42,920	0.48%	8.487	-10,120	2.05	-18,783	-106,592	87,809
	MUSCHI FILE PRODA...	602,350	6.80%	9.583	610,320	6.89%	7.815	-7,970	1.77	1,002,770	-76,377	1,079,147
MF2	PATE ARDEAL PORC	16,130	0.18%	0.478	15,320	0.17%	0.400	810	0.08	1,576	387	1,189
	PATE ARDEAL PUI	4,700	0.05%	0.600	7,205	0.08%	0.600	-2,505	0.00	-1,503	-1,503	0
	PATE BUCEGI	3,868,800	43.65%	9.577	3,551,880	40.12%	7.841	316,920	1.74	9,204,066	3,035,254	6,168,812
	PATE SIBIU GASCA	71,590	0.81%	6.430	45,000	0.51%	5.899	26,590	0.53	194,894	170,980	23,914
	PATE SIBIU PORC	630,070	7.11%	5.735	1,046,000	11.81%	5.138	-415,930	0.60	-1,760,497	-2,385,326	624,829
	PATE SIBIU PUI	2,452,780	27.68%	6.173	2,336,685	26.39%	5.570	116,095	0.60	2,124,999	716,668	1,408,331
MFP	CARNATI AFUMATI	1,650	0.02%	9.245	300	0.00%	7.607	1,350	1.64	12,971	12,480	491
	CARNATI ARDELENE...	59,050	0.67%	9.100	84,303	0.95%	7.463	-25,253	1.64	-91,816	-229,792	137,976
	CARNATI CABANOS	2,660	0.03%	10.792	1,900	0.02%	9.742	760	1.05	10,196	8,202	1,995
	CARNATI OLTENESTI	65,000	0.73%	8.941	45,000	0.51%	7.270	20,000	1.67	254,003	178,813	75,190
	CRENVUSTI DE PORC	155,175	1.75%	6.506	131,150	1.48%	6.101	24,025	0.40	209,380	156,302	53,078
	CRENVUSTI DE VITA	28,160	0.32%	10.897	31,720	0.36%	10.421	-3,560	0.48	-23,708	-38,793	15,084
	RULADA DE PORC	30	0.00%	8.500	30	0.00%	7.500	0	1.00	30	0	30
	RULADA DE VITA	484,720	5.47%	9.173	533,400	6.02%	7.576	-48,680	1.60	405,058	-446,521	851,578
MGS	CAFEA BOABE ELIT...	194,835	2.20%	6.137	219,125	2.47%	6.132	-24,290	0.00	-148,035	-149,064	1,029
	CAFEA BOABE IAC...	5,370	0.06%	8.761	2,800	0.03%	7.429	2,570	1.33	26,247	22,517	3,730
	CAFEA BOABE IAC...	12,240	0.14%	8.734	12,400	0.14%	7.578	-160	1.16	12,937	-1,397	14,335
	CAFEA BOABE LAV...	1,420	0.02%	10.768	1,300	0.01%	8.250	120	2.52	4,565	1,292	3,273
	CAFEA BOABE SEL...	1,640	0.02%	12.301	840	0.01%	10.223	800	2.08	11,586	9,840	1,746
	CAFEA BOABE STE...	80,760	0.91%	9.000	39,920	0.45%	9.000	40,840	0.00	367,560	367,560	0
	CAFEA MACINATA E...	14,920	0.17%	0.600	15,059	0.17%	0.600	-139	0.00	-83	-83	0
	CAFEA MACINATA I...	2,400	0.03%	6.959	5,360	0.06%	6.618	-2,960	0.34	-18,771	-20,599	1,829
	CAFEA MACINATA I...	51,400	0.58%	8.744	35,840	0.40%	7.469	15,560	1.28	181,773	136,061	45,712
	CAFEA MACINATA L...	400	0.00%	9.300	11,920	0.13%	7.720	-11,520	1.58	-88,299	-107,136	18,837
	CAFEA MACINATA ...	9,239	0.10%	0.800	10,041	0.11%	0.800	-802	-0.00	-642	-642	-0

Figure 7. Variations on sales for the groups of products


Variatii vanzari

Group of Product	Type of Group	To 8,2007	%8,2007	RON / TO8,2007	To 7,2007	%7,2007	RON / TO7,2007	Diff To	Differences RON/to	Differences RON	Differences quantity	Differences price
MF1	Muschi	647,348	4.08%	9.689	669,176	4.63%	7.905	-21,828	1.78	982,765	-211,502	1,194,267
MF2	Pateuri	7,044,070	44.40%	7.989	7,002,090	48.41%	6.643	41,980	1.35	9,763,536	335,398	9,428,138
MF3	Salamuri	130,035	0.82%	9.006	109,579	0.76%	7.509	20,456	1.50	348,275	184,237	164,038
	Uleiuri	324,512	2.05%	10.039	181,280	1.25%	8.518	143,232	1.52	1,713,824	1,437,962	275,862
MFA	Paine	1,097,740	6.92%	9.155	1,149,340	7.95%	7.418	-51,600	1.74	1,523,566	-472,378	1,995,944
MFG	Carne pasare	5,109,929	32.21%	9.638	3,751,986	25.94%	7.405	1,357,943	2.23	21,466,269	13,087,775	8,378,495
MFO	Oteturi	340,320	2.15%	9.863	417,840	2.89%	8.318	-77,520	1.55	-118,949	-764,548	645,599
MFP	Preparate din carne	796,445	5.02%	8.695	827,803	5.72%	7.428	-31,358	1.27	776,115	-272,662	1,048,777
MGS	Cafea	374,624	2.36%	6.935	354,605	2.45%	6.343	20,019	0.59	348,838	138,839	209,999

Figure 8. Comparative evolution



establish if there was or not an evolution of the sales (Figure 9).

- *Period comparisons* era done using the same dimensions, but we establish a certain period for which we want to visualize sales evolution. For example, if we use a 7 days period, this does not mean that we built the evolution for that week, but for a 7 days period previous to the analysis date.
- *Monthly comparisons* – we draw the sales evolution following the three dimensions for each of the 12 months previous to the analysis date.

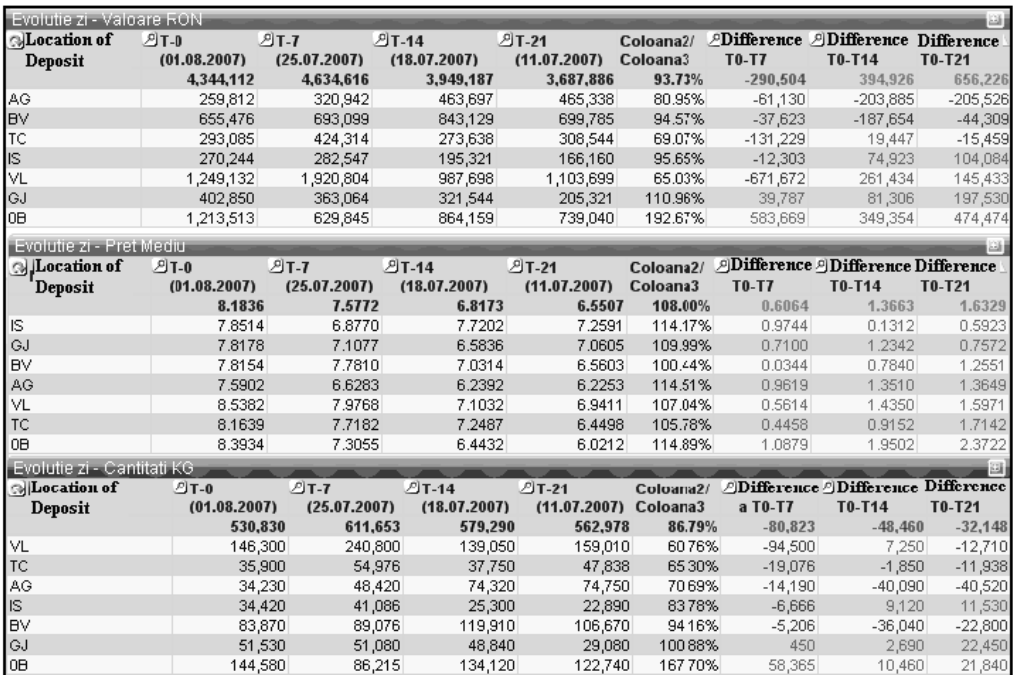
A.8. The margin analysis on product and customer. The in-depth analysis of the company's total margin means to study the main product margins and to establish the influence of direct and indirect factors on them. Figure 10 may provide the margin analysis on customers for a certain period of time (year, month, day) and also the product margin by selecting the attached menu.

Comparisons between the margin and value for both products and customers may be achieved, too (Figure 11).

A.9. "What-If" evaluation. This report shows how the margin value changes if the product price and/ or quantity change (increase or decrease).

The managerial decisions on sale prices should consider the two components of the sale price:

Figure 9. Days of the week comparisons



Evolutie zi - Valoare RON

Location of Deposit	T-0 (01.08.2007)	T-7 (25.07.2007)	T-14 (18.07.2007)	T-21 (11.07.2007)	Coloana2/ Coloana3	Difference T0-T7	Difference T0-T14	Difference T0-T21
	4,344,112	**4,634,616**	**3,949,187**	**3,687,886**	**93.73%**	**-290,504**	**394,926**	**656,226**
AG	259,812	320,942	463,697	465,338	80.95%	-61,130	-203,885	-205,526
BV	655,476	693,099	843,129	699,785	94.57%	-37,623	-187,654	-44,309
TC	293,085	424,314	273,638	308,544	69.07%	-131,229	19,447	-15,459
IS	270,244	282,547	195,321	166,160	95.65%	-12,303	74,923	104,084
VL	1,249,132	1,920,804	987,698	1,103,699	65.03%	-671,672	261,434	145,433
GJ	402,850	363,064	321,544	205,321	110.96%	39,787	81,306	197,530
0B	1,213,513	629,845	864,159	739,040	192.67%	583,669	349,354	474,474

Evolutie zi - Pret Mediu

Location of Deposit	T-0 (01.08.2007)	T-7 (25.07.2007)	T-14 (18.07.2007)	T-21 (11.07.2007)	Coloana2/ Coloana3	Difference T0-T7	Difference T0-T14	Difference T0-T21
	8.1836	**7.5772**	**6.8173**	**6.5507**	**108.00%**	**0.6064**	**1.3663**	**1.6329**
IS	7.8514	6.8770	7.7202	7.2591	114.17%	0.9744	0.1312	0.5923
GJ	7.8178	7.1077	6.5836	7.0605	109.99%	0.7100	1.2342	0.7572
BV	7.8154	7.7810	7.0314	6.5603	100.44%	0.0344	0.7840	1.2551
AG	7.5902	6.6283	6.2392	6.2253	114.51%	0.9619	1.3510	1.3649
VL	8.5382	7.9768	7.1032	6.9411	107.04%	0.5614	1.4350	1.5971
TC	8.1639	7.7182	7.2487	6.4498	105.78%	0.4458	0.9152	1.7142
0B	8.3934	7.3055	6.4432	6.0212	114.89%	1.0879	1.9502	2.3722

Evolutie zi - Cantitati KG

Location of Deposit	T-0 (01.08.2007)	T-7 (25.07.2007)	T-14 (18.07.2007)	T-21 (11.07.2007)	Coloana2/ Coloana3	Difference a T0-T7	Difference T0-T14	Difference T0-T21
	530,830	**611,653**	**579,290**	**562,978**	**86.79%**	**-80,823**	**-48,460**	**-32,148**
VL	146,300	240,800	139,050	159,010	60.76%	-94,500	7,250	-12,710
TC	35,900	54,976	37,750	47,838	65.30%	-19,076	-1,850	-11,938
AG	34,230	48,420	74,320	74,750	70.69%	-14,190	-40,090	-40,520
IS	34,420	41,086	25,300	22,890	83.78%	-6,666	9,120	11,530
BV	83,870	89,076	119,910	106,670	94.16%	-5,206	-36,040	-22,800
GJ	51,530	51,080	48,840	29,080	100.88%	450	2,690	22,450
0B	144,580	86,215	134,120	122,740	167.70%	58,365	10,460	21,840

Figure 10. The margin on customers for a single month

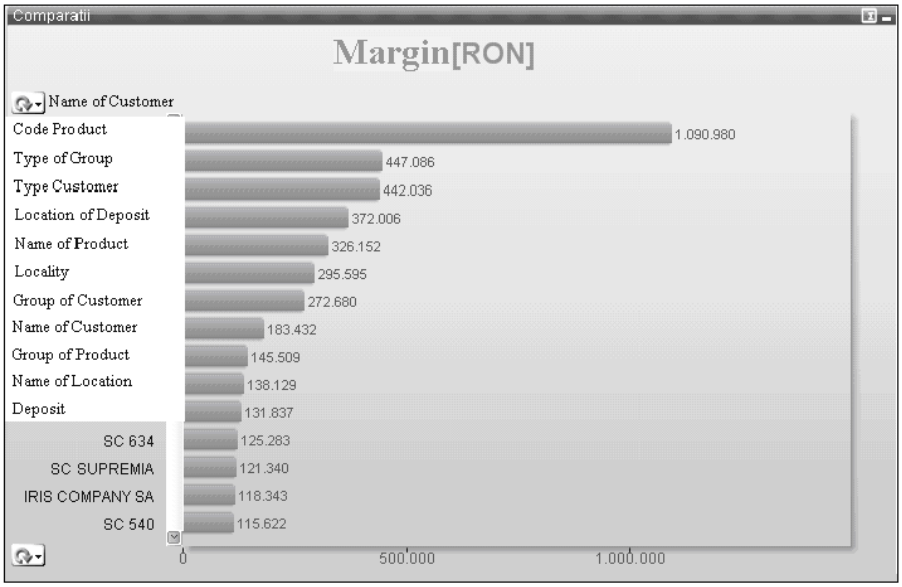
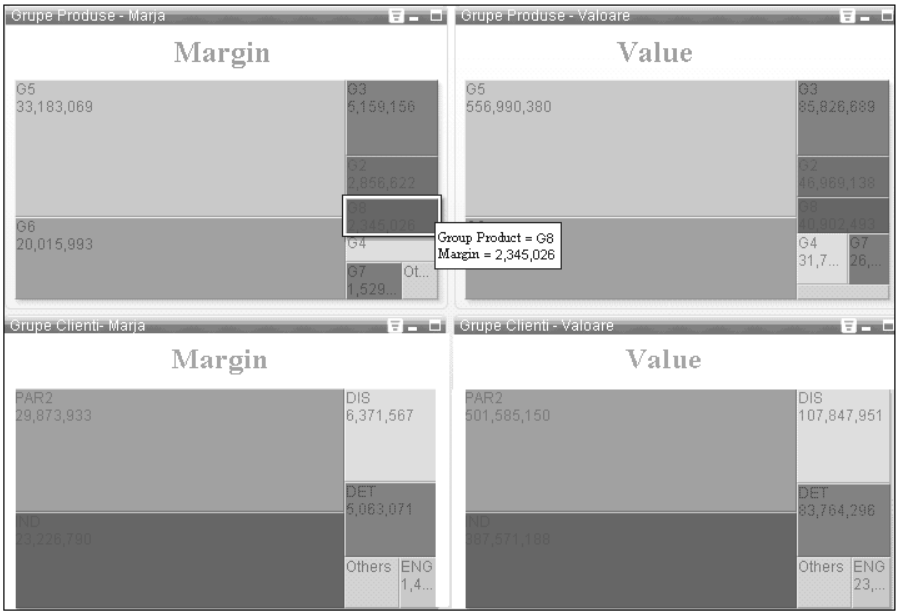


Figure 11. Margin-Value comparisons



- The purchase price of the goods;
- The commercial margin.

The commercial margin, also known as the commercial addition, should be settled as to allow cost recover with good circulation, including the taxes regarding the good circulation (the value of product shipment, depositing and valuation, the market taxes, etc.) and gaining a certain profit.

The manager of a company has to make simulations to change the prices, the quantity to sell or the purchase costs.

For example:

- If the purchase cost increases with a number or percents higher than the increase percent of the product price, the margin will increase; otherwise, the margin will decrease;
- If the quantity and price increase, the margin will also increase;
- If the purchase cost increases more than the price value, the product quantity has to increase considerably so that the margin increases (Figure 12).

A.10. The Key Performance Indicators (KPI).

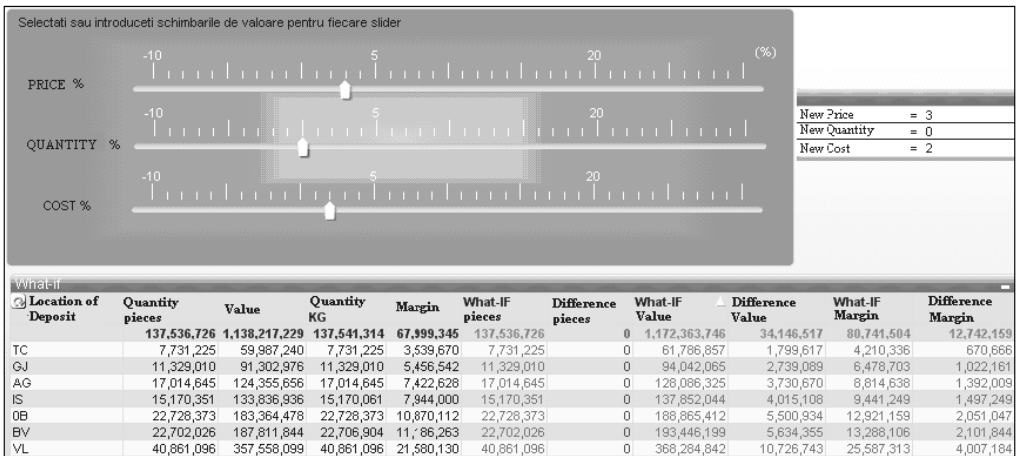
The key performance indicators are important for the teams, managers, or businesses in order to evaluate rapidly the progress to measurable objectives.

Every business area can choose to follow other types of KPIs, according to the objectives which are to be fulfilled. For instance, in order to increase the customers' satisfaction, a calling centre can have as its goal to settle to answer to a specific number of telephone calls in a shorter period of time (Figure 13).

Another possibility is for the sales department to use KPIs in order to settle performance objectives, such as the number of the new products sold every month. Other example of such indicators could be defined:

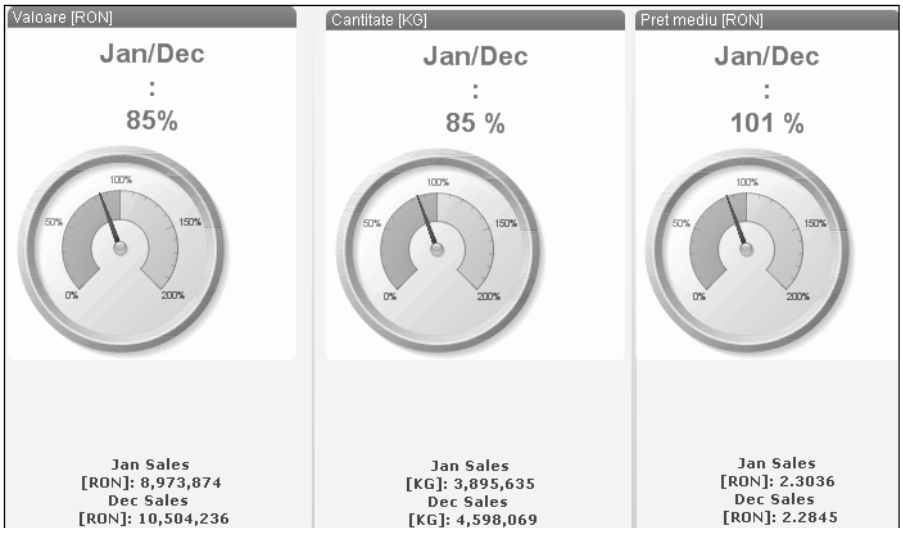
- The average income on customer;
- Sales versus target for every employee of the sales department;
- The success rate (the number of contracts signed of the total).

Figure 12. What If" evaluations



Location of Deposit	Quantity pieces	Value	Quantity KG	Margin	What-IF pieces	Difference pieces	What-IF Value	Difference Value	What-IF Margin	Difference Margin
	137,536,726	1,138,217,229	137,541,314	67,999,345	137,536,726	0	1,172,363,746	34,146,517	80,741,504	12,742,159
TC	7,731,225	59,987,240	7,731,225	3,539,670	7,731,225	0	61,786,857	1,799,617	4,210,336	670,666
GJ	11,329,010	91,302,976	11,329,010	5,456,542	11,329,010	0	94,042,065	2,739,089	6,478,703	1,022,161
AG	17,014,645	124,355,656	17,014,645	7,422,628	17,014,645	0	128,086,325	3,730,670	8,814,638	1,392,009
IS	15,170,351	133,836,936	15,170,061	7,944,000	15,170,351	0	137,852,044	4,015,108	9,441,249	1,497,249
0B	22,728,373	183,364,478	22,728,373	10,870,112	22,728,373	0	188,865,412	5,500,934	12,921,159	2,051,047
BV	22,702,026	187,811,844	22,706,904	11,; 86,263	22,702,026	0	193,446,199	5,634,355	13,288,106	2,101,844
VL	40,861,096	357,558,099	40,861,096	21,580,130	40,861,096	0	368,284,842	10,726,743	25,587,313	4,007,184

Figure 13. KPI



In the present case, I considered as performance indicators: the products value, the sold quantity, and the average price and I took into account the days of the current month and the days of the last month till the same day.

Case of Study B: Example of Human Resources Analysis

For exemplifying, I consider a firm which deals with the human resources analysis within a company. Data referring to human resources is processed in due time and analyses such as: the analysis of labour force, absenteeism, productive hours, personnel expenses, training days etc can obtained. The simple and comparative analyses, the examples and statistics shown in a corresponding chart are important means to support decision, the solution meeting the needs of the company in the short, medium and long term.

A part of the designed reports for accomplishing an analysis on human resources within a company are presented in the following:

B.1. Salary evolution per month for each employee of the companie. This report shows the standard wage, the gross salary, the incentive category received over a period of three months (as selected) by each employee. For each employee, the differences in the standard wage, in the gross salary per month as well as the periods of time when s/he was given incentives can be easily noticed (see Figure 14). The information in this table can be rearranged.By targeting the month this will become column heading and we can see the value of the three components (standard wage, gross salary, incentive category) for each month. At the same time we can make selections such as: to visualize information on a certain department, on a certain position, etc.

B.2. Standard wage analysis: the departments within a company and the positions within the departments are shown in the form of a table (see Figure 15). The following information is calculated for each position, for a three month period: the number of employees with the same position, the total sum and the average of the monthly standard wage, as well as the minimum and the maximum standard wage given in a month. This table can be modified, just with a few ”clicks”, to obtain the same statement for each employee, examining the differences in the salary for the same employee but also the differences in the salary for two employees with the same position. The monthly evolution of these parameters is easy to follow, and comparisons can be made between nonconsecutive months.

B.3. Evolution of costs contains the graphic with monthly values on net salary, gross salary, standard salary and on the total cost for a three-month period of time. This graphic enables the manager to notice the monthly differences between the expenses with the employees and it offers computer support for controlling the salary increases within a firm with a decentralized decision and with

Figure 14. Salary evolution per month

Top - varianta 2

	Standard Salary				Gross Salary				Incentive Category			
Month	Total	10/2008	09/2008	08/2008	Total	10/2008	09/2008	08/2008	Total	10/2008	09/2008	08/2008
NAME	Total				Total				Total			
Total	**12,886,680**	**4,436,036**	**4,240,520**	**4,210,124**	**13,523,289**	**4,557,859**	**4,353,297**	**4,612,133**	**2,509,794**	**685,721**	**698,633**	**1,125,440**
Popescu Ion 646	**38,730**	12,910	12,910	12,910	**33,852**	9,200	9,164	15,488	**8,910**	0	0	8,910
Popescu Ion 567	**47,046**	15,682	15,682	15,682	**33,415**	11,153	11,131	11,131	**0**	0	0	0
Popescu Ion 3616	**47,046**	15,682	15,682	15,682	**33,393**	11,131	11,131	11,131	**0**	0	0	0
Popescu Ion 876	**29,580**	9,860	9,860	9,860	**28,499**	10,499	6,999	11,001	**10,572**	4,932	0	5,640
Popescu Ion 781	**26,916**	9,158	9,158	8,600	**26,308**	6,501	6,500	13,307	**10,148**	0	0	10,148
Popescu Ion 3612	**0**	0	0	0	**25,243**	15,717	4,763	4,763	**9,200**	9,200	0	0
Popescu Ion 4087	**23,550**	7,850	7,850	7,850	**24,746**	5,594	5,580	13,572	**11,271**	0	0	11,271
Popescu Ion 4621	**0**	0	0	0	**23,814**	7,938	7,938	7,938	**0**	0	0	0
Popescu Ion 4622	**27,000**	9,000	9,000	9,000	**23,689**	6,413	6,388	10,888	**6,340**	0	0	6,340
Popescu Ion 4112	**25,500**	8,500	8,500	8,500	**22,665**	6,032	6,032	10,601	**6,435**	0	0	6,435
Popescu Ion 553	**21,513**	7,171	7,171	7,171	**20,060**	5,090	5,097	9,873	**6,739**	0	0	6,739
Popescu Ion 595	**17,280**	6,340	6,340	4,600	**20,034**	8,801	4,500	6,733	**10,944**	6,059	0	4,885
Popescu Ion 4309	**16,200**	5,800	5,200	5,200	**19,454**	4,117	3,696	11,641	**11,200**	0	0	11,200
Popescu Ion 4736	**6,900**	2,500	2,200	2,200	**19,382**	6,731	7,488	5,163	**20,403**	6,983	8,347	5,073
Popescu Ion 566	**21,390**	7,130	7,130	7,130	**19,213**	5,091	5,061	9,061	**5,636**	0	0	5,636
Popescu Ion 3509	**27,000**	9,000	9,000	9,000	**19,189**	6,413	6,388	6,388	**0**	0	0	0
Popescu Ion 154	**27,000**	9,000	9,000	9,000	**19,189**	6,413	6,388	6,388	**0**	0	0	0
Popescu Ion 2876	**25,800**	8,600	8,600	8,600	**18,345**	6,104	6,104	6,137	**46**	0	0	46
Popescu Ion 4638	**19,500**	6,500	6,500	6,500	**17,990**	4,612	4,612	8,766	**5,850**	0	0	5,850
Popescu Ion 4498	**15,000**	5,000	5,000	5,000	**16,891**	5,004	5,322	6,565	**8,800**	2,050	2,500	4,250
Popescu Ion 594	**17,130**	5,710	5,710	5,710	**16,873**	4,053	8,767	4,053	**6,629**	0	6,629	0
Popescu Ion 2529	**18,310**	6,300	6,300	5,710	**16,385**	4,862	4,470	7,053	**4,296**	0	0	4,296
Popescu Ion 4610	**13,500**	4,500	4,500	4,500	**16,095**	3,315	6,392	6,388	**9,000**	0	4,500	4,500
Popescu Ion 4114	**16,500**	5,500	5,500	5,500	**15,836**	3,919	4,109	7,808	**5,785**	0	285	5,500

Figure 15. Standard wage analysis

DEP_NAME	FUNCTION	Month	NAME	Number of employess	Average standard ware	Average	Minim	Maxim
Administrare Retea Magazine	**Total**			**1**	**1,250**	**1,250**	**1,250**	**1,250**
	Analist Date	08/2008	Popescu Ion 285	1	1,250	1,250	1,250	1,250
		09/2008	Popescu Ion 285	1	1,250	1,250	1,250	1,250
		10/2008	Popescu Ion 285	1	1,250	1,250	1,250	1,250
	Total			**1**	**1,250**	**1,250**	**1,250**	**1,250**
	Asistent Manager	08/2008	Popescu Ion 283	1	1,250	1,250	1,250	1,250
		09/2008	Popescu Ion 283	1	1,250	1,250	1,250	1,250
		10/2008	Popescu Ion 283	1	1,250	1,250	1,250	1,250
	Total			**3**	**2,750**	**917**	**850**	**1,000**
	Operator Date		Popescu Ion 284	1	1,000	1,000	1,000	1,000
		08/2008	Popescu Ion 286	1	900	900	900	900
			Popescu Ion 287	1	850	850	850	850
			Popescu Ion 284	1	1,000	1,000	1,000	1,000
		09/2008	Popescu Ion 286	1	900	900	900	900
			Popescu Ion 287	1	850	850	850	850
			Popescu Ion 284	1	1,000	1,000	1,000	1,000
		10/2008	Popescu Ion 286	1	900	900	900	900
			Popescu Ion 287	1	850	850	850	850

many employees. The total cost and the wages display the same trend, because they are in a direct connected. Anyway, the share of wages in the total cost is more than 55%. If the manager makes a connection between this trend of the wages and of the total cost with sales development, he will have a full image of the firm profitability and its development. So, his decisions can be supported with concrete data and can aim each worker or each department (Figure 16).

B.4. Evolution of pay rise contains for each employee the minimum standard wage and the maximum standard age the difference between maximum and minimum, the percentage of the difference and the average standard salary over a three month period of time (see Figure 17). The last column shows the number of months with pay rise.

Figure 16. Costs evolution

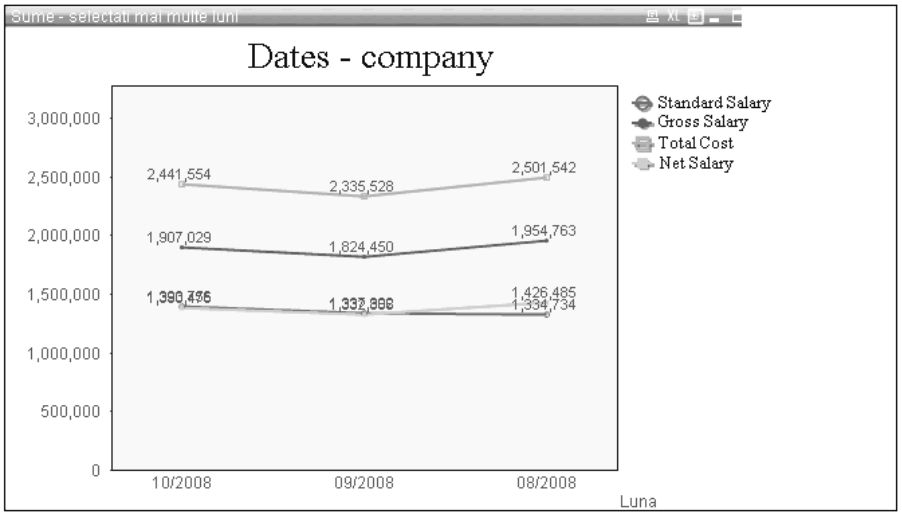
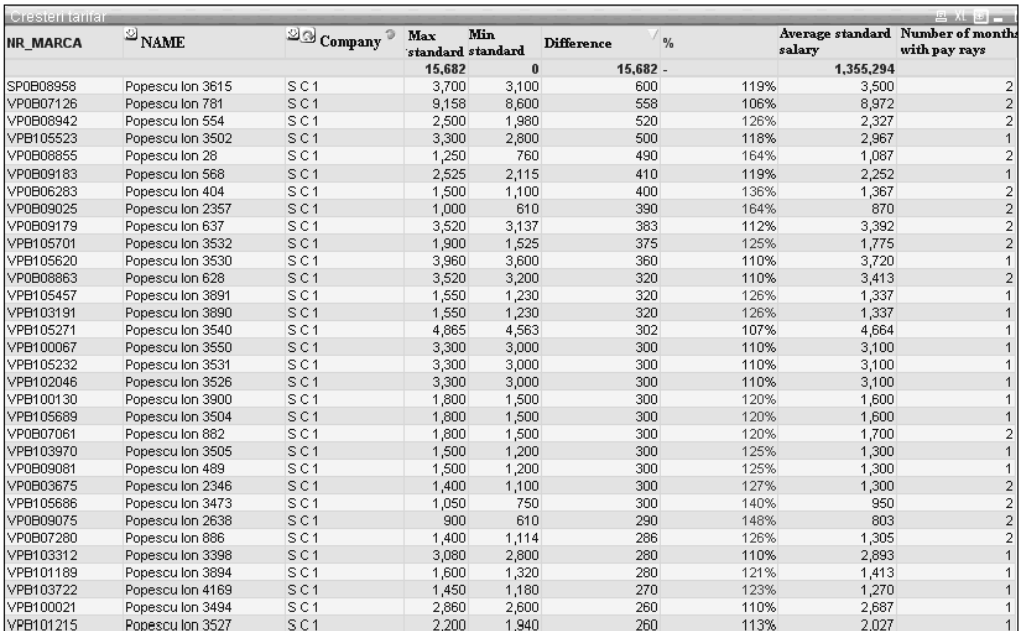


Figure 17. Evolution of pay rise



Crestere salar

NR_MARCA	NAME	Company	Max standard	Min standard	Difference	%	Average standard salary	Number of months with pay rays
			15,682	0	15,682	-	1,355,294	
SP0B08958	Popescu Ion 3615	S C 1	3,700	3,100	600	119%	3,500	2
VP0B07126	Popescu Ion 781	S C 1	9,158	8,600	558	106%	8,972	2
VP0B08942	Popescu Ion 554	S C 1	2,500	1,980	520	126%	2,327	2
VPB105523	Popescu Ion 3502	S C 1	3,300	2,800	500	118%	2,967	1
VP0B08855	Popescu Ion 28	S C 1	1,250	760	490	164%	1,087	2
VP0B09183	Popescu Ion 568	S C 1	2,525	2,115	410	119%	2,252	1
VP0B06283	Popescu Ion 404	S C 1	1,500	1,100	400	136%	1,367	2
VP0B09025	Popescu Ion 2357	S C 1	1,000	610	390	164%	870	2
VP0B09179	Popescu Ion 637	S C 1	3,520	3,137	383	112%	3,392	2
VPB105701	Popescu Ion 3532	S C 1	1,900	1,525	375	125%	1,775	2
VPB105620	Popescu Ion 3530	S C 1	3,960	3,600	360	110%	3,720	1
VP0B08863	Popescu Ion 628	S C 1	3,520	3,200	320	110%	3,413	2
VPB105457	Popescu Ion 3891	S C 1	1,550	1,230	320	126%	1,337	1
VPB103191	Popescu Ion 3890	S C 1	1,550	1,230	320	126%	1,337	1
VPB105271	Popescu Ion 3540	S C 1	4,865	4,563	302	107%	4,664	1
VPB100067	Popescu Ion 3550	S C 1	3,300	3,000	300	110%	3,100	1
VPB105232	Popescu Ion 3531	S C 1	3,300	3,000	300	110%	3,100	1
VPB102046	Popescu Ion 3526	S C 1	3,300	3,000	300	110%	3,100	1
VPB100130	Popescu Ion 3900	S C 1	1,800	1,500	300	120%	1,600	1
VPB105689	Popescu Ion 3504	S C 1	1,800	1,500	300	120%	1,600	1
VP0B07061	Popescu Ion 882	S C 1	1,800	1,500	300	120%	1,700	2
VPB103970	Popescu Ion 3505	S C 1	1,500	1,200	300	125%	1,300	1
VP0B09081	Popescu Ion 489	S C 1	1,500	1,200	300	125%	1,300	1
VP0B03675	Popescu Ion 2346	S C 1	1,400	1,100	300	127%	1,300	2
VPB105686	Popescu Ion 3473	S C 1	1,050	750	300	140%	950	2
VP0B09075	Popescu Ion 2638	S C 1	900	610	290	148%	803	2
VP0B07280	Popescu Ion 886	S C 1	1,400	1,114	286	126%	1,305	2
VPB103312	Popescu Ion 3398	S C 1	3,080	2,800	280	110%	2,893	1
VPB101189	Popescu Ion 3894	S C 1	1,600	1,320	280	121%	1,413	1
VPB103722	Popescu Ion 4169	S C 1	1,450	1,180	270	123%	1,270	1
VPB100021	Popescu Ion 3494	S C 1	2,860	2,600	260	110%	2,687	1
VPB101215	Popescu Ion 3527	S C 1	2,200	1,940	260	113%	2,027	1

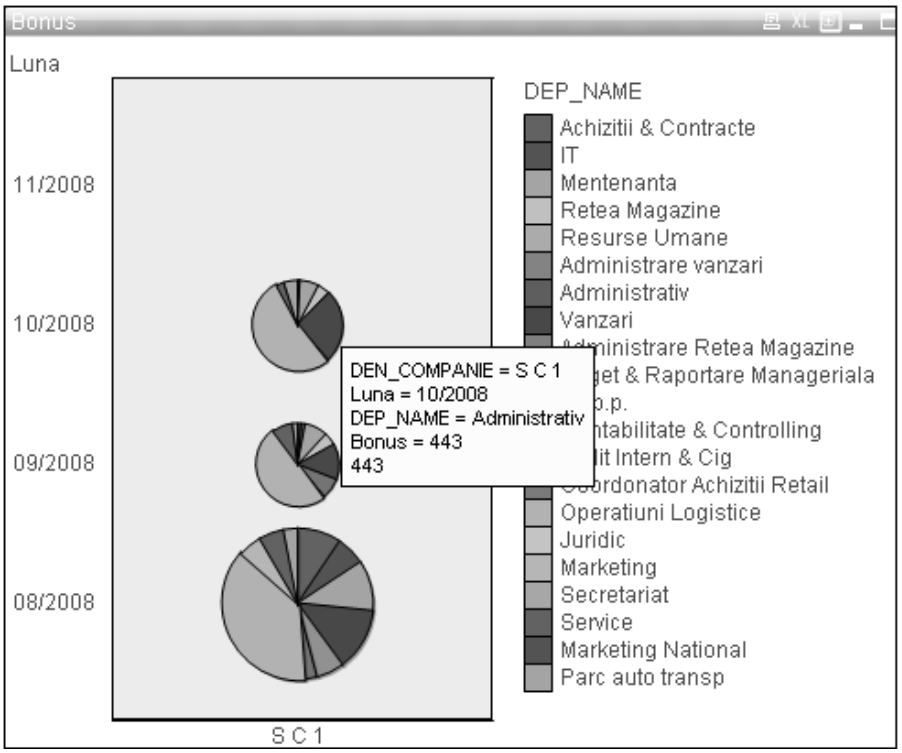
The actual analysis of the salaries can be done when it is needed, for the whole company or only for a small group of employees.

This report offers the informational support to control pay rises in a company with decentralized decision, with many employees (the increase percentage of over 20% are automatically signaled – colored in red). In the present example the increases are due to the change of position as well as the pay rise decided directly by the employer.

B.5. ***Bonus analysis*** contains for each department of the company the sums in the incentive category (bonus) given to the employees every month (see Figure 18). The chart can be used for statistics on the bonuses given by a company to its employees in a month or over a certain period of time. At the same time, the sums in the incentive category given by the company to its employees can be compared, for the whole company or for each department. By placing the mouse on a certain department in the chart (a certain color) detailed information on department, month and the incentives given to employees are shown. We can notice that in August, which is a holiday month, all departaments and workers got primes, while in the rest of the months, only some departaments got primes, namely, again, the logistic operations department and the sales department were in top.

B.6. ***The analysis of extra work hours*** done by the company per month (see Figure 19). The average of total expenses, the average number of extra hours, and the value of the extra hours per employee are calculated for the company. The last column shows the ratio of the value of the extra work hours to the total expenses of the department. The supplementary working hours are noticed here at the logistics operations department and that explains the larger wages and primes given by the company to these departaments that contribute to the increase of the firm performances. If the firm manager will correlate

Figure 18. Bonus analysis



the increase of the total cost due to the supplementary working hours with the sales increase due to these working hours, he can decide if it is efficient or not to ask for such enlarged working program and pay for it.

The features of this report can be modified and thus the total expenses per department, per salary earner or per budget group can be carried out.

Figure 19. The analysis of extra hours

Analiza - cheltuieli totale

Dep_Name	Function	Number employ	Total expenses	Average expenses	Extra work hours	Average extra hours	Value of extra hours	Value extra hours/ total expenses
		1,172	7,327,176	9,584	61,268	8	711,072	9.70%
Contabilitate & C...	Contabil	4	44,359	11,090	0	0	0	0.00%
IT	Administrator Sistem	4	25,638	6,409	0	0	0	0.00%
Operatiuni Logisti...	Ingrijitor curatenie	4	7,110	1,778	0	0	0	0.00%
Resurse Umane	Administrator Salarizare	4	24,108	6,027	0	0	0	0.00%
Resurse Umane	Inspector Resurse Umane	4	18,262	4,565	0	0	0	0.00%
Achizitii & Contra...	Gestionar	6	30,258	5,043	0	0	0	0.00%
Operatiuni Logisti...	Customer Service Specialist	6	32,839	5,473	0	0	0	0.00%
Vanzari	Manager Zona	6	72,075	12,012	0	0	0	0.00%
Retea Magazine	Operator Calculator	7	23,562	3,366	0	0	0	0.00%
Achizitii & Contra...	Agent Achizitii	9	53,985	5,998	0	0	0	0.00%
Administrativ	Ingrijitor Curatenie	18	44,034	2,446	0	0	0	0.00%
Vanzari	Lucrator Comercial	22	121,888	5,540	0	0	0	0.00%
Operatiuni Logisti...	Casier	4	24,588	6,147	5	1	65	0.26%
Operatiuni Logisti...	Mecanic Auto	9	189,805	21,089	12	1	182	0.10%
Operatiuni Logisti...	Dispecer	8	69,969	8,746	13	2	207	0.30%
Achizitii & Contra...	Magazioner	3	84,401	28,134	16	5	209	0.25%
Operatiuni Logisti...	Ajutor gestionar	2	12,458	6,229	18	9	213	1.71%
Operatiuni Logisti...	Facturist	27	165,098	6,115	14	1	226	0.14%
Operatiuni Logisti...	Sofer	1	6,153	6,153	16	16	261	4.24%
Operatiuni Logisti...	Manipulant	42	120,001	2,857	65	2	476	0.40%
Operatiuni Logisti...	Gestionar	37	202,477	5,472	44	1	504	0.25%

Figure 20. Leave records



B.7. ***Leave records*** contains information regarding the average number of vacation days taken by the employees of each company over a three month period. A simple click can change the chart to visualize information on sick leaves and the number of meal tickets per employee or change the period of time (one month on nonconsecutive months). The same information on leaves can be displayed in a chart but grouped on a department, on positions or on budget groups (Figure 20).

B.8. ***The supervision of employee activity.*** Is done by recording the days with sick leave and holidays, the number of training days, extra hours, the hours with normal work regime, the hours worked in the night shift or on holidays, for each month(see Figure 21).

A simple click can change the chart to visualize information on sick leaves and holidays, the number of extra hours, the number of hours worked in the night shift or normal work regim per employee or change the period of time(one month or nonconsecutive months).

The same information on leaves can be displayed in a chart but grouped on a department, on positions or on budget groups. The charts show the monthly evolution in the number of working hours, the absenteeism or personnel refresher courses.

B.9. ***Instrument panel:*** contains three types of charts that show, with a view to carrying out comparison and analysis, situations referring to (see Figure 22):

- The employee fluctuation for company over a five month period. This report also shows, if the features are changed, the number of sick leave days taken, the number of training days, the number of extra work hours and the bonus give to the employees;
- The total cost spent by company on human resources as well as the gross cost for taxation;
- The observation on the salary earners' activity taking into account the number of sick leave days taken, the number of training days, the number of extra work hours and the total number of employees, per month.

Figure 21. The supervision of employee activity

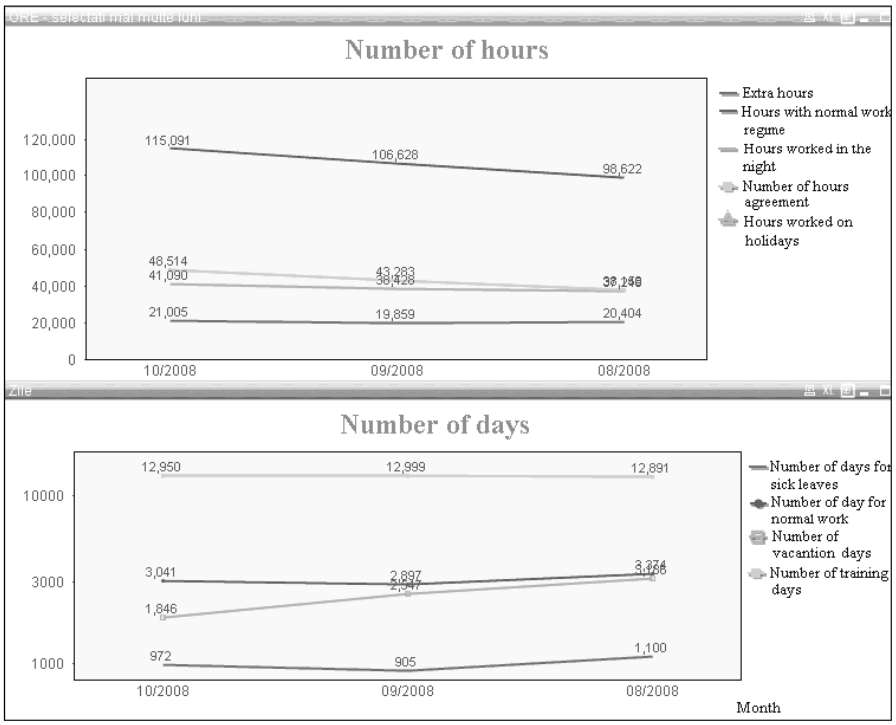
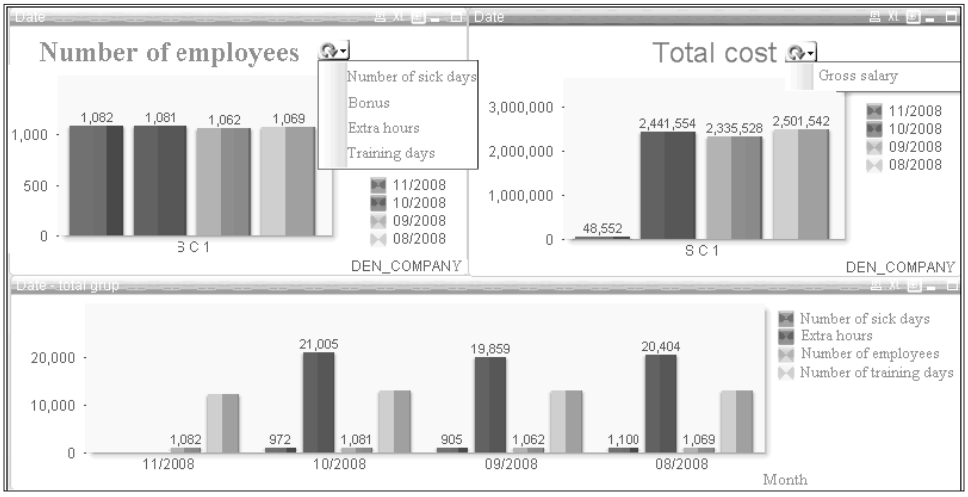


Figure 22. Instrument panel



CONCLUSION

We must admit that these technologies are at the beginning of a long journey, in a world where the key to success lies on the ability to make better decisions and in a much shorter period of time than the competition. However, the life of a company depends more and more on such decisions, fact that makes impossible to deny the benefit that the BI can bring.

The cost of implementing the BI systems is rendered by a visible save of time that is accomplished by the company's management for the period when it gets the information and by the earnings of money that come from the quality of decisions.

This information system is a Business Intelligence product offers informational support to those with analysis and decision powers in the „HR" and „Sales" departments. Implementing a business intelligence solution has the following benefits (Thompson, 2004):

- It places at the users' disposal all relevant information about the business they need in due time.
- Simplifies the search for complex data and automatizes business processes
- The solution is adapted to the specific requirements of the organization, unlike a prefabricated and difficult to adjust one
- It makes use of the existing technologies: Excel and requires little training as it is based on the present knowledge of the users.
- It reduces the period of time for decision making, allowing rapid reaction to changes and generating a competitive advantage.

We believe that, in the future, Business Intelligence solutions will become indispensable tools in the management of any company since quick and good decisions will become critical for survival and evolution on the European market. Romania shows a great potential to assimilate IT solutions, the receptivity for Business Intelligence solutions becoming more and more obvious both as mentality and practical application within the Romanian business environment. There are still problems, as there are Romanian managers that still need to be convinced to adopt global Business Intelligence solutions.

The reason why Business Intelligence is needed in the activity of a company or of an institution in Romania is connected to the need to cope with the competitiveness imposed by the European market, by the standards and the legislation that must be observed, as well as by the acute need for a time and profit and performance economy. The problems faced by most of the organization, especially by the public ones, is the lack of fast, centralized and relevant information, the huge amount of information only partially used and the impossibility to turn the data into benefits, as a result of users' superficial and sporadic access to it.

The set of the BI reporting devices offers the access to the information that we need, when we need, in order to make the right decisions in the shortest period of time. Today, all the companies know the fact that their pieces of information are valuable/reliable. The most intelligent of them already invest in BI instruments and they offer the necessary visibility in the decision making process at all the levels of the organization.

Just because of the world crisis, the companies should become more efficient to survive. And it should be taken action right now. A BI system is included at the defensive investments and its role became very important under the circumstances.

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Chapter 17
Recruitment and Retention of Healthcare Professionals for the Changing Demographics, Culture, and Access in Canada

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ABSTRACT

The Canadian healthcare system strives to serve a population altered by ever-changing demographics, cultural shifts, and diverse societal populations, and to serve those in rural communities with remote access to health care. The following chapter examines Canada's current healthcare system and the effects on demand for services and the supply of healthcare providers created by the need to service rural populations, by limited access to medical schools, and by the introduction of foreign medical/health professionals. More specifically, the chapter reviews the symptoms of a strained medical system plagued by "brain waste" due to the non-use of qualified immigrant healthcare professionals, long wait times as a result of inadequate staffing and resources, and a school system that hinders the development of aspiring medical care professionals from rural and international areas. If Canada is to face these challenges with efficacy and vigour, effective human resources management techniques and competent human resources professionals are a necessary prologue. Medical knowledge and skill must be valued; healthcare professionals should be utilized more efficiently to improve healthcare access and minimize brain waste.

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INTRODUCTION

In response to the changing demographics of the Canadian population, various broad macro-policies have been implemented, changed, and subsequently remodelled in an effort to recruit and retain medical professionals to improve healthcare access (Kirby, 2002; Mazankowski, 2003; Romanow, 2002). On a micro level, the needs of the Canadian population are far from static. Ideally, macro-level healthcare policies should answer the healthcare issues affecting Canadians today, that is, the provision of adequate, quality healthcare for those who need it. However, it is important that the changing needs of Canadians are identified in order to provide an effective healthcare system adapted to the realities of Canadian society. Identifying the health needs of Canadians and the inefficiencies and inadequacies of a healthcare system that fails to meet them will provide a specific area of focus in which to remedy Canadian healthcare.

Effective human resources (HR) management—in order to provide adequate healthcare services—must anticipate the potential pressures that will be faced by staff and medical and health facilities. Currently, a major factor for future medical strain is the aging population. The percentage of Canadians over 65 has increased to 13.7, meaning that nearly one in seven Canadians are senior citizens (Martel & Malefane, 2007). The elderly are living longer, in many cases with one or more chronic medical conditions, and consequently, are requiring increasingly more medical attention. Epidemiological research has demonstrated that as the average life expectancy rises, so does the average number of years that a person lives in a disability-dependent state. As pointed out by Beaujot and Kerr (2004) "at age 45, men can expect to live 10.7 years, or 32.5 per cent of their remaining lives, with some disability, and the same would apply to women for 15.1 years, or 40.1 per cent of their remaining lives after age 45" (p. 49). The baby boomer cohort of the 1950s—a large proportion of the Canadian population—is aging and without a corresponding increase in fertility or migration levels, is resulting in an increasingly older population. The median age of Canadians in 2001 was 37.6 years, and is projected to be 45 years by 2036; the proportion of those over 65 is predicted to increase from 13% in 2001 to 25% by 2036 (Beaujot & Kerr, 2004).

Healthcare professionals have seen an increase in degenerative diseases within the older cohort; consequently, the strain on the medical system is exacerbated by the increased need for medical attention required for longer periods of time and often in individuals with more complex conditions and co-morbidities. Improvements in medicine and technology may have prolonged the lives of the elderly, but in doing so, have increased the demand for physicians, nurses, and other healthcare professionals, and increased pressure and workload on existing healthcare providers. Such pressures can act as a disincentive to practice medicine in Canada

The sustainability of the current Canadian healthcare system is also an issue of concern. The costs of health care in Canada are increasing substantially each year. From 2006 to 2007, private and public sector spending on healthcare had risen 3.2%, even taking into consideration inflation and population growth (CIHI, 2008a; 2008b). Additionally health expenditure had risen from 9.1% of Canada's gross domestic product (GDP) in 2000 to 10.7% of 2007's GDP; this accounts for approximately 39.2% of provincial and territorial government expenditures. Health expenditure is increasing at a higher rate than health revenues. From 1993 to 2007, health revenues increased by 49%, while health expenditures increased by 60%. Unless drastic changes are made, it seems impossible that the Canadian and provincial/territorial governments can maintain a similar level of care, while controlling costs.

Changing Canadian demographics and cultural diversity also present potential challenges to healthcare workers; an increasingly broad cultural diversity requires the healthcare system

to be tolerant and accommodating to the changing population. Rural healthcare access is an additional area requiring improvement. Approximately 20% of Canada's population is currently living in rural areas, yet these areas are serviced by less than 10% of the physician population (CIHI, 2008a). Changes to international recruitment and redistribution of medical professionals may serve as important retention strategies to lessen the impact of the demands of an aging population and access to care in the rural population.

Challenges such as cultural diversity, an aging population, lack of healthcare providers in rural areas, and attempts to recruit internationally have produced issues in Canadian health care for which the medical system was not prepared. These issues manifested themselves in the form of "brain drain" (i.e., the loss of qualified health professionals to other countries), "brain waste" (i.e., the underutilization of international medical graduates), and as a by-product, have added to the increased waiting times for some health services and to ongoing debates about the ethical issues regarding international recruitment (i.e. our gain is another country's loss of a qualified health professional in a global environment where there is a worldwide scarcity of health human resources). In order to accommodate our changing society, these issues must be resolved. Particularly, the accommodation of more medical professionals is imperative in order to support increasing demands for medical care.

In an attempt to resolve the inadequacies of the Canadian healthcare system, government programs have attempted to increase the immigration levels of foreign-trained medical professionals and increase opportunities for residency training in Canada. Additionally, for individuals who fit the profile of future doctors who will practice in rural Canada, flexibility in medical school and residency training program admissions requirements has been granted (Goertzen, 2005) However, many questions remain. How are these programs expected to increase immigration levels of foreign-trained medical professionals *and* ensure more flexible admissions requirements in order to include more rural students? Is there any evidence that these programs have had success in recruiting and retaining medical professionals in Canada or in improving access to healthcare professionals in underserviced areas, such as rural communities? The answers to these questions are still being pursued. For example, technology has also been utilized in providing healthcare access to rural Canadian populations. The goals of such initiatives are to increase access to medical professionals, while simultaneously increasing the distribution of healthcare information and care to remote and underserviced areas.

Former senator Michael Kirby, in his national healthcare report (2002), examined some of the problems plaguing the Canadian healthcare system, and made several recommendations to address these issues. A general theme in his recommendations is an improvement in the coordination of health services between provincial, territorial, and federal governments. Since Confederation the delivery of health services and education, licensing and regulation of healthcare professionals has been a provincial responsibility with shared ideals and financing across the various levels of government. Kirby suggested the establishment of a national council to coordinate certain aspects of the healthcare system, such as recruitment and licensing regulations. In subsequent reports on the state of Canadian health care, Romanow (2002) and Mazankowski (2003) developed similar recommendations. Both agreed with Kirby in that the healthcare system must be reconfigured to establish well-defined roles and responsibilities for regional healthcare authorities and for the federal and provincial/territorial governments. Romanow also suggested the creation of a Health Council of Canada, similar to Kirby's national council, to facilitate cooperation between federal and provincial/territorial governments. These suggestions present the idea that a solution to the health

human resources problems of Canada must involve some integration of federal and provincial policy.

The above discussion illustrates the role of, and demand for, human resources policies and practices in the healthcare system. Is Canada effective at recruiting and retaining medical professionals? Currently each province and territory is suffering from similar problems regarding adequate provision of healthcare. It seems Canada requires drastic changes to address the shortage of healthcare practitioners and to provide prompt access for the population. Canada needs to develop an integrated approach to addressing this nationwide problem. By developing a strong understanding of the possible symptomatic causes and the current issues Canada is facing, adequate solutions for health human resources may be found.

HUMAN RESOURCE MANAGEMENT ISSUES

Despite the growing concern over Canadian medical practitioner shortages, several positive trends have been observed. For example, 2004 was the first time in over 35 years in which more doctors returned to Canada from abroad than those who left to practice elsewhere in the world (CIHI, 2006). According to the Canadian Institute for Health Information (CIHI) the same pattern has occurred in the last three years, and the number of physicians who moved abroad decreased by 57% over the past five years (CIHI, 2006). The number of practicing physicians in Canada has increased by 4.9% over the previous five years, while the increase in the population at large in the same period was only 4.0% (CIHI, 2006). Additionally, the CIHI data demonstrated that:

- The overall increase in physicians was attributed to an increase in Canadian-trained physicians.
- The number of doctors trained in Canada grew by 5.2% between 2002 and 2006, compared to an increase of less than 1% (0.7%) in the number of foreign-trained physicians.
- Doctors trained abroad came primarily from the United Kingdom and Ireland, South Africa, India, Egypt, and the United States.

Based on these trends, it appears that medical provision in Canada may be sound, or at the very least, on a progressive track. However, there is still an imperative need for strategic development in improving the distribution of medical personnel within Canada. Many more physicians move between provinces and territories within Canada than immigrate or emigrate. This internal migration has a very clear overall trend, with Western provinces receiving most of the physicians. Between 2002 and 2006, Alberta and British Columbia were the only two jurisdictions that continuously experienced net gains in physicians from interprovincial migration (CIHI, 2006). Both of the these provinces have experienced significant economic and population growth in the last decade, and it is very likely that doctors have migrated to these areas on the basis of greater job prospects and hopes of higher wages. The same pattern of internal migration can be seen in almost every industry where distinct regions experience a surge of economic growth. The shortage of physicians may be a problem that varies in severity from region to region, but there are still some steps that can be taken to improve the coordination of efforts across the provinces and territories at a national level.

ISSUES WITH THE CURRENT CANADIAN MEDICAL SYSTEM

The Commonwealth Fund International Health Policy (CFIHP) survey, conducted by the Commonwealth Fund and the Harvard School of Public Health (Schoen, Blendon, DesRoches, &

Osborn, 2002), found that the vast majority of Canadian physicians stated that there were serious community shortages of nurses and specialized medical care professionals. These shortages have contributed to increased wait times in hospitals, as well as access to a physician, and have reduced the amount of time that physicians are able to spend with individual patients. This has resulted in a drastic reduction in the quality of care (Esmail, 2006). The CFIHP survey (Schoen et al., 2002) also found that two-thirds of Canadian physicians believed that the quality of patient care will decline in the future. Additionally, there was a significant decline in physician satisfaction with the Canadian healthcare system since the previous investigation conducted in 1991, when nearly 33 per cent of physicians were satisfied compared to only 24 per cent in 2000 (Blendon et.al, 2001). For example, a practitioner from the Université de Montreal Hospital Centre even recalls having to handle her own administration, such as scheduling patients. Although recent increases in medical school enrolment have sparked hope for an increasing population of medical practitioners, it does nothing to help alleviate the immediate demand. The small increase in medical school graduates will not be enough to replace the large number of aging doctors ready to retire nor address the increasing demands for medical practitioners. Solutions to these shortages include increasing opportunities for international graduates, adopting new practice models to enhance patient flow, further embracing technology, and encouraging healthcare workers to work more closely together (Collier, 2008).

Patients are experiencing the same frustration that healthcare professionals are. The lack of administration, available medical technicians and health professionals, and key resources increases wait times for access to beds in healthcare facilities and for access to practitioners and diagnostic tests, and curbs healthcare efficiency (Prentice, 2007). According to the Wait Time Alliance, a coalition working under the Canadian Medical Association (CMA), creating a workforce that meets current Canadian demands is a first step in resolving the consequences of an inadequate system (Howell, 2008). Howell (2008) also touches on the impending issue of current practitioners who are approaching the age of retirement; one in five physicians are nearing retirement. The Canada Healthcare Providers Study (CIHI, 2006) determined that Canada had the highest percentage of individuals that needed to wait six days or more to see a physician out of the six countries surveyed. Canada also had the lowest percentage of individuals able to see a doctor within one day (CIHI, 2007). Delays will only increase as more specialists retire in the near future. Over one-third of Canadian medical specialists are over 55 and over 4,000 are already planning to retire (National Physician Survey, 2007). The Canadian Cardiovascular Society expects to see a decline in the number of its specialists within the next two decades (CIHI, 2006).

In 2005, physicians made up only 9% of Canada's workforce. Of this 9%, there was a roughly even split between specialists (4%) and family doctors and general practitioners (5%) (CIHI, 2008a). This suggests that the number of family doctors is also an issue. Both the number of specialists and the number of general practitioners are expected to decline over the next few years. Over 5 million Canadians went without a family doctor in 2004. The area of internal medicine alone will require 60 to 100 new recruits each year just to maintain the level of the current workforce, which presents an issue for Canadians as, on average, only 20 graduate each year (Howell, 2008).

A central issue regarding human resources management of medical care professionals is that there is no central agency responsible for setting policy and strategy for health human resources management in Canada. There is little data regarding the total number of specialists, and no comprehensive tracking system to alert Canadians when there are shortages (Howell, 2008). Romanow (2002) also described this shortage of information and recommended that

there be a national committee in Canada to gather information about recruitment, distribution, and remuneration of healthcare professionals. Kirby (2002) also suggested that more studies should be conducted on how to improve the productivity of healthcare professionals. This lack of knowledge leaves the Canadian government questioning the number of medical school openings and residency positions to fund. Howell (2008) also notes that no one organization has sole responsibility for providing up-to-date information for specialists. One suggestion is that the Canadian Medical Association or the Royal College of Physicians and Surgeons of Canada should undertake responsibility to provide up-to-date information, since manpower forecasts from specialist organizations are extremely vague, and do not reflect the true need for all specialists in Canada (Howell, 2008). As well, specialist associations themselves are encountering difficulties in producing forecasts for their own focus because of staff shortages, out-of-date materials, and poor funding.

ISSUES WITH KNOWLEDGE TRANSFER ACROSS BORDERS: FOREIGN-TRAINED MEDICAL PRACTITIONERS

Canada desperately needs new doctors to replace the large number of those in the baby boomer cohort that are beginning to retire; an unfortunate issue compounded by a medical system already strained by an aging population requiring increased medical attention, a lack of students graduating to practice, unequal distribution of doctors in remote areas, and doctors that choose to stop practicing. Canada needs a large number of new doctors, right now, just to meet the OECD average of 3.1 physicians per 1,000 population from its current 2.1 per 1,000 (OECD, 2009). Part of the problem with producing this many new professionals is that the Canadian medical education system "offers just over 2,400 first-year medical school slots annually, slightly more than seven per 100,000 people; by comparison, the U.K. has 13 openings per 100,000 people" (Kingston, 2008, p. 1). Recently, Ontario medical schools have adopted a policy that aims to assist foreign graduates who require language improvement and cultural integration before they can apply for Canadian residency training.

The issue of knowledge transfer is highlighted for Canadians studying abroad in Ireland. In 2004, there were approximately 400 Canadians enrolled in Irish medical schools where the language and cultural differences are small (Pole, 2004). If these Canadian-born students were to return to practice in Canada, they would be required to pass the same Medical Council of Canada examinations as graduates of Canadian schools, take in-training evaluations, and compete for residency training slots along with Canadian graduates. According to Dr. Jack McDonald (former president of the RCPSC) "virtually all still would like to return to Canada but there aren't residency training positions for them, so most end up in the United States" (as quoted in Pole, 2004, p.12). Unfortunately some deans of medicine feel that students with foreign undergraduate degrees (whether they are Canadian or not) should have access only to the "leftover" positions in the residency matching competition, lessening the chances that we will recapture these bright Canadian students (Pole, 2004). Thus, Canadian medical students who choose to study abroad (approximately 1,500 per year), must compete with foreign trained doctors for residency positions. This results in lower percentages of Canadian-born doctors (Maudsley, 1997).

The integration of foreign trained medical graduates into Canadian medicine can be improved by accrediting foreign schools that have similar and overlapping curriculums. The issue of integration is currently a provincial responsibility; however, it should be a target for national policy making. Chan (2002, p. 1102) noted that:

"We need a comprehensive, coordinated framework for health human resource planning. We must monitor trends every year, set plans more frequently, and continually fine-tune our policies on admissions, postgraduate training and foreign graduate intake. We must do a better job of anticipating future demand, identifying more efficient models of care and reducing inappropriate care."

In order to improve the supply of doctors, the federal government must assist the provincial governments with this responsibility.

One final criticism of the medical school system is its removal of rotating internship programs common to all medical students. The initial aim of rotating internships was to give students the necessary experience needed in order to make an informed decision about whether to specialize or become a general practitioner. Instead, in their third year of school, students must decide on a clinical specialty or career focus, in many cases without any experience in that particular medical field. It is difficult to make the transition from one specialty to another, and this contributes to the intense pressure and feelings of dissatisfaction that many young medical students report (Marshall, 1997).

INTERNAL ISSUES: SHORTAGES OF EQUIPMENT, FACILITIES, AND FUNDING

The Canadian healthcare professional shortage is further exacerbated by several other factors. For example, the CFIHP found that 63 per cent of Canadian physicians reported shortages of the latest medical and diagnostic equipment in their communities, and more than 70 per cent of Canadian physicians reported a shortage of hospital beds (Blendon et al., 2001). Half of Canadian physicians reported a shortage of home care, and more than 70 per cent reported shortages of long-term care and rehabilitation facilities. It appears that there is a general lack of funding for health care in Canada. Inadequate resources make it difficult for the already limited number of physicians to efficiently treat patients. Furthermore, the lack of facilities and funding may discourage new foreign and domestic medical graduates from practicing in Canada (Blendon et al., 2001).

A common arrangement regarding payment for healthcare services is the fee-for-services model in which healthcare providers receive a fee for each service they provide. However, an emerging method is the pay-for-performance system. In this model, healthcare providers and/or institutions are rewarded for meeting preset quality and efficiency standards. Currently, the concept of pay-for-performance in the healthcare system is relatively vague. Monetary incentive systems alone are not sufficient to retain even the most valuable physicians. This may be partially due to ethical values aside from the lure of monetary incentives. Physicians also value professional relationships, *esprit de corps*, camaraderie with coworkers, and recognition for their work (Lazarus, 2007).

Concerns about the work-life balance of healthcare staff will increase the difficulty of retention. Due to the nature of their jobs, overtime, and irregular shift work are often unavoidable. When preparing schedules, management should always take into consideration the healthcare professionals' physical and psychological well-being, and try to accommodate their personal needs. Lazarus (2007) suggests that management should constantly ensure that the healthcare staff's expectations are met. When asked about the solution for retaining healthcare staff, the president of Doctors Nova Scotia, Dr. Rhonda Church, concluded that "money is only part of the equation. Being part of a dynamic and positive environment is equally important" (quoted in Cardwell, 2007, p. 1).

Physicians themselves have also proposed several solutions for improving the quality of medical care in Canada. For example, improved use of new information technologies, such as

electronic medical records (EMRs) and electronic prescribing systems, would increase the number of patients physicians could assist by decreasing the amount of time spent looking for information or writing prescriptions. In 2001, only 17 to 24% of physicians said that they used these systems (CIHI, 2007). A study conducted in Alberta suggested that a major barrier to the implementation of EMRs is the physician's reluctance to take time away from their work to gain the appropriate training and technical support (Ludwick & Doucette, 2009). However, Ludwick and Doucette (2009) found that those who did invest the time to learn the system reported significant benefits to using EMRs. Additionally, a considerable number of Canadian physicians stated that the implementation of treatment guidelines or protocols would also be very useful (Blendon et al., 2001). Having the latest medical and technological equipment accessible is only half of the problem — the other half is using it effectively.

Additional internal pressures also affect healthcare providers' retention rates. Murrow, Nowak, and Hurst (2007) found that effective administration and presence of a positive culture are essential in motivating physicians to stay at their jobs. Sufficient support and infrastructure will help retain physicians, while inadequate facilities, out-dated technology, and inept personnel, both administrative and clinical, are influencing factors that contribute to leaving one's job (Lazarus, 2007). Healthcare institutions should construct valuable internal marketing programs that create positive environments in order to lower turnover rates. Similar to other organizations, management must continuously and actively listen to healthcare staff while conducting ongoing surveys, 360-degree assessments, and setting reliable goals. Providing healthcare staff with continued training, as well as the opportunity to further develop in their areas of interest, can be further motivation to stay in their job. Job descriptions and work environments must be stimulating and provide variety (Lazarus, 2007). The work of healthcare professionals must be challenging and inspiring.

TAKEN FOR GRANTED: WASTED HUMAN CAPITAL-THE IMPORTANCE OF FOREIGN-TRAINED PROFESSIONALS AND IMPLICATIONS OF BRAIN WASTE

Sheldon et al. (2008) illustrated that health care employees are leaving developing countries for greater economic opportunities offered by developed nations (for instance in the U.S., U.K., Canada, and Australia). The World Health Organization (WHO) recognizes that there are a limited number of educated healthcare professionals worldwide, and that competition for their knowledge and services is a global fight (WHO, 2008).

In recent years, a voluntary freeze in medical school funding and decreases in class sizes were based on the belief that the United States was facing a physician surplus in the coming years. Consequently, only one new medical school was founded between 1990 and 2003. In an attempt to gain control of ever-increasing medical costs, the Balanced Budget Act of 1997 froze the number of medical school graduates. This decision was particularly important because, at the time, population growth was accelerating (Sheldon et al., 2008). Even with fewer graduates and an increasing population, the supply of healthcare professionals was expected to be in line with demand. The 1975 Study of Surgical Services in the United States (SOSSUS) indicated that the existing surgeons would be sufficient to perform surgeries needed within the country. In 1989, the United States encountered an unexpected change; the committee for long-term planning uncovered a forecasted shortage of surgeons due to the aging population by the year 2000.

Barer and Stoddart (1991) caused a similar stir in the Canadian healthcare system. Their report examined the common deficiencies of the Canadian healthcare system and made suggestions for improvement. One influential recommendation was their proposal for the reduction of medical school enrolment by ten per cent in

order to keep the quantity of physicians in line with Canada's population. Additionally, Barer and Stoddart suggested decreasing both the number of provincially-funded post-graduate programs and Canada's reliance on foreign graduates. In 1992, these recommendations were accepted by the government (Esmail, 2006). Due to the application of these recommendations, Canada's physician per 1,000 population ratio reached a high of 2.2 in 1993 and has now flat-lined at 2.1, well below the international OECD average of 3.2 (OECD, 2009). Canada now faces the possibility of a prolonged physician shortage.

Changes to health care have relieved some of these issues and shortages as the scope of practice of non-physician clinicians has increased. Nurses can now write prescriptions in the United States, and many nurse practitioners assist in anaesthetics and midwifery, establishing careers in these field. However, non-physician healthcare workers cannot provide the critical services that, for instance, surgeons can. Additionally, there are other non-technical skills that require cultural specialization in order to meet the needs of a growing population of immigrants in North America, and particularly in Canada.

Choosing a healthcare professional with a similar cultural background can have profound impacts on one's treatment and satisfaction. Wang, Rosenberg and Lo (2008), in their study of immigrant mainland Chinese, illustrate the importance of the family physician who speaks the patients' first language. It should also be noted that since 1998 China is Canada's largest source of immigrants (Wang, Rosenberg & Lo, 2008). Since Canada currently employs public health care, payment is not an issue when choosing a family physician; patients instead seek a physician who both speaks their native language and is of the same ethnicity. An issue facing Toronto-area immigrants—resulting from their inability to speak one of the nation's first languages—is their subsequent inability to understand the Canadian healthcare system (Wang et al., 2008). Approximately 32% of new immigrants do not speak English. While Canadian hospitals do offer translation services, they do not provide primary health care, i.e. the general healthcare services and consultations that address the large majority of common illnesses or diseases. Canadian hospitals offer instead tertiary hospital services, the specialized care for a limited number of conditions. In contrast, hospitals in China do provide primary health care that eliminates the need for patients to seek out the services of a primary care physician.

Language and cultural barriers may also have a strong influence on the number of immigrants utilizing healthcare services, and the extent to which they seek them out. Difficulties understanding medical terminology along with different ways of interpreting symptoms influence their utilization of Canadian healthcare. A focus group of 15 mainland Chinese immigrants (Wang et al., 2008) indicated that of all factors, language was the most important for choosing a Chinese-speaking physician. The participants indicated that Canadian medical terminology was difficult to comprehend, and that they could communicate more effectively with a Chinese-speaking physician. Even among those who did not experience problems with differing dialects, none expressed interest in using an English-speaking physician. Participants indicated that they believed Taoism, the fundamental aspect of Chinese culture and medicine is better understood by a medical doctor from a similar culture. Concepts such as Yin/Yang and Chi influence the way symptoms are interpreted, and patients with backgrounds similar to their primary care physicians are better able to communicate their feelings. Chinese physicians also have a connection to traditional Chinese medicine in Toronto, and were able to refer their patients to traditional Chinese healers in herbal medicine and acupuncture that is more fitting in the Chinese culture. Traditional Chinese healers can also prescribe medicinal food, a mandate that Western practitioners do not have. Taking these factors into consideration, in 2005, Ontario man-

dated that Chinese medicinal healers were to be recognized as professionals and to be regulated by the *Regulated Health Professionals Act* (MPP Consultation Group on Traditional Chinese Medicine and Acupuncture, 2005). However, despite the evidence of a growing demand for diverse medical professionals, as well as an increased attempt to recruit and train them in Canada, there has been little progress towards actually increasing their prevalence.

This is not to say that Canada has not employed various strategies to recruit foreign medical experts into the country. Canadian provinces often rely on head-hunters to put together incentive packages to lure foreign medical experts to Canada, and also advertise in medical journals which foreign practitioners may read and consider. Such practices have been scrutinized as being ethically misguided, as many of the foreign medical professionals that Canada is able to recruit are from developing countries, that have an insufficient supply of doctors of their own (Cardwell,2007). During the 1980s and 1990s, Canadian recruiters targeted doctors in South Africa, and by the year 2000, there were approximately 1,545 physicians located predominantly in rural locations in British Columbia, Alberta, and Saskatchewan.

However, a majority of foreign trained physicians are never able to practice in Canada, a phenomenon referred to as "brain waste". University of Toronto sociologist Monica Boyd found in a study based on a 2001 census that of 5,400 foreign-trained physicians between the ages of 32 and 54 years, only 55% of them had occupations in Canada as physicians. She believed this was due to the exclusion of groups who traditionally have a more difficult time adapting to the high Canadian standards. For example, Eastern Europeans have a less than 66% chance of ever practicing (Boyd & Schellenberg, 2008).

Unfortunately, because these foreign candidates are profiled and stereotyped, some provinces have also been accused of systematically and indirectly discriminating in admittance practices for residency training. The ethical implications of such evidence have caused grassroots organizations to construct opposition forums that educate foreign-trained medical professionals about the difficulties that they will face due to Canada's archaic training system. Consequently, such forums encourage individuals not to emigrate to Canada. One such forum is www.NotCanada.com, which allows contributors to discuss personal stories, such as doctors who end up working in low-skilled jobs, wasting their talents, while developing negative perceptions of the Canadian government and society. Attracting foreign medical professionals to fill underserviced positions in Canada has a contradictory effect, since the recruitment does not actually materialize in an increase in practicing personnel. Instead, it may deter future medical professionals from migrating to Canada to practice.

Differences in language, communication, understanding of cultural norms, and culture shock, are often the most difficult barriers to overcome when an individual from a foreign culture is submerged into the host country. Although most countries educate their professionals in English comprehension, there is still a large culture gap, and often extensive training is needed to adapt to new surroundings (Andrew & Bates, 2000).

Many people perceive monetary benefits to be among the most influential for a Canadian-born medical professional in his/her decision of whether to practice in their home country. This is certainly true in some situations, but not all doctors and nurses feel this to be the case. There are many intrinsic rewards gained from community relationships that matter more to healthcare professionals than economic pay-offs. It is often the case that practicing in small towns fosters personal and community relationships, an intrinsic value cherished more than monetary influences. It is commonly observed that medical graduates from small towns are more likely to practice in rural areas (Goertzen, 2005). Unfortunately, it is also less likely that they will graduate, as underprepared

students from rural areas often face unrealistic expectations when medical schools compare them to different standards, resulting in lower completion rates within these groups. Consequently, the health field suffers a double loss: fewer positions are available for competent students capable of handling the challenging medical school environment, and the rural localities that desperately need medical professionals cannot recruit the graduates who are most likely to practice there (Goertzen, 2005). In light of practicing rural-physician scarcities, the medical school system has traditionally been inefficient in producing a sufficient number of rural health practitioners.

One initiative proposed to deal with these inefficiencies is the opening of medical schools that strictly target students who are more likely to practice in rural or underserviced areas after graduation. Human resources research should aim to detect individual differences in physician characteristics that draw them to different practicing areas, such as prior places of residence, age, marital status, and gender. Such findings would give the health field a better understanding of which types of tools to use for recruitment and retention of different medical graduates, as well as experienced doctors.

By opening schools that target rural candidates, shortages may be reduced as individuals from a rural background are more likely to practice in rural areas following graduation. One study focusing on rural family physicians practicing in Ontario, found that many factors influence a physician's decision about where to practice (Rourke, Incitti, Rourke, Leslie & Kennard, 2005). In particular, those who grow up in communities with a population of less than 10, 000 were significantly more likely to practice in rural communities (Rourke et al., 2005). Physicians with undergraduate clinical training in a rural area and those who take their residency training in a small community are also 2.46 times more likely to continue practicing in a rural area. Those who have post-graduate training of at least eight weeks in a rural area are more likely than others (about 2.17 times more) to continue their practice in a rural area (Rourke et.al., 2005).

LOCATION OF PRACTICE: URBAN OR RURAL?

Approximately 90% of Canada's population lives within several hundred kilometres of the American border; the remaining population is widely dispersed amongst rural areas. As previously noted, these rural communities suffer from a chronic shortage of family physicians. Medical staffing in these areas has generally been based on the idea that when a sufficient number of physicians are trained, and urban centers are adequately serviced, remaining physicians will trickle into less urban areas (Goertzen, 2005).

There are four fundamental factors that increase the likelihood that graduates will practice in rural areas (Goertzen, 2005). First, physicians with a rural background have a higher probability of serving in a rural area following graduation. The background and interests of his/her spouse can also affect the decision. The second factor encompasses appropriate undergraduate and postgraduate training for rural practice, especially practical training in a rural setting. The third dynamic is a personal attraction to the recreational, cultural, educational, and social opportunities available to the physician, spouse, and their children in a rural setting. For example, a physician may prefer opportunities to ski, swim, and hike within a few kilometres of home and work. Finally, the working conditions and remuneration for rural physicians must be adjusted accordingly. Rural settings require family physicians with a range of skills to handle patients in multiple locations, including offices, emergency departments, hospital wards, operating rooms, delivery rooms, and chronic care facilities. Dr. Eliseo Orrantia (2005), a family physician in the rural town of Marathon, Ontario, affirms that a supportive team of physicians, ongoing communication between

them, personal control over work schedules, and an internal governance agreement on an alternative payment plan, can reduce burnout or departure.

There is a fairly wide gap between available training positions in family medicine and the number of students who are willing to pursue family medicine. According to one study conducted by Wright, Scott, Woloschuk and Brennies (2004) only one-fifth of new medical students stated that family medicine was their first career choice. Although most students do not consider family medicine to be their first career choice, they agreed that there was a possibility for them to work in family medicine in the future. Additionally, older students educated in smaller communities were more concerned with maintaining a lifestyle outside of medical practice, were more likely to choose a career in family medicine, and were less likely to take a job in a hospital (Wright et al., 2004).

RESOLVING THE INTERNAL PROBLEM: UNEVEN DISTRIBUTION OF DOCTORS IN RURAL VERSUS URBAN AREAS

In response to the consistent shortage of Canadian-trained physicians and the discrimination faced by foreign-born medical graduates, Ontario, Quebec, and Manitoba have set up postgraduate training programs for international medical graduates. In 1992, British Columbia funded a program to license international medical graduates. Unfortunately, this program only provides two entry positions every year, and only 25 to 35 candidates are even eligible for this program. Additionally, most of these programs are only available to landed immigrant or foreign-born individuals possessing Canadian citizenship status.

Telehealth

Telehealth is the distribution of health-related information and services over short or long distances transmitted via telecommunications technology. It can be used for transferring patient information, such as diagnostic medical images and previous medical histories. It can also be used for diagnostic and treatment aspects of health, including video conferencing, that can transmit real-time images and information between medical specialists to analyze the condition of a patient, or provide consultation between rural and non-rural medical professionals or a physician and patient.

It has been one option that provincial governments have utilized in order to create a sense of collegiality and professional proximity between rural and non-rural medical professionals. The Quebec Ministry of Health and Social Services concluded in a Delphi study of nine expert physicians that telehealth is an effective method to improve the accessibility of health services in remote areas of Canada, as well as the recruitment and retention of practitioners (Duplantie, Gagnon, Fortin, & Landry, 2007). Distance barriers may otherwise limit communication between rural doctors and their medical peers, resulting in diminished collaboration with other medical professionals, their removal from mainstream academia, and consequently a lack of opportunities for professional development.

Telehealth was shown to have a positive effect on the recruitment and retention of remote/rural physicians, as it helps address the potentially deterring issues of limited communication and isolation, which contribute to rural doctor shortages (Duplantie et al., 2007). However, it should be noted that telehealth is not a substitution for access to medical specialists, and can make retention less likely and recruitment very difficult. Rural physicians must have stand-ins to relieve them from practice, while they are educated on new procedures and innovations in medicine. Additionally, technology is not a substitute for physical contact with other medical professionals, that, in and of itself, can lead rural health workers to feel isolated reducing the likelihood of retaining them (Duplantie, et al, 2007).

Recommendations

One possible recommendation is that medical schools should plan for future medical professional supply by taking into consideration the generalizations one can make about the current age cohort and its demographics, such as increased life expectancy and increased cultural diversity. Equality and diversity in the school system is greater than ever before; such inclusiveness must consider group differences in work values. Whereas the hardest working doctors have been said to be the oldest, these professionals come from a generation where people worked to live. Although a healthy challenge is important for personal development, today's generation tends to puts more importance on leisure time and time spent with their families. The highest concern for this new group is burnout and stress (Lazarus, 2007).

Gender is also an important consideration when planning for sufficient numbers of future doctors. The number of women in the medical profession, including historically male-dominated positions such as surgeons and specialists, is increasing in relative proportion to men. Some studies have concluded that females work on average less than male counterparts in terms of weekly hours and years (CIHI, 2007). The reasons for this can be inferred: women often still carry the burden of their household with them, and are still the predominant caregivers for their children, making the work-life balance a challenge.

As the Canadian government plans to upgrade immigration to help increase Canada's decreasing labour force, diversity will continue to increase. If foreign citizens are comforted by having the option to see a doctor of their own ethnicity, but cannot find one, or are sceptical of seeing a doctor who is not of their ethnicity, they may avoid visits altogether. Such an occurrence can lead to prolonged sickness, taxing their place of employment with unnecessarily lengthy sick pay, absenteeism, and lost productivity.

Lastly, medical school acceptance needs to be inclusive of rural-residing Canadians, increasing the likelihood that they will return to rural areas and creating a more equal physician distribution throughout Canada. With greater access to doctors, the strain on urban areas will be less, increasing the effectiveness and efficiency of the Canadian healthcare system.

CONCLUSION

Overall, the number of healthcare professionals is not sufficient to sustain an acceptable level of care for Canada's changing demographics. Cultural diversity, an aging population, and the distribution of medical access throughout Canada are issues that can be resolved with the assistance of effective human resources management. Wait-times, preferences for a physician with the same ethnic or cultural background, and the strains on urban doctors are issues to be addressed in the coming years. It is recommended to introduce a more culturally-sensitive medical admissions program that is inclusive of aspiring physicians from different countries, backgrounds, and cultures. Also, recruitment from rural areas can help solve inequality in the distribution and access to medical care. Finally, investments in developing new secondary resources, such as administrative and technical staff and knowledge-sharing activities using computer technology can assist in retention of doctors where they are most needed.

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Chapter 18
Integration of Predated Notifications of Personal Actions for HR-Planning in ERP-Systems

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ABSTRACT

This chapter intends to reveal the benefit of predated notifications of personal actions for HR-planning and discusses the interrelated demands on ERP-systems. If e-government is implemented, one has to think of rearranging the government's HR-structure in order to adapt to the new circumstances, too. This means to take advantage of modern HR-methodology in order to become more efficient in HR-administration. One possible way in improving human resource management (HRM) is using predated notifications of personal actions for HR-planning. Human resource planning (HR-planning) is a component of strategic enterprise planning. It is fully integrated into the enterprise-wide planning process, because HR-planning is not only determined by other planning areas, but it also determines them vice versa. So the more precisely and comprehensively HR-planning is done, the more accurate derived key figures, which are used in other planning areas, can be. Governments usually deal with a huge amount of personnel, so HR is one of the main tasks in administration. Predated notifications of personal actions usually are known in present, but will be started in the future. In contrast to planning a personnel action the predated one will take place with the highest possible probability. An example for making the difference more clear may be an employee's retirement. It does not stringently depend on the employee's age, but rather on the person's individual decision to retire. As a general rule, an employee's intention to retire is already known about half a year before it takes place. If this information is used in the planning process, the company will have enough time to estimate the loss of knowledge or the cost-savings that will be caused by the employee's withdrawal. In huge companies, HRM typically is supported by ERP-

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systems. The functionality offered by the software depends on the company's needs and may range from a simple keeping of personnel data to a complex module called human capital management, which is used for payroll accounting, talent management, employee self services, and many more. If the decision-making body considers the company's personnel as business critical, a lot of employee-related data is collected and analyzed, ranging from master data to planning key figures. This chapter will emphasize the importance of efficient HR-planning for governments in order to improve their business processes. It can be seen as one of the goals of e-government. It will be pointed out how HR-planning can be improved by using predated notifications of personal actions, so that HR-divisions in governments can use advanced HR-planning right on from the beginning when preparing themselves for e-government.

INTRODUCTION

E-Government has been invented in order to improve governmental business processes with the help of information and communication technology (ICT). The main objectives are cost-reduction, increase of process-quality and lowering lead-time. But improvements do not have to focus on governmental business processes only. Governments will work more efficiently, if all administration tasks are optimized, too. And one of the main tasks in administration is HR-management. The optimization potential in the HR-sector can be imagined if one takes a look at how many full-time employees are deployed in the German Federal Land Nordrhein-Westfalen and its communes. The population living in Nordrhein-Westfalen in 2007 was about 18 millions of people (NRW, 2007). In 2007 there have been 188.425 employees with a full-time contract for administration tasks (NRW, 2008). For comparison, the Daimler AG in Germany producing Mercedes-Benz cars among others had 272.382 employees all over the world in 2007 (Daimler, 2008). An efficient human resource management is vital for companies as well as for governments, which act with view to offer a high-performance and high-quality governmental service at optimal cost. A more precise HR-planning will definitively lead to a more efficient use of personnel, no matter if governments or companies are concerned, as both have to face the same challenges in HRM.

With the need for a more precise enterprise-wide planning the HR-planning must be optimized, too. The improvement can be achieved by collecting and analyzing systematically pre-dated notifications of personal actions and using this data to enhance HR-planning. ERP-systems are applied to collect the actions that will take place in the future, so the data is fully integrated and can easily be used in the planning process. In the following the importance of pre-dated notifications of personal actions will be highlighted and it will be shown how the data can be used for an ERP-system-based HR-planning. The findings will lead to a better use of HR-resources, in governments and companies.

Thus, governments have the opportunity to make one more steps towards a higher sophisticated e-government through improvements in HR-management. Governments can have an effect on the efficiency of their HR-planning with the choice for an enhanced ERP-system and take advantage of a more efficient HR-planning-module and -process. When dealing with e-governmental readiness, it is necessary to emphasize that the customer-view (or citizen-view) is not the only perspective that has to be considered. This research indicates that the optimization of general administrative tasks in governmental business processes is one of the tasks governments must work at in order to become ready for e-government or to use e-government more intensively. And HR is one of these administrative tasks every government is

faced with. What is more, now and in future HR will become a vital division of governments, like IT and Financials. This research uses the awareness that HR has to be taken into consideration if a government or a company wants to improve it's HR-management and concentrates on a specific part of HR-planning and HR-controlling, the predated notifications of personal actions.

HUMAN RESOURCES PLANNING

Human resource management is defined by Scholz (Scholz, 2000) as "the systematical analysis, evaluation and organization of all personnel aspects in a company". The main task of HRM is deriving HR-goals from the company's strategic objectives and also assuring the achievement of these objectives (Drumm, 2006). HRM is more than just collecting personnel data. It must not be isolated from other business data used in the company, although personnel data often is considered as severely critical as far as privacy is concerned.

Looking at a company's manner when dealing with its employees one can suggest what kind of HR-philosophy is dominating. Saying it backwards, it means that HRM guidance is determined by HR-philosophy, which makes a statement about the importance of HR in the company (Müller-Christ, 2005). HRM may have different guidelines. It depends on the decision, whether the employees must be just administrated, or they are joint venturers, who expect a wide supply of services (Müller-Christ, 2005). As an example two different enterprise concepts will be presented. On the one hand a bakery with a lot of chain stores. This type of company needs to administrate a lot of homogenous, lowly trained employees. On the other hand a law firm with highly trained experts, who demand a service from the personnel office.

Human resources have to subordinate to strategic objectives in the same way as other divisions of the company (Schanz, 2000). The main objectives for HRM can be harmonized with HR-philosophy and derived from economic and social aims (Olfert, 2006). Although companies may differ from each other, they have to solve the same primary problems in HRM. Kossbiel specifies them as availability and effectivity of human resources (Kossbiel, 1994). A definition strongly influenced by functional economic thoughts says that the main objective of HRM is offering the required personnel in all sectors of the company, in the exact number, with best skills, at the right time and with regard to long-term profitability and objectives of both, the company and the employee (Freund 2003). Finally all this points to the conclusion, that HRM is an interdepartmental function, which affects all other sectors of the company. Simultaneously HRM aims for decentralized tendencies. Therefore coordination, communication and harmonization of strategic HR-objectives are vital to a sustainable success of the company (Reichard, 2001).

An important part of HRM is HR-planning. It includes all activities that are used for planning the quantity and quality as well as the personal actions, which have an impact on the HR-structure (Müller-Christ, 2005). Kolb says, HR-planning "is the systematic anticipation of future actions concerning a company's personnel" (Kolb 1998). The main objective is to assign strategic enterprise aims to HR and to prepare the personnel systematically for future requirements with the use of personal actions, so that the target achievement will be maximized (Schanz, 2000). Important constraints are given by the law, so that not all action alternatives may be permitted (Olfert, 2006). Finally the effectiveness and availability of human resources has to be maximized (Kossbiel, 1999).

HR-planning can be divided into quantitative and qualitative HR-planning, followed by the planning of personal actions. The whole process is known as the planning part of human resource management (HRM). Quantitative HR-planning deals with the number of employees or headcount (HDCNT) and the full time equivalent (FTE) in relation to time and space. Qualitative HR-

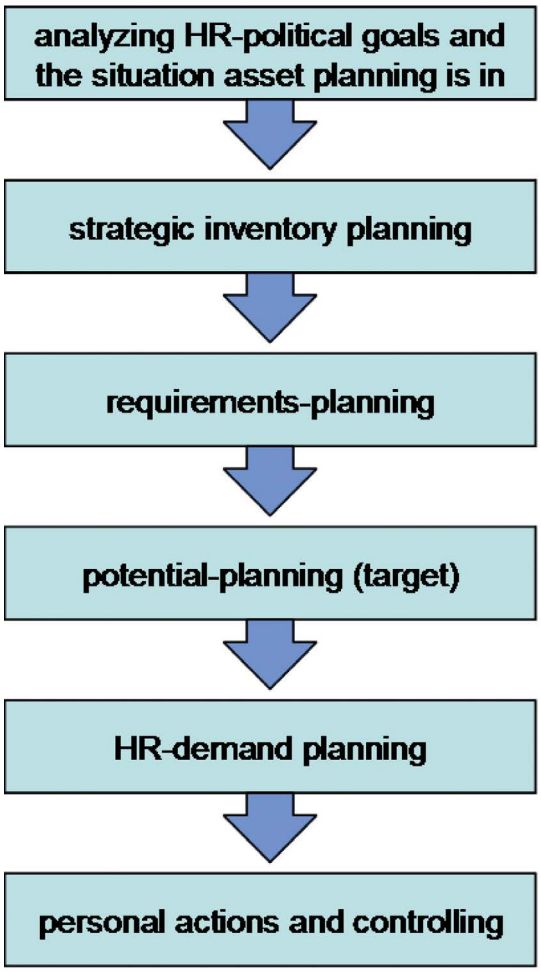
planning is about the employees' occupational aptitude, depending on time and space as well. Planning of personal actions means describing the process of turning the actual performance into the target performance as far as the personnel sector is concerned.

HR-planning is not just one activity; it is just an aggregation of many tasks. These tasks are planning the demand, the acquisition, application, development, leadership, disposal and the costs of HR, for example (Reichard, 2001). The different tasks are highly interlocked between each other, what leads to the conclusion that only an integrated and comprehensive view of the HR-sector can lead to the point (Albert, 2002). External and internal factors must be considered in the planning model in order to adapt objectives and actions to real world conditions (Drumm, 2006). A roadmap for HR-planning (see Figure 1) has been proposed by Müller-Christ (Müller-Christ, 2005).

With subject to HR-political guidelines the personnel inventory planning is prepared. Changes in the production-planning or recurrent events like the close of the second quarter are often the inducement for the HR-planning process. Besides pointing out the reason for starting to plan again, the identification of determining rules of the objects to be planned and constitution of planning parameters like planning horizon, factors, allocation base and the planning and estimation methods take place (Springer 2006).

When all basic conditions for the planning process are set, current and future HR-requirements can be listed and arranged into homogeneous task-groups (Springer 2006). Ideally each task in the company can be represented by a job by connecting the specification of service to a position in the organizational hierarchy (Jetter, 2003). Generally speaking the specification of service is dynamical and must be connected to a timeline, because it changes very often. Therefore it is suggestive to aggregate the specifications into time slots, in which they are unaltered (Edinger, 2008).

Figure 1. Roadmap for HR-planning



From the prepared data the qualitative and quantitative target-values can be derived. A statistical analysis of job descriptions provides an indication of how many employees have to work at what kind of job in the company. The number of employees usually is described in headcount (HDCNT) or full-time-equivalent (FTE), the quality of performance in the job is given by the required qualifications (Drumm, 2006). In HR-structures with homogenous descriptions of job performances the number of work places is estimated by statistical methods. Modelled on job descriptions the target value for the headcount is calculated for one or more points in time. For the

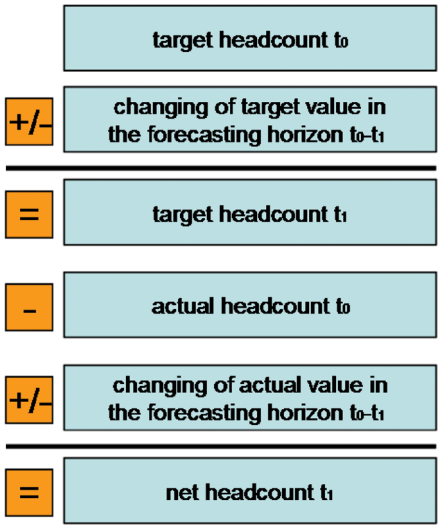
computation data from many sources, internal and external, is used, like work plans, job descriptions, absenteeism analysis and employment law (Scholz, 2000).

The way of how the target value for the headcount is computed is decisive to how the actual headcount has to be calculated. This is made for assuring the comparability of actual and target values and to develop and monitor personal actions, which have a stake in the actual headcount. The actual headcount represents the current HR-structure and is updated as well as the target headcount, because it is influenced not only by planned personal actions, but also by several factors (Olfert, 2006). Factors in detail are demographical changes, job training, changes in the work schedule, absenteeism and retirements (Schanz, 2000). In general these factors are known before they happen, so updating the actual headcount in advance is possible. Therefore in addition to the estimation of the actual HR-structure a prediction of how it will look like in the future and what kind of measures are needed to work against factors must take place (Reichard, 2001).

When the actual and target values for HR are computed, a comparison of the headcounts reveals how much employees are needed to achieve the company's objectives. Planning the demand determines how the actual HR-structure has to be changed in order to fulfil the company's requirements, in other words: how many employees with what kind of qualification are when and where needed to meet the production and performance plans (Schanz, 2000). Planning the demand is also called the pivotal unit of HRM (Müller-Christ, 2005). It is the fundament for the whole HR-planning and determines all other HR-sectors (Springer, 2006). Demand planning is connecting production and sales planning with HR-planning. It determines, if the number of employees has to be increased, decreased or unchanged in every division of the company, so that the personnel capacity is used with a maximum benefit in the short, middle and long term. Demand planning means not only to estimate the headcount that will be used productively, but also the amount of employees that serve as a buffer to compensate absenteeism (see Figure 2). What is more, the demand for replacement of existing jobs and filling new ones (or dismissing employees) has to be planned, too (Drumm, 2006).

In order to ensure the required headcount for the creation of value in the company measures have to be implemented to match actual and target values. Neither actual nor target headcount are constants, both can be changed using personal actions (Drumm, 2006). For example, the target headcount can be reduced by implementing more efficient production techniques. What personal action is applied to change the headcount depends on the objective and the action's characteristics. Characteristics are the type and intensity of the action, the costs and the period of time it affects the headcount. Secondary effects like influencing the employees' motivation must be evaluated, too, even if they are not intended. Not taking into consideration secondary effects can even lead into a devaluation of intangible assets

Figure 2. Computing the net demand (Adopted from Müller-Christ 2005)



(Jochmann, 2007). Hence a simulation of a personal action's effects is vital.

The results from demand planning are handed over to personnel acquisition (Springer 2006). All agreed personal actions must be monitored with the aid of key figures in order to make a prompt reaction to irregularities possible. Unexpected changes are most likely as all planning data is future dated and most of it has been only estimated. Thus expressive, subject-oriented key figures must be defined in advance. They replenish HRM through making a comprehensive view over HR-development in the whole company possible (Hentze, 1993).

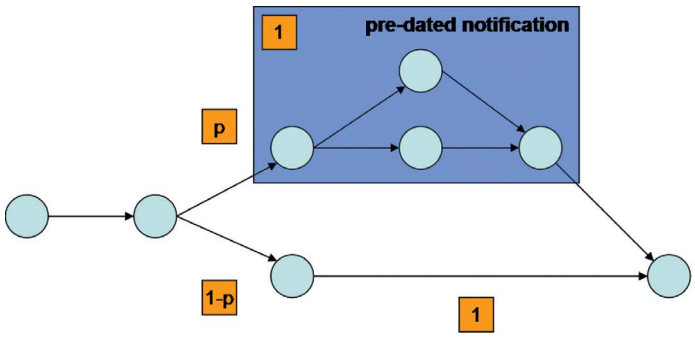
PRE-DATED NOTIFICATIONS OF PERSONAL ACTIONS

From the actual point of view future events can only be anticipated. If the level of abstraction is low enough, all statements about future evens are uncertain. The more precisely a future event is predicted; the more difficult it is to reach the objectives. Uncertainty for future events can be distinguished between two kinds: uncertainty if an event will occur and uncertainty what it will be like. In the quantity of all possible predictions about future events and their effects on HR pre-dated notifications of personal actions are those with the highest probability and very precise description of the effects that will take place when the action is executed. There is a clear cause-and-effect-chain when we talk about pre-dated notifications with a probability of occurrence of 1 (unity). Pre-dated notifications are no plan-values, but they affect them and thus are highly valuable for the HR-planning process.

A pre-dated notification is a future event with a maximum probability of occurrence, which is started with input-data and whose action has a deterministic effect on the environment. Actions can be executed simultaneously or sequentially, but they all have the probability of occurrence of 1 (unity). The cause-and-effect-chain and the probability can be modelled as a deterministic process, which can be implemented in any other decision process. Figure 3 illustrates a pre-dated personal action implementation in a decision tree. Furthermore, as many events can take place inside the process-chain of a pre-dated notification, it is not a Bernoulli experiment.

As pre-dated notifications are no planning values, they must be handled differently in creating scenarios, too. The accrual from planning happens through versioning: a plan can have many versions; pre-dated notifications have only one valid version. The action is started always under the same conditions and causes every time the same effects. Therefore, pre-dated actions are constant events in a planning process. Input-parameters and output-data make pre-dated per-

Figure 3. Pre-dated personal action implemented in a decision tree



sonal actions flexible, so that an implementation into different processes or even into dynamic scenarios is quite easy. The deterministic workflow guarantees a comparability of all planning versions with the same pre-dated notification of a personal action.

A pre-dated notification of personal actions is distinguished by a functional description of the starting events and the following effects on personal data. By this means a catalogue of personal actions can be created in order to define pre-dated notifications of personal actions correctly. Listing the complete input-data is vital, so that all uncertain values of parameters are excluded right from the beginning. The creation of a catalogue means also, that personal actions which are not mentioned inside this catalogue must not become a pre-dated notification of personal actions and must be regarded separately.

An employee's decision to change its full-time job into a part-time one will serve as an example for a pre-dated notification of a personal action. A correct pre-dated notification defines the employee, the beginning-date of the action and the new FTE. A false pre-dated notification of a personal action is entering a probable FTE and not the constant target value (see Table 1). This may happen if one wishes to emphasize that the employee still does not know, how much part-time he wants to do in the future.

Pre-dated notifications of personal actions are derived from personal actions, because in fact they are an anticipation of changes made to the HR-structure and have identical work flows. Therefore pre-dated notifications can be turned into a personal action without making any severe change to the process or the existing data. The main characteristic is the fact that pre-dated notifications are not approved yet and will not be turned into a productive event until the decision-maker decides it to become a regular personal action. This is the main difference: a personal action is turned into reality at once, a pre-dated one changes its status from pre-dated into productive or is copied and set productive. In terms of EPR-systems this means, that the date difference between entry-date and beginning date indicates, if the personal action was pre-dated or not. None or a small difference indicates that there is no pre-dated notification of personal actions. But regular personal actions cannot be analyzed later easily, because one has to inspect the beginning-date and the entry-date to identify a pre-dated notification, what will become very complex in modern ERP-systems, as the entry-date is not a common data field for functional (i.e. HR) analytics. And if the entry-date is higher than the beginning date, we talk about personal actions that were started retroactively, because one has forgotten to execute them in the right time, for instance. These actions may not be considered as pre-dated as well. What is more, not all personal actions are in the catalogue of pre-dated notifications. Finally, using only the entry-date and the beginning-date is not suitable to identify pre-dated notifications.

Like personal actions pre-dated notifications are approved by the HR-division in advance. The decision making process with the HR-division, the managers and the affected employees as key players usually has successfully ended before. Although the process takes more time when

Table 1. Correct and false pre-dated personal action

	employee	personal action	Beginning	new FTE
correct pre-dated personal action	10000001	work-time reduction	01.01.2008	=0,5
false pre-dated personal action	10000001	work-time reduction	01.01.2008	=(0,5*0,8)+(0,62*(1-0,8))

Table 2. Pre-dated personal actions

personal action	description
Employment	A person becomes an employee. Usually the decision has been made months before the action takes place.
Dismissal	An employee leaves the company at a point in time in the future. More often than not this is known a few months before the employee is dismissed.
Retirement	An employee leaves the company at a point in time in future and will get a retirement pay from that date on. Usually a retirement is known about one year before.
training course	An employee will take part in a professional training. Although this is not mandatory a personal action, it may be worth analyzing it together with personal actions.
organizational change	An employee is being relocated in future. This action has to be prepared carefully, so it is known a few months before.
take-over of trainees	A trainee has been doing well during his apprenticeship and will be taken over. Often one can make this decision before the trainee has written his final exam.
partial retirement	An employee wishes to take part in a partial retirement program. The beginning date is know years before, as the contract has to be changed completely for that purpose. The working-phase and the retirement-phase typically take five and more years.
maternity leave	The employee will become inactive for a period of time, or he will be active again. The time period is known before about half a year.
Salary change	An employee's salary has to be changed, because he will take part in a project team, what for he will earn more money.

all affected actors are involved, this procedure assures that the pre-dated notification will take place with a maximum probability and does not has to be reversed. An exemplary set of personal actions shows (see Table 2) what kind of actions can suite as pre-dated notifications.

How much value is added by the successful implementation of pre-dated notifications depends on how many personal actions are started in the company on average. If there are only a few employees, the number of personal actions will be low and no methodical collection of this data is needed. Objectives provided by the top-management of a small company are very detailed and the data the management uses is almost completely operative. Most personal actions are decided directly by the CEO and included into the plans, whereby an analysis of pre-dated notifications of personal actions is not of interest. But if a company has so many employees, that it applies decentralized management techniques, the organizational distance between the decision-makers and the basic staff is big enough to turn pre-dated notifications into useful information.

The benefit for HR-planning is the opportunity to improve the updated actual values and to analyze pre-dated notifications of personal actions in order to make predictions about the number of pre-dated personal actions in the future. Clear-cut information about changes in headcount and the employees' master data are highly planning relevant, because they are as precise as the existing personal master data. Thus they can be analyzed in the same way and the same level of detail as existing data collected in the past and can be used for HR-planning without any constraint. The integration factor is most important: using pre-dated notifications of personal actions one can exactly predict how an employee's master data will be affected. This information can be used for example to forecast the loss of know-how through the dismissal of an employee before he really leaves the company. Thereby the HR-division is able to start counter measures, so that the loss of knowledge will be compensated in the organizational unit. In a more complex scenario all effects of the dismissal can be simulated like cost-changes, different span of control, organi-

zational effects, qualification profiles, changes in absenteeism or even the contribution to profit. If pre-dated notifications are analyzed through a longer period, trends can be educed from the collected data, which can be used to make even the target values more accurate and an evaluation of how many pre-dated notifications really became personal actions.

Using pre-dated notifications of personal actions for operative analysis is possible, too. Career planning, for example, can be monitored with the use of data gained from pre-dated notifications. The according personal actions are organizational changes, changes in contract or professional training. If these pre-dated notifications are considered, an employee will be asked to join conferences which will be useful for his career. The other way around one could monitor whether an employee is still developing his skills and moving forward his career by analyzing his pre-dated notifications of personal actions. This offers the opportunity for the HR-division to act before too much time has passed and it will be too late for any action.

INTEGRATION OF PRE-DATED NOTIFICATIONS OF PERSONAL ACTIONS INTO ERP-SYSTEMS

Today's companies use ERP-systems in order to support the main divisions like financials, material management or HR. The more sophisticated the software is, the more functions it offers. In the majority of cases an ERP-system's HR-component offers master data collection, payroll accounting and computation of personal actions. Superior software offers even routines for HR-planning and employee self-services (Haßmann, 2003).

A HR-module's level of complexity depends on a company's demands. The more challenging the demands are, the more complex the software is. ERP-systems like the SAP ECC 6.0 HCM-module offer the function to enter personal actions and to execute them, what finally gives way to make the system change an employee's master data (Edinger, 2008).

Changes in data mostly result from so-called personal actions, which are implemented in programming routines. These routines use input-data, compute the data according to the selected personal action and generate output-data. So it is a complex program that causes changes of the data in the data base. Although most of the personal actions needed by HR-administrators are already available in the software in terms of ready-to-use routines and functions, they are rarely used to record pre-dated notifications of personal actions. More often than not the only data that implicates a future action is the valid-from-date of the personal action. What is more, employee-self-services (ESS) have to be used more intensively in order to reduce administration tasks as far as pre-dated notifications are concerned.

The capture of pre-dated notifications of personal actions must be identical with the collection of personal actions in order to use the data comprehensively for HR-planning. The only difference in the records is a label that identifies them as pre-dated notifications of personal actions. But data that belongs to pre-dated notifications must not have any impact on productive processes, the payroll accounting for instance. Although pre-dated notifications are events that will happen almost for sure, the data must be stored separately and the actions must not be applied to productive data until the process has been approved by the management.

Pre-dated notifications can be collected manually or generated automatically by the system. The advantage of manual input of data is the precision and the complete supervision over the process and the data. Disadvantages are not only the manual effort, but the more complex workflow and the appointment of the dates. If the process is not reliable enough, events may not be recorded correctly and thus personal actions will be incorrect. Automatic collection of data and pre-dated notifications on the other hand is suitable only

if the events require almost the same data and have an identical process every time. Thus flexibility is low or will cause a much more complex process, if it has to be guaranteed. But in some cases like taking over trainees or the retirement of an employee automatic generation of pre-dated notifications may be easy to implement.

Pre-dated notifications of personal actions must be converted into real personal actions without any barriers, so that the manual effort gets as low as possible. Ideally a reminder exists, which provides information to a clerk in the HR-division about pre-dated notifications, which will be actual soon. The system can also generate suggestions for personal actions to be started like the replacement of a job position. A workflow-integration could suite perfectly here. When applying a pre-dated notification the data record should be copied, and not changed. This procedure ensures that pre-dated notifications can be differed from regular personal actions and analyzed later on.

If a pre-dated notification is not to be activated, the data should not be deleted from the system. The records can be used to evaluate how many pre-dated notifications were turned into productive personal actions in the past. This monitoring will provide information about how reliable pre-dated notifications really are.

Today large-scale enterprises use a data warehouse for enterprise-wide reporting. The newest trend is to integrate planning functions into the data warehouse. Even existing planning routines are transferred from the ERP-system to the data warehouse in order to generate scenarios and to make plans on a higher scale. In this case redundancy may be eliminated through service-oriented-application-programming. The programming routines needed for planning functions are offered by a service, which runs on the ERP-system and computes values for the data warehouse, which calls it, for instance. However it should be examined if all functions are needed to be transferred to a data warehouse.

FUTURE TRENDS

Today personal actions usually are collected and maintained by the HR-division. It is a service the HR-division offers to the company's employees. This will certainly change soon. With employee self-services and delegated HR-planning a new approach has been started, which will lead into a decrease of personnel maintaining personal actions and master data. These administrative tasks will be taken over by the employees themselves or the mid-level management. Like employee self-services, which made HRM more efficient and cost-optimized, personal actions will be the next outsourced task. In future the HR-division will only authorize personal actions; the employees will deal with the maintenance themselves.

Many surveys described how positive the impact by ESS on HRM is. Costs for Standard HR-processes will decrease by up to 50%, personnel needed for administration tasks will be reduced by up to 40% (CEDAR, 2002) and lead time will be reduced by up to 50% (Hunter Group, 2000). With these KPI-values it is only a matter of time until personal actions will be delegated, too.

The HR-module is an essential component of an ERP- and also of a governance system. It is not only an operational system, but also a data source for reporting systems like data warehouses. Future trends in e-government analytics indicate the necessity of a data warehouse-based reporting for statistical analysis and data mining (Nandan and Gopi Chand, 2007; Sharma, 2008). This kind of reporting will use HR-data, too. As reporting becomes more and more transparent, especially in e-governance, data quality is most important. It is obvious, that the higher the data quality is, the more precise reports and analyses will be. In case of e-governance many of the reports concerning the government are public, so especially in this case reports must be reliable, transparent and updated. And public interests focus on how efficient the work is done, too. An enhanced HR-planning will contribute to this very well.

CONCLUSION

There cannot be a single answer for challenges of today's governmental processes. E-Government is just one measure of many. What is more, the implementation of e-Government forces to adapt all other structures in the government to the new strategy, ICT and HR for example. As far as HR is concerned it is necessary to analyse the HR-structure in governmental departments and anticipate changes that will take place because of e-Government.

The implementation of e-Government will lead to different requirements: on the one hand many jobs will become dispensable, because the work can be done more efficiently with less effort; on the other hand the employees will be faced with a broader field of activity, i.e. dealing with an enterprise portal and workflows.

The government's HR-system must meet all the requirements which result from the suddenly dynamic structure in business processes and job descriptions. If a new HR-system will be introduced in HR-division of a government, it will be one of the few leading vendors. This assumption results from the fact, that the headcount in a government will be more than 100.000 employees (see 188.425 employees with a full-time contract for administration tasks in the German Federal Land Nordrhein-Westfalen (NRW, 2008). This amount of people necessitates a powerful HR-system.

When evaluating the different systems available on the market, one should also take the ability to deal with pre-dated notification of personal actions into consideration. The significance of pre-dated notifications of personal actions for HR-planning is high enough to be considered seriously. In the planning process they improve the target values because the data added to the process is comprehensive and precise. Thereby the operative processes are supported very well and tendencies can be recognized early.

Pre-dated notifications are usually known some time before they shall take place, but they are rarely used for the planning process. Standard ERP-systems do not offer the function to work with pre-dated notifications of personal actions. The planning process, which is supported by ERP-systems, thus is not enhanced by the data from pre-dated notifications. But the data would be very useful, as it can be fully integrated into the data model without great efforts, because pre-dated notifications of personal actions are quite similar to existing personal actions. On the contrary the information about pre-dated notifications is used in reports and planning processes. But the source for the data is not the integrated ERP-system, but a bunch of Excel-sheets. The process is not integrated as well and becomes very error-prone. The effort to consolidate the data is enormous in this case, even if the planning is done only once a year. Finally this will lead to not regarding the data from pre-dated notifications as important anymore.

Thereby the benefit of integrated pre-dated notifications is often higher than assumed by the IT-director. Even if the planning values for headcount gets about 30 FTE more precise, with an average earning of 50.000€ (employer's share for social insurance included) the saved costs are 1.500.000€ high. If we take a look at more expensive job titles on the executive levels the cost savings will be much higher, projects will run better and will not be delayed because of the leak of information about personal actions.

ERP-systems as the central software product in a corporate information systems landscape must offer the option to use pre-dated notifications of personal actions. The benefit for the customer is much higher than the costs to implement the functionality. Governments wanting to become ready for e-government should also take a close look at the ERP-system they want to introduce and find out if it supports pre-dated notifications of personal actions when building up or improving their HR-management system. What is more, the organizational structures have to be prepared for an enhanced HR-controlling and HR-planning,

because an ERP-system is not a final solution, but only a tool which makes efficient HR-management possible. Not until the business processes are redesigned and set up-to-date, governments will be completely ready for e-government.

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KEY TERMS AND DEFINITIONS

Employee Self-Services (ESS): Employee self-services have been invented in order to make HR-administration more efficient by transferring administrative workload to the employees. Commonly an enterprise portal is used as user interface, which is directly connected to the database. Employees are allowed to maintain certain master data themselves, like address or vacancy-dates. ESS made administrative HR-processes faster up to 50% (Hunter Group, 2000).

Human Resource Management (HRM): Human resource management is defined by Scholz (Scholz, 2000) as "the systematical analysis, evaluation and organization of all personnel aspects in a company". The main task of HRM is deriving HR-goals from the company's strategic objectives and also assuring the achievement of these objectives (Drumm, 2006).

Human Resource Planning (HR-planning): HR-planning is an important part of HRM. It includes all activities that are used for planning the quantity and quality as well as the personal actions, which have an impact on the HR-structure (Müller-Christ, 2005). Kolb says, HR-planning "is the systematic anticipation of future actions concerning a company's personnel" (Kolb, 1998:pp#). The main objective is to assign strategic enterprise aims to HR and to prepare the personnel systematically for future requirements with the use of personal actions, so that the target achievement will be maximized (Schanz, 2000). Important constraints are given by the law, so that not all action alternatives may be permitted (Olfert, 2006). Finally the effectivity and availability of human resources has to be maximized (Kossbiel, 1999).

Personal Actions: Personal actions are a bunch of functions to change data in a database consistently. They are implemented in programming routines. These routines use input-data, compute the data according to the selected personal action and generate output-data.

Pre-Dated Notification: A pre-dated notification is a future event with a maximum probability of occurrence, which is started with input-data and whose action has a deterministic effect on the environment. Actions can be executed simultaneously or sequentially, but they all have the probability of occurrence of 1 (unity).

Time Slot for Master Data: An employee's master data often changes in a period of time. This can be his address or bank account number, but also his assignment to an organisational unit or his status. For time-dependency each dataset has a valid-from and a valid-to date. Time slots define the temporal validity of master data restricted by the valid-from and valid-to date of each dataset.

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Chapter 19
Human Resource Related Problems in Agile and Traditional Software Project Process Models

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ABSTRACT

This paper explores the impacts associated with different software process models on the staff. The main research question addressed is whether any process model leads to a higher satisfaction of staff, and less human resource related problems, including staff turnover or increased stress levels. This issue is empirically investigated using a set of projects from 15 different software developing companies. Agile-oriented models are not necessarily limited to small projects, but both groups showed nearly identical distributions for team size and duration. Interestingly, rigid-type models tend to exhibit higher effort estimations, and lower correctness in these estimations. Also customer satisfaction is slightly lower. With regard to human resource issues, the differences are not major overall, but there are some noticeable exceptions. In general, satisfaction and acceptance are higher at lower stress and overtime levels for agile-type project participants, but, interestingly and contrary to theory, people wish for more responsibility. Agile-type projects also enjoy some advantages in information sharing and communication, and in some quality aspects. Rigid-type projects show considerable higher abilities to cope with absence of personnel.

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INTRODUCTION

Software development is, above all, a task performed by human beings. Nevertheless, human factors and human resource management have not been a major issue in the context of software engineering and software development, with some notable exceptions (Brooks, 1999; DeMarco & Lister, 1999; DeMarco, 2002; Cherry & Robillard, 2008; Good & Romero, 2008; Tenenberg, 2008). In this paper, we will explore the impacts associated with different software process models on the staff. With this term, we subsume all people directly involved in the respective projects, and therefore include analysts, programmers, management and others.

The main research question addressed is whether any process model leads to a higher satisfaction of staff, and less human resource related problems, including staff turnover or increased stress levels. Naturally, impacts of staff satisfaction on the quality of the final product, and on efficiency and effectiveness of work should not be underestimated. For example, eXtreme Programing (XP) explicitly has a "no overtime" rule designed to maintain spirit and motivation (Beck, 1999). We addressed this question with a literature review on human resource related topics in software development, and an empirical study. The empirical study included interviews with a number of project participants, mostly project managers from different software developing companies.

The outline of the paper is as follows: We will start with a literature review which covers the types of software process models included in our study, as well as possible human resource related problems and prior research on the intersection of both issues. Then we will detail the empirical study undertaken, starting with a description of the methodology, followed by the results themselves. The paper closes with discussion and directions for future research.

LITERATURE REVIEW

Process Models in Software Development

The concept of a process model in software development is still not uniformly defined, and some of the approaches to be found in the literature are not detailed enough to be called a full-blown process model. The basic idea we will use is that a process model contains a list of time-successive steps in a problem-solving process, thus constituting a guideline for developing software, structuring the overall project, helping in achieving goals including quality levels, and aiding in planning, controlling and monitoring (Liu et al., 2008). Also a process model helps in giving a common understanding to all involved parties, and defining clear interfaces between different tasks. Process models also gain special importance in multi-project management (Demirkan & Nichols, 2008).

In the literature, a plethora of approaches can be found including the V-model, SA/SD, XP, Scrum and many more. Although they are difficult to group, for this paper we will adopt a widespread differentiation between those models which are of a more consecutive, waterfall-based nature (Royce, 1970) like V-model or SA/SD, for which Syed-Abdullah et al. (2006) also use the term designed-based approaches, and those which show more prototyping, spiral-oriented features (Boehm, 1988). This last group is currently primarily embodied by agile approaches like Scrum or XP, which are based on the Agile Manifesto. This holds as central tenant that both the business and technology environment continue to change at an increasing pace. Therefore the main question to be addressed is how to better handle these changes, not stop them early in the life cycle by anticipating them all, while still aiming at achieving high quality and timeliness. A focal point therefore is the flexibility that is to be ensured (Ollson, 2008). This leads to a set of principles, which value individuals and interactions over processes and tools, work-

ing software over comprehensive documentation, customer collaboration over contract negotiation, and responding to change over following a plan, while explicitly acknowledging the value of the items on the right. While all the instruments of more process- and planning-oriented methods are recognized as useful, they are the ones seen as needing to give in problematic situations.

Quite often, the right choice of model is a huge challenge. Lots of research has focused on comparing different models, and trying to determine in which contexts different approaches have merit or not (Boehm & Turner, 2003; Reifer, 2002; Stephens & Rosenberg, 2003). For example, agile approaches have faced a lot of criticism, one of them being that planning, processes and documentation are essential, and agile development is nothing more than an excuse for hackers to do as they like, coding away without planning or design (Rakitin, 2001). Another point of criticism is the reliance of agile methods on individual competency and craftsmanship, with participants working together in self-organizing teams even including members of other organizations, e.g. customers (Cockburn & Highsmith, 2001; Lindvall et al., 2002). It is argued that the number of developers possessing excellent technical knowledge paired with the necessary social skills is naturally limited. Also the possible size of agile development teams is discussed. While Cockburn and Highsmith (2001) cite successful projects with up to 250 people, other authors see a size limit in the area of 15 to 20 people. For any analysis, it is important to note that in many cases, a model is not used according to a certain book or source, but is tailored to fit a certain project (Garcia-Crespo et al., in press). Also the distinction between the types of process models as described above is not as distinct in practice many times. For our empirical study, we have therefore not used a binary variable, but a 6-grade Likert scale to rate between full agility and full rigidity. This is somewhat akin to what Boehm (2002) and Boehm and Turner (2003) have proposed and used in form of a continuum.

Human Resource Problems in Software Development

In all team-based settings, a series of problems can arise during work. The first determining factor in this is the selection of team members which can work together without major frictions (Reel, 1999), and to optimize cost, duration and risk (Tsai et al., 2003). Especially in the initial phases of a project, distribution of work packages is often the most pressing task, during which necessary communication phases are neglected. Main sources for team problems are in most cases deadlines, differing opinions on a factual level, personal difficulties among staff, opaque process steps and a lack of well-defined interfaces. Naturally, the end of a project puts the members of a team in most cases under the highest time pressure, and therefore results in mental phenomena such as mild irritability. For international projects also the mentality of different nationalities can play a major role in stressful situations, or even cause them. It is not always possible to keep every employee in the team, so some team members might need to get dismissed, which for projects is also often difficult due to accumulated experience and increased overall pressure. Sengupta et al. (1999) found that staffing and assimilation delays cause considerable problems for managers. Regarding time problems, two different aspects need to be considered: On the one hand, scheduled deadlines must be respected and, on the other hand, managers often have little time for the employees' needs. Managers are responsible for ensuring that milestones are met. If they also have very little time for the staff, and thus are not in good and permanent contact with the employees, they might become aware of any problems too late. In this research, we will focus on any such problems related to the staff. This includes the number of people reporting illnesses, especially before major milestones, the number of absences without valid excuse, any contract terminations by employees, employee satisfaction and complaints, cases of fake work

or refusal to work, interpersonal problems like boycotts of certain co-workers, using work assets for personal tasks or faking time sheets, errors, delays and quality problems, as well as employee motivation and stress level in general.

Process Models and Human Resource Related Effects

To date, there is not much research linking human resource related problems and the process models used in software development projects. The process model followed structures both the flow of work and also the different interactions, and thus can be hypothesized to have an impact on employees, their satisfaction and stress levels. For example, Cherry and Robillard (2008) empirically study ad-hoc collaborations which are spontaneous and mostly based on face-to-face communication. In agile approaches, these collaborations are much more pronounced than in traditional approaches, which mostly rely on documentation (Cherry & Robillard, 2008). It was found that these collaborations take significant time, but are rarely taken into consideration during task assignment. Nevertheless they are important for knowledge sharing. The increased presence of those interrupting collaborations in one type of process model could therefore increase satisfaction with knowledge transfer and social effects, but might increase stress levels due to neglect in task assignment and frequent interruptions. Jiang et al. (2003) also identify the organizational environment, like centralization and especially formalization, which can directly be linked to process models, as an important factor for team effectiveness. Tenenberg (2008) argues for institutional analysis of software development teams in the lens of collective action problems to uncover policies that enhance cooperative and restrict self-serving behaviour, the latter of which can lead to human resource related problems. In the conclusions, he directly links to agile processes.

In the most similar research to the one presented here linking human resource related problems to process model adopted, Syed-Abdullah et al. (2006) empirically analyzed the effects of agile methods, namely XP, on the well-being of a set of 17 development teams composed of undergraduate students. The main effects on well-being in general are job design, performance monitoring, human resource practices and team leader's support. They employed participative observation, as well as focus group interviews and questionnaires. Initial results show that XP has a positive effect on the level of enthusiasm (as opposed to depression) in the most dynamic project, but no statistical effects on anxiety – contentment. In another empirical paper, Pikkarainen et al. (2008) show that agile practices improve both informal and formal communication. While the use of SCRUM and some XP practices was found to facilitate team and organizational communication of the dependencies between product features and working tasks, the use of agile practices requires that the team and organization use also additional plan-driven practices to ensure the efficiency of external communication between all the actors of software development. Cohn and Ford (2003) detail their experiences in introducing an agile methodology (SCRUM) to organizations. They explain that in such cases, some developers actually resist, because they might enjoy creating non-code artifacts, or that they dislike the more frequent interactions with management. They also report cases where developers became overwhelmed by the freedom of not having a detailed plan governing their actions. In one case, a group of overly enthusiastic people adopting agile practices too quickly caused problems and frictions within the team. In some cases, the dissatisfaction even turned into complaints at the HR department with regard to how the project was managed. All of those effects either directly constitute human resource related problems, or might be the cause of stress or dissatisfaction.

Table 1. Demographic data on participating organizations

	N	Min.	Max.	Mean	Median
Age (years)	13	5	50	19.2	15
Number of employees	9	20	92000	21564.4	110
Number of countries active in	13	1	80	13.9	2
Turnover in 2008 (Mio. EUR)	4	3	11764	5298.9	4714

Additional empirical data on agile methodologies were reported by Sfetsos et al. (2006), based on interviews with 30 managers and developers from 15 Greek firms applying XP. Among other factors, they found communication and synergy between skilled personnel to be a significant success factor.

METHOD AND DATA SET

Methodology

For this empirical research, we used a set of 15 randomly selected companies in Austria. In this set, both smaller companies, but also large and multinational organizations are represented (see Table 1 for data on the organizations).

Within each company, an interview with one person, quite often a project manager, was performed. In all cases, the most recent project was used as reference. For this the project had to be completed or at least very near to its end. All data was anonymized before any analysis, no personal data about the interview partners were collected. The majority of the interviews was conducted live, one of them was done by telephone due to scheduling problems. The interview was a semi-structured one, using a guideline containing a set of closed questions and also several open questions to catch any comments not covered by the pre-conceived list. This mix was chosen so as to be able to have some quantitative analysis for common problems and attributes, while being able to capture more rich data in an interview setting, or to probe deeper in some cases. Therefore, we chose not to use a questionnaire and mail or e-mail it to possible respondents. The interview guidelines and scales were pre-tested once with an IT project manager, which resulted in small changes to the wording of some questions.

Most of the questions had to be rated on a 7-point Likert scale, using +3 to -3, with the endpoints question-specific. This form was mostly used for the questions pertaining to human resource related problems or motivational aspects, but also, e.g., for resulting customer satisfaction ratings. Of considerable importance was also the question for rating the process model itself, here a 6-point scale between very agile (1) and very rigid (6) was employed. As has been discussed above, process models are almost never used according to book, and are difficult to put in one simple category. This is somewhat similar to the continuum that Boehm (2002) and Boehm and Turner (2003) have used. For our data set, the majority of respondents classified their own process model as rather an agile one. That ratio is exactly 2:1. That means there were ten project managers that modeled their actions as rather agile and five classified the process model to be of a rather rigid nature. Only two project managers indicated that they have used a comprehensive process model as described in the literature, and in only two cases the extreme positions in the spectrum were selected. This underlines the importance of not sticking to binary categories, and published process models, but allowing for company and project specific variations. In an additional part of the interview, quantitative data

on the project, like size or duration, and also on results were collected.

For analysing the data, we try to establish in most cases a relationship between the process model adopted and the dependent variable, mostly ratings for human resource related issues. Descriptively, we report mean and median ratings for both groups. To test these for differences, we use the exact Wilcoxon rank sum test, which can deal with small sample sizes, and also with ties that are relatively frequent in this data set. In this approach, we use the classification into two groups (as can also be seen in Table 2). In a separate approach, we employ a series of univariate OLS regression analyses to establish in each case a simple linear model between the dependent variable considered, e.g. stress level, and the independent variable process model, and in that case use the full scale of six different levels which was employed to capture this data (see also Table 2). For these cases, we also check the non-parametric Spearman correlation coefficient.

Data Set

Table 2 gives a first overview of the data set and some project characteristics collected[1]. We will now continue to give some results on differences between the groups according to process models in general, while in the next section will be focusing on the human resource related problems.

The two groups did not show any major differences with regard to team size or duration (Wilcoxon rank sum test, $p > 0.1$), although the estimated effort was significantly higher for the rigid-type projects (Wilcoxon rank sum test, $p < 0.1$). While this is in accordance with the literature, which sees this type of process models in

Table 2. Data set of projects with characteristics

Group	Project	Process model	Team size	Duration (months)	Estimated effort (person-months)	Deviation in effort from estimate (percent)	Deviation in duration from plan (percent)	Customer satisfaction (7 point scale from +3 very high to -3 very low)
Agile	1	2	15	14	24.0	100	8	2
	2	1	12	12	23.5	0	0	3
	3	2	8	8	6.0	12	0	3
	4	3	4	3	5.0	10	5	2
	5	3	6	11	27.5	20	0	2
	6	3	6	10	18.0	-10	-10	1
	7	1	5	9	12.5	0	0	3
	8	2	8	5	4.8	0	20	2
	9	3	7	12	10.0	24	34	2
	10	3	10	7	22.5	10	14	2
	Mean	**2.4**	**8.2**	**9.1**	**15.4**	**16.6**	**7.1**	**2.2**
Rigid	11	5	10	6	40.0	0	0	3
	12	6	9	8	15.0	15	0	0
	13	4	5	5	25.0	12	20	2
	14	5	6	15	30.0	30	0	1
	15	5	8	8	15.0	100	30	2
	Mean	**5.0**	**7.6**	**8.4**	**25.0**	**31.4**	**12.5**	**1.6**

use for larger projects, and also needing higher effort due to their nature, the results for team size are more surprising. Theory would prescribe agile process models to be more suitable for smaller groups, which is still true in this dataset with a mean of about 8 persons, while more rigid models are employed in larger projects. This size is about equal to what Reifer (2002) found. This difference is not to be seen here. Regarding correctly estimating the effort, the result that agile projects seem to fare better is also surprising, as effort estimation in general will be more easy to perform in a rigid environment of fixed requirements, although the difference is statistically not significant (Wilcoxon rank sum test, $p > 0.1$). It is interesting, that those projects of rigid type which were finished on time seem to have been doing so at the expense of customer satisfaction: Exactly the two projects with this type of process model which finished on time scored lowest in this regard. The average customer satisfaction resulting from the agile models was at 2.2 (median 2) and the rigid models at 1.6 (median 2), which overall did not constitute a significant difference when comparing these two groups (Wilcoxon rank sum test, $p > 0.1$). Using the full scale of process models, the model adopted actually becomes a significant factor in a linear model using customer satisfaction as dependent variable ($p < 0.05$), with the model achieving an adjusted R^2 of 0.31. The factor stays in the model if other control variables like team size or total effort are added. Agile process models place a high value on customer satisfaction as well as early and continous inclusion of user representatives, which seems to affect the outcome as underlined by this empirical result. It was striking that with regard to the hierarchical structure of the project team all persons indicated a flat hierarchy, although according to theory, rigid models in general favor a hierarchical structure. Outside the team, very hierarchical forms were present in the organizations.

Regarding the age of team members in the projects of the two groups, again there is a small, but statistically not significant difference. In general, both types of projects have young and old employees working on them, which leads to results around the mean of 0 with the endpoint of the scales 3 very old, which was anchored at 50 years due to the industry conditions, and -3 very young at about 20-25 years of age. For rigid-type models, the mean value was 0.2 (median 0) and for agile-type models -0.8 (median -0.5), showing a small but insignificant difference (Wilcoxon rank sum test, $p > 0.1$). There could be several reasons for that, for example training received during education might give younger people more awareness and insight about agile methodologies, which leads to both them choosing such projects, and also being chosen for them. As an additional factor, agility and flexibility are more often associated with younger people, so this again might lead to both a selection and self-selection bias in project placement.

ANALYSIS

The main point of investigation for differences between the two groups of projects are diverse human resource related issues.

Acceptance and Responsibilities

As a major influence on this, and also in a way an outcome of exposure to the model in practice, is the acceptability of the model to the involved persons. In general, both types of model, agile and rigid, have a quite high acceptance rate, although agile models score somewhat higher: For rigid models, the acceptance rate was consistently 2 (on the -3 to +3 scale), for agile models straight 3 70% of the time, 20% scored 2, and one outlier of -1 existed (mean 2.4, median 3). Therefore, overall, agile-type process models seem to be more acceptable for team members (Wilcoxon rank sum test, $p < 0.05$), which would be in line with theory, as these models put more emphasis on team members, their

responsibilities, and several other aspects which should help to increase the morale. Responsibilities and wishes for changes in this area (i.e. mostly the wish for increased responsibility) were also inquired as separate topics. In theory, agile models propose concepts like shared responsibilities, collective code ownership and other related ideas, while rigid models advocate a more well-defined, small set of responsibilities for each team member. Interestingly, the results, although showing only a minor and not significant difference between both groups (Wilcoxon rank sum test, $p > 0.1$), display the opposite trend: In the mean, for the agile projects, -0.2 resulted (with -3 denoting no wishes for increased responsibilities, median 0.5), with -1 (median -2) for rigid models. Overall, as the numbers in absolute terms indicate, this is not a major problem in all projects, but the direction still seems interesting. One explanation could be that collective code ownership and similar concepts in agile development are either not fully implemented, or are too abstract for some people, who would prefer more clearly defined responsibilities. There is one additional explanation for this, which is derived from the personality of people chosen for agile projects. Possibly, developers with a higher propensity towards taking on responsibilities are selected, or self-select, to participate in this type of projects, but are still not satisfied with the level found there. In rigid-type projects, they would be even more displeased.

Sharing and Caring

Disclosure and transfer of information between different project participants seems to be working more efficiently in agile-type models. Although the values with -0.9 (median -1.5) and -1.6 (median -2) are not very far apart (Wilcoxon rank sum test, $p > 0.1$), the trend might indicate that agile models have a small advantages in achieving communication and cooperation within the project team. Also Pikkarainen et al. (2008) have shown that agile practices improve both informal and formal communication. Knowledge sharing within a project organisation is one of the most influential factor on success, and was found to be correlated to organisational culture (Ajmal, in press). While we did not directly take organisational culture into consideration, the development model and underlying values followed can be said to form an important part of this, and thus the results underline this. In a connected topic, it was also explored whether people cared about their colleagues beyond a work context, but no difference between the two groups were to be found regarding this (Wilcoxon rank sum test, $p > 0.1$), although theory again sometimes cites this as an advantage resulting from agile process models.

Human Resource Related Problems

The main block in our empirical research dealt with a long list of human resource related problems which can occur in software development projects, or mostly, in all projects. We will now take a look at whether some or all of these problems tend to turn up in one of the groups of projects according to adopted type of process model, and how well and easily they can be dealt it in that case. The first problem concerns team members' illnesses. In only one case, a major disorder turned up during the course of the project, all other illnesses were rather short-term. Neither in numbers nor in the counter-strategies a major difference between both groups of projects showed in the data (Wilcoxon rank sum test, $p > 0.1$). Strategies employed included redistribution of work, postponement of milestones or a reduced number of iterations (only for agile-oriented projects). While there was no major difference in these points, the impacts on the projects actually differed: For agile models, the impact on duration of the project was more severe (-1.1, median -2) than for rigid models (-2.4, median -3), where almost no delay resulted. Despite the difference, it is not statistically significant (Wilcoxon rank sum test, $p > 0.1$). While in theory this could be blamed on larger number of

manpower in rigid-type projects, this cannot be accepted as a reason in this dataset, as the mean size of the projects is quite similar between both groups. It seems as if rigid-type projects might be better able to deal with (temporary) loss of team members than agile models, although due to concepts like pair programming or collective code ownership, this should actually be the other way. The issue of absenteeism is negligible in general, because in the projects there were only sporadic absenteeisms and no striking differences between the two models. The same is true for all instances of refusal of work, like leaving work undone uncommented, fake work, threats of illness or similar: Those occurred in a small number of projects only, and there is no difference between the groups of projects considered (Wilcoxon rank sum test, $p > 0.1$). Also inter-personal problems within the team, like boycott of cooperation with certain colleagues, occurred only seldomly and without difference in both types of projects (Wilcoxon rank sum test, $p > 0.1$). No major problems with management or colleagues turned up in any project. Also other effects like deliberate damaging of resources, the wasteful use of company resources, the use of equipment for personal use and cheating in various events such as payroll or hours statements, were seldomly reported, and incidents do not show any connection to the process model (Wilcoxon rank sum test, $p > 0.1$). It can be noted at this point that using company equipment for personal tasks is not seen as a major problem by management. It is widely accepted that this happens to some degree, and is not judged to be problematic. Of course, it needs to be noted that some of these effects are quite severe, and there might be some inhibition to report those within a questionnaire or interview.

Quality and Errors

We also checked for differences in several quality-related aspects due to human resource problems. For instance, the quantity of errors as made by the team members is reported as not very low for both models. This is not seen as something very negative, with some interviewees mentioning that errors are a natural consequence of getting work done. Also, some errors are quite easily fixed in software development. Between the two types of process models, a small difference showed up, with advantages for agile methods: While the value for rigid models is slightly above 0 with 0.6 (median 1), thus leaning towards more errors, the value for the agile group is slightly negative with -0.5 (median 0), indicating a smaller probability of errors. In the OLS regression model, the adopted process model turns out to be a significant factor ($p < 0.05$, even if controlled for team size or total effort) as does the correlation coefficent (non-parametric Spearman, $p < 0.1$), underlining this relationship. Jiang et al. (2003) also have identified the organizational environment as a major factor in effectiveness. Of course this could also be caused by team member selection, as agile approaches are often deemed to need better people, which are therefore selected and thus have a smaller rate of errors. For the question of how often the results of the work do not meet quality requirements, there is no significant difference between the models, as is for forgetting important dates (Wilcoxon rank sum test, in both cases $p > 0.1$). A difference is found when the relationship between quality and quantity is investigated. The average value in relation to this issue has shown that rigid models have a worse outcome than agile models (mean of -0.2 with median 0 versus -1.2 and -1, respectively). A similar situation can be seen with regard to delivery on time, again showing advantages for the group of agile approaches, although the differences in both cases are not significant (Wilcoxon rank sum test, $p > 0.1$).

Stress and Satisfaction

A major factor for satisfaction within a project or work environment in general is the workload. Both too high a workload, which results in overtime

and stress situations, and too low a workload have been found to have detrimental effects. Complaints about both were relatively seldom in the projects in our sample, within both groups, the mean was -1.4 (median -1 respectively -2). With regard to stress and occurrences of overtime (as opposed to complaints), there is actually a difference between projects employing different process models: Stress is actually quite common, and more so in rigid-type projects. They have a mean of 1.6 (median 2), while agile projects only reach 0.8 (median 1). For overtime, the difference is even more pronounced, with mean and median 2.0 (rigid-type projects) against 0.5 with median 1 (agile-type projects). The second difference is statistically significant (Spearman correlation, $p < 0.1$, OLS regression, $p < 0.05$, even if controlled for team size). This underlines that some of the main ideas in agile models, including reasonable workload and "no overtime" rules are actually implemented, and counters the notion of Cherry and Robillard (2008) that more frequent informal collaborations might increase stress levels. Possibly resulting from this, both in motivation and performance, agile-type projects score slightly better than the other group of projects, but in both cases the differences are not statistically significant (Wilcoxon rank sum test, $p > 0.1$). An unusually sharp decrease in performance was, on the other hand, only found in agile-type projects on two counts. For one of those, a reason was given, which was frustration of an employee when he/she could not enforce his will. A more or less final stage for dissatisfied employees is the possibility to terminate the contract. This should therefore be taken as a serious sign of discomfort with the current work situation. In our dataset, such a threat nearly never was made by an employee, with the exception of one project from each of the two groups. These two projects were also the only ones where actual layoffs took place during the lifetime of the project. Therefore, no significant difference between the two types of process models can be seen in this regard (Wilcoxon rank sum test, $p > 0.1$).

Lastly, we used the answers to all human resource problem related question for arriving at an overall staff satisfaction measure. Due to lack of any weighting scheme to differentiate between questions (or any reliable way to arrive at such), all answers receive equal weight in the summation, using the mean result for each question. On this level, the results are actually quite good for both models, hinting at high overall satisfaction levels. For the complete list of 29 questions included, rigid-type projects had a sum of means of -43, agile-type of -44.3 (out of a possible maximum of -87). Again, a difference between both groups of projects can be seen, with an advantage for agile process models, but it is quite small.

CONCLUSION AND FUTURE RESEARCH

Results and Discussion

In this paper we have dealt with human resource related problems and issues in software development projects, and their relation to the adapted process model. We have used a classification to distinguish between two broad groups of models: More modern, agile approaches, and more traditional, rigid-oriented types. The empirical study has shown that indeed companies do not adopt models directly as proposed in the literature, but adapt and change for each project. Therefore, we are facing a continuum of process models according to this dimension of agility and rigidity, which makes it more difficult to arrive at statistically significant results. Using interviews with members of 15 different software developing companies in Austria, we have arrived at a data set of recent projects. Regarding project characteristics, it was interesting to see that agile-oriented models are not necessarily limited to small projects, but that both groups showed nearly identical distributions

for team size and duration, contrary to current mainstream assumptions (Boehm, 2002). Interestingly, rigid-type models tend to exhibit higher effort estimations, and lower correctness in these estimations. Also customer satisfaction is slightly lower, which would coincide with the literature which highlights the importance placed by agile models on customer satisfaction and inclusion, and the age of project participants is slightly higher. This last finding can be explained by different educational backgrounds, or psychological traits together with self-selection.

With regard to human resource issues, the differences are not major overall, but there are some noticeable exceptions: In general, satisfaction and acceptance are higher, confirming the findings of Syed-Abdullah et al. (2006), at lower stress and overtime levels for agile-type project participants. Agile models mostly have a no overtime rule, so this might seem intuitive, but Cherry and Robillard (2008) have hypothesized that the more frequent informal interactions could increase stress levels. Their notion was not supported by our findings.

On the other hand, interestingly and contrary to theory, people wish for more responsibility. There are some explanations for this last finding, one being that collective code ownership and similar concepts are either not fully implemented or too abstract for some people, and another being derived from the personality of people with a higher propensity towards taking on responsibilities being selected or self-selected for this type of projects, who are still not satisfied with the level found there. This might be likened to what Cohn and Ford (2003) experienced as over-enthusiasm. Agile-type projects also seem to enjoy some advantages in information sharing and communication, and in some quality aspects. Both of these ideas have already been proposed in literature (Jiang et al., 2003; Cherry & Robillard, 2008; Pikkarainen et al., 2008). Reifer (2002), for example, found similar quality levels, but not superior ones. On the other hand, rigid-type projects show considerable higher abilities to cope with absence of personnel.

Overall, therefore, both types of models have been found to be adopted in practice, but not to their full extent, but in slightly adapted, changed, and mostly moderated form. Companies seem to shy away from extremes in both cases, which seems to be a sensible choice given the results presented here. Both models have advantages and disadvantages, but neither are very pronounced. As expected, agile-oriented approaches achieve good results for some dimensions like stress or overtime, but show problems in other areas like responsibility or coping with employee absence. A good fit for a company and team would therefore enable to reap benefits from both ideas, and to withhold any major problems on the other hand. The managerial applicability of this research lies exactly in this trade-off which is a conscious decision of team leadership. Any decision on which process model to adopt needs to take these human resource related effects into consideration, in addition to other factors like cost or schedule.

Limitations and Further Research

Naturally, any empirical study always has some limitations, which also give impetus for further research. Of course, a larger data set, including a diverse population of projects would be interesting to explore. Still, we have tried to ensure the external validity by gathering data from a widely diverse set of small and large, old and young companies. Pre-testing of the questions and scales was employed to counter any problems with construct validity. As many questions pertain to problems easily measured in other ways, it is not assumed to be a major concern. For the overall satisfaction measure as a construct, validity would need to be ensured by a large-scale investigation of team members. Sadly, this was not possible. One main threat is internal validity, as it is possible that some of the results are influenced by a selection bias in staffing projects: Theory holds that agile approaches need more capable and highly motivated team members, so exactly those might possibly be

selected. This would lead to some of the results seen here, like better quality or less satisfaction with responsibilities, which in this case would not be due to process model, but personnel attributes and selection. The same effect could result out of self-selection, i.e. a certain type of person selecting projects or companies with a more agile-oriented approach. It would therefore certainly be worthwhile to include employee qualifications and abilities, or, even better, to study the same people in differently organized environments or projects. Naturally, this is a long term task, which nevertheless might yield very interesting and relevant results. It has also been found to be difficult to assess some human resource related problems like theft or cheating in time reporting, because these severe violations might carry penalties even much later on. Achieving a high level of trust would be paramount in getting truthful results for these areas. With regard to quality and customer satisfaction, it would also be interesting to include interviews with those different stakeholders and gather more, and more objective, information on this. With this paper, we hope to have given a first glimpse at the topic of human resource related topics in connection with process models employed, and we hope research on this is going to continue. After all, software development constitutes a major human effort, and addressing the participants' needs, concerns and problems would greatly enhance our knowledge about and ability to manage these efforts successfully.

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Chapter 20
Personnel Performance Appraisal Coverage in ITIL, COBIT and CMMi:
A Study from the Perspective of People-CMM

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ABSTRACT

Human capital is of paramount importance in the ICT industry. This paper analyses one of the elements which underlies effective management of human assets: performance assessment. This analysis uses the development of a common standard based on the tasks and processes outlined in People CMM, the standard in human resource management designed by the Software Engineering Institute. This framework is evaluated in different models related to IT Governance, such as COBIT and ITIL, as well as other related IT practices like CMMI for Development, CMMI for Acquisition, and CMMi-SVC. The results indicate that COBIT is the only framework that presents reliable coverage in relation to personnel performance assessment.

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1. INTRODUCTION

Human capital is key for the knowledge society. The advancement in techniques for personnel development has enabled the application of practices and processes which foster training and learning, improving the performance of individuals and groups. Studies of human capital (Schultz, 1959; Becker, 1964; Mincer, 1974) indicate that this asset is sustained in knowledge, and that this element provides individuals with increases in their cognitive abilities, leading to more productive and efficient potential activity. Drucker (1998) stated that knowledge is the most significant economic resource of a post-capitalist society. Thus, according to Bakry and Alfantookh (2010), building the knowledge culture is of increasing importance, not only because of its role in providing sound knowledge management and effective knowledge-based economic development, but also because of its support to environment protection, intercultural harmony and human well-being.

In this scenario, Knowledge Intensive Organizations (KOI) are, according to Starbuck (1992), those organizations in which "knowledge plays a more important role than any other of the inputs to an organization". In this environment, KOI, in which IT-related organizations are included, according to Hurley and Green (2005) require effective measurement techniques for the development of their employees, both from the perspective of knowledge as well as competency elements (aptitudes, attitudes, etc.). Human capital is particularly critical for competitiveness in high-tech sectors (Bartelsman et al., 2004). According to López-Fernández, Martín-Alcázar, and Romero-Fernández (2010), IT human resources are gaining importance in an environment more and more competitive and changeable. This circumstance has obliged an increase in the importance of human capital in general and its evaluation, in particular in different environments focused on the governing and management of ICT. In order to accurately analyze such elements, the current paper proposes a structured reflection of this research field, comparing the practices proposed in the state of the art with those models implemented in the ICT field. To include a more refined analysis, this paper outlines some recommendations for the inclusion of such practices in different models. Given that, according to Ruiz-Larrocha et al. (2011), IT standards (like ISO 27001, ITIL and COBIT) are available to assist organizations implement the appropriate programmes and controls to mitigate risks, knowing to what extent these standards covers performance appraisal could be helpful for managers and practitioners alike.

The remainder of the paper is organized as follows. The next section defines the state of the art about people assessment methods, as well as its components and principal implications. This is followed by the description evaluation framework. Subsequently, several ICT related initiatives are analyzed using the evaluation framework. Lastly, the paper presents the principal conclusions and future work of the study.

2. STATE OF THE ART

IT workers professional practice must be continually revised and improved in order to adapt workers' competences to technical innovations and soft skills to evolving markets (Casado-Lumbreras et al., 2009). Thus, in all industries, but more in particular in IT, one of the leading activities for managers is to discover to what degree workers are competent. In this scenario, the performance appraisal of human resources has been explored both from a theoretical and applied viewpoint.

The use of rating scales in performance evaluations is deeply rooted in the history of personnel psychology (Landy & Farr, 1980). However, performance appraisal is a delicate issue (Myloni, Harzing, & Mirza, 2004). Cole (2001, p. 798) defines performance appraisal as a formalized, systematic assessment and discussion of an employee's performance and his/her potential and

desire for development and training. In plain words, according to Chilton and Hardgrave (2004) performance is a term that is often used to refer to the degree to which an employee has executed his or her assigned duties. Appraisal practices often include formal review and feedback sessions, and may include procedures for establishing work objectives, conducting self-appraisals, and setting performance goals (Thurston & McNall, 2010). There are three approaches a manager can take in evaluating an individual employee: (1) effectiveness and productivity; (2) evaluation of traits; and (3) evaluation of behaviors (Latham & Wexley, 1977).

According to Curtis, Hefley, and Miller (2009), the role of performance appraisal as a part of performance management is primarily to record the results of performance for use as input to decisions about adjustments to compensation, personal development planning, staffing, promotion, and other workforce activities. In this way, performance appraisal is the central point for the collection of data which underlie decisions regarding the competency of human assets in their activities, requiring, on the one hand, the definition of the elements for comparison with established performance standards, and on the other hand, mechanisms put into place for the storage and exploitation of performance information.

On the other hand, poor management of human factors can hinder the use and effectiveness of technology and Information Systems (Ives & Olsen, 1984; Willcocks & Mason, 1988). Examining this aspect even further, performance management has been cited as a common cause of IS failure (Eastman, 1991; Legge, 1989; Seilheimer, 1987). According to Ball and Harris (1982) Information Systems personnel evaluation is the second most critical issue of IS management. Perhaps for this reason, the literature has discussed the difficulty of developing software systems and evaluating IT personnel in the organization for more than 40 years (Boyd et al., 2007). The different goals of the stakeholders lead to different courses of action and conflicting perspectives of this personnel performance (Linberg, 1999), the differences between the perception of the success of IT staff and the success of the standard user being one of the principal sources of disagreement, as exhibited by the evaluation (Jiang et al., 2001).

In this study domain, in one of the earliest studies of IT personnel performance, Arvey and Hoyle (1974) developed a behavioral expectation scale to measure the performance of systems analysts and programmers. Subsequent to this work, contributions by many other authors were made for the construction of a method of performance management (Igbaria & Wormley, 1992; Jiang, Sobo,l & Klein 2000; Chilton & Hardgrave, 2004). The applications of the performance measures proposed are focused on distinct objectives, such as the comparison of performance between contract versus permanent workers (Ang & Slauter, 2001), fit between individual characteristics and job characteristics (Ketler & Smith, 1993), assignment of personnel in software projects (Acuña & Juristo, 2004; Acuña et al., 2006), to cite some of the most significant cases. Concerning the elements which have been examined in order to achieve an effective evaluation, intensive debates have also emerged among the scientific community regarding the elements for performance evaluation. In a recent significant contribution, based upon a literature review, Boyd et al. (2007) found seven important performance dimensions for IT Professionals: (1) work quality, (2) project work, (3) general tasks, (4) interpersonal quality, (5) dependability, (6) teamwork and leadership, and (7) career related training.

Independently of the evaluation method and the items evaluated, due to the importance of performance appraisal, the authors considered it interesting to determine the level of support which is given to this management tool in the various ICT maturity and governance initiatives. The sections which follow provide a response to this research question.

3. ELEMENTS FOR THE ANALYSIS

Prior to realizing the analysis of the evaluation of performance of different frameworks, a reference standard for the management of human capital and a diagnostic element which permits the analysis of the distinct models from a common perspective should be established.

The reference standard in the management of human capital selected was the People Capability Maturity Model (P-CMM). P-CMM is a model of maturity and capacities based on 17 key process areas for the management of human capital in software development organizations, however, it can also be applied to organizations in other industry sectors (Curtis et al., 2009).The model is divided into 5 maturity levels (from level 1 to level 5, which represents a rather restricted view of the management of human capital), each of which represents a change in the culture of the organization. Traversing the levels, each level improves the attraction, deployment, organization, motivation and retention of human capital. Each of the 17 process areas corresponds to one of the four operating levels of the model, and is divided into the following sections: purpose, description, objectives, compromises, skills, practices, measures, verifications. From the perspective of performance management, P-CMM offers an evolution according to level with four phases; at level 2, performance is measured at individual level and is reported to the managers; at level 3, performance is measured at team level, and is reported to the management, together with performance at individual level. At level 4, performance is measured quantitatively; and at level 5, performance is aligned between the teams of the organization. Taking into account the characteristics of this model, for the present research, the model has been analyzed selecting exclusively the process areas which focus on performance management: Performance Management (level 2), Quantitative Performance Management (level 4), Organizational Performance Alignment (level 5); together with the objectives and practices of other process areas linked to this management. As a diagnostic, a checklist for the evaluation of the performance of human capital has been created. For the preparation of this checklist, the P-CMM model has been analyzed examining process areas, activities, and objectives, which cover the elements necessary to evaluate human capital performance. The evaluation, viewed as a process, has been divided into three sub-processes; establishment of measures, measurement, and evaluation of performance. Within each sub-process, generalized practices which are based on at least one P-CMM practice have been included. Each

Table 1. Checklist extracted from People-CMM

Process	Subprocess	ID	Activity	Mode
Human Capital Performance Assessment	Establishment of measures (EST)	EST1	Individual. (PM: P4, P5) (QPM: P3) (C-BP: P7)	I
		EST2	Unit (PM: P1, P2) (QPM: P2) (C-BP: P6) (WP: P6)	G
		EST3	Group (QPM: P3) (WD: P3)	G
	Performance measurement (MED)	MED1	Individual Level (PM: P7) (QPM: P5, P6) (CCI: P2)	G
		MED2	Unit Level (PM: P3) (WP: P11)	I
		MED3	Group Level (QPM: P5, P6) (WD: P13)	G
		MED4	Almacenamiento de las mediciones de rendimiento (QPM: P8)	A
	Evaluation of performance (EVA)	EVA1	Individual Level (PM: P9) (C-BP: P8, P9) (CCI: P3)	I
		EVA2	Group Level (EW: P11) (CCI: P6)	G

I= Individual; G= Group; B= Both

sub-process contains a series of activities with an identifier, a level (individual or group or both), a short description together with the P-CMM practices to which it is related. These practices are defined using the initials of the process area which they pertain to, and the practice number. Table 1 demonstrates the checklist.

The section which follows presents the analysis of the evaluation of performance using various ICT models, employing as analysis tool the checklist just described. The use of the checklist may be split into three levels. At the activity level, an activity is considered covered when at least one element of the model under analysis has the same objective as the activity in the P-CMM model. At the sub-process level, three categories have been considered: performance appraisal at individual level, when the model covers individual employee activities (I); covered at group level, when the model applies measurement and evaluation at group level (G); and covered at both levels, when the model covers all activities of the P-CMM model together with those which pertain to both categories, individual and group (A), or "joint".

4. ANALYSIS OF THE MODELS IN RELATION TO HUMAN CAPITAL EVALUATION PRACTICES

The models selected for the analysis are focused on the following principal areas: ICT management, project development, and outsourcing. For the selection of the models, their relevance and level of use has been taken into account, both in academic and organizational environments. Employing the diagnostic element formulated in the previous section, the results of the analysis for the following models will be presented and discussed: ITIL, COBIT, CMMi-DEV, CMMi-ACQ y CMMi-SVC. For each model, the following aspects are included: a brief description of the model, the checklist as applied to the model, and a summary of the analysis together with the considerations taken into account for performing the analysis. Upon completion of the analysis of the models, the section includes a diagram which summarizes the conclusions of the findings.

4.1. Information Technology Infrastructure Library (ITIL)

Information Technology Infrastructure Library (ITIL) is a standard of best practices whose objective is to manage ICT infrastructure efficiently, with the objective of guaranteeing the levels of service agreed upon by the ICT organization and its clients (OGC, 2009). ITIL in version 3 consists of a set of five books published by the Office of Government Commerce (OGC), which empowers an ICT organization to improve the service it offers to its clients. Each of the books covers a specific area: Service Strategy, Service Design, Service Transition, Service Operation, Continual Service Improvement; this set has been entitled ITIL Core. For each area, ITIL defines objectives, activities, and the inputs and outputs of the processes of the ICT organization. Using these elements as a basis, it is possible to realize an analysis of the evaluation of the performance of human capital from the ITIL perspective.

The elements of ITIL utilized for the analysis of this model are processes, together with sub-processes, and their associated activities. Based on these elements, and using the checklist, the following results are obtained (Table 2):

Taking into account the results displayed in the previous table, it can be deduced that ITIL does not cover the entire process of human capital performance evaluation, the model lacks elements for measuring and evaluating at individual level (MED1, EVA1), however, it defines roles and responsibilities for the entire service provision life cycle (EST1). At joint level, ITIL does not cover performance measurement (MED2). To carry out the current analysis, ITIL has been considered in the context of services; with the outcome that the practices for human capital

Table 2. ITIL personnel assessment coverage

Activity (ID)	Related Elements	Covered (Yes/No)
EST1	Service Design: Roles & Responsibilities Service Transition: Roles & Responsibilities Service Operation: Roles & Responsibilities Continual Service Improvement: Roles & Responsibilities	Y
EST2		N
EST3	Service Design: 4.2 Service Level Management	Y
MED1		N
MED2	Service Transition: 4.4 Release and Deployment Management	Y
MED3	Service Design: 4.2 Service Level Management, 4.3 Capacity Management Service Transition: 4.1 Transition Planning and Support, 4.2 Change Management, 4.4 Release and Deployment Management Service Operation: 5.1 Monitoring and Control Continual Service Improvement: 4.3 Service Measurement	Y
MED4	Service Design: 4.3 Capacity Management, 4.6 Information Security Management Service Transition: 4.7 Knowledge Management	Y
EVA1		N
EVA2	Service Design: 4.2 Service Level Management, 4.7 Supplier Management Service Transition: 4.4 Release and Deployment Management, 4.6 Evaluation Service Operation: 5.1 Monitoring and Control	Y

performance evaluation for groups are considered uniquely for services in the context of this framework or model.

4.2. Control Objectives for Information and Related Technology (COBIT)

COBIT is a set of recommended practices for the governance of Technologies and Information Systems (TIS), created by the Information Systems Audit and Control Association (ISACA), and IT Governance Institute (ITGI) (ISACA, 1996). COBIT 4.1 is organized into 34 high level control objectives for TIS processes, which are grouped into 4 activity domains for the governance of TIS: Plan and Organize (PO), Acquire and Implement (AI), Deliver and Support (DS), Monitor and Evaluate (ME).For each of the 34 objectives, COBIT provides detailed control objectives, 215 objectives in total. All of the objectives, both those at high level (34), as well as the detailed objectives (215), are correctly structured and contain explanations of their purposes and reach (ITGI, 2007). COBIT defines the relation between an ICT organization and its goals, as a set of clearly defined processes which use the skills of the employees, and the infrastructure, to use automatic business applications, adding value to the information of the organization.

The elements of COBIT used for the analysis are the detailed objectives, based on which, and using the checklist, the following results are obtained (Table 3):

Taking into account the results of the previous table, it can be said that COBIT covers the entire performance evaluation process of human capital, which includes its sub-processes and activities. In order to realize the analysis, the researchers considered the characterization of COBIT focusing on services and projects; this has been subsequently formulated as the conclusion that the performance appraisal of human capital practices for individual employees are considered in this model for projects only, and group evaluation for services.

Table 3. COBIT personnel assessment coverage

Activity (ID)	Related Elements	Covered (Yes/No)
EST1	PO4.12, PO7.3, P010.8	Y
EST2	PO10.7 (at project level)	Y
EST3	DS1.3, DS1.4 (at service level)	Y
MED1	PO7.3, DS3.5	Y
MED2	PO10.13 (at project level), DS3.5	Y
MED3	DS1.5 (at service level), DS3.5	Y
MED4	ME 1.2	Y
EVA1	PO7.7, DS3.2	Y
EVA2	DS3.2 (at service level)	Y

4.3. Capability Maturity Model Integration for Development (CMMi-DEV)

CMMi-DEV (CMMI, 2006) provides a comprehensive integrated solution for development and maintenance activities applied to products and services. This model forms part of a set of models whose objective is to cover the necessities of specific areas. CMMi-DEV follows the structure CMMi Model Foundation, which defines, among others, the following elements: objectives, roles, measurements, and verifications. Taking into account these elements, it is possible to analyze human capital performance evaluation from the perspective of this model.

The elements of CMMi-DEV used for the analysis are the practices, both generic and specific, based on which and using the checklist, the following results are obtained (Table 4):

Examining the results obtained, it can be concluded that CMMi-DEV covers the entire performance appraisal process. It should be mentioned that the coverage of the practices at individual and joint level is low, given that CMMi-DEV does not include practices exclusively dedicated to evaluate performance at these two levels. To realize the analysis, the researchers considered the characterization of CMMi-DEV as focused on the development of projects; this has led to the conclusion that evaluation performance practices for groups are considered for projects in this model, and individual employees for suppliers.

4.4. Capability Maturity Model Integration for Acquisition (CMMi-ACQ)

CMMi-ACQ (CMMI, 2007) is a maturity model evolution of CMMi-DEV model focused on the acquisition process of acquirer organizations. This model follows the structure of the CMMi Model Foundation, making it possible to utilize

Table 4. CMMi-DEV personnel assessment coverage

Activity (ID)	Related Elements	Covered (Yes/No)
EST1	GP 2.3, 2.4, 4.1;	Y (Low coverage)
EST2	MA: SP 1.1, SP 1.2	Y (Low coverage)
EST3	SAM: SP 1.3 (Supplier)	Y
MED1	IPM: SP 1.4; QPM: SP 1.1, 2.1(Project);	Y (Low coverage)
MED2	(IPM) + IPPD: SP 3.3 (Team)	Y (Low coverage)
MED3	GP 2.8, 4.2;	Y
MED4	MA: SP 2.1	Y
EVA1	SAM: SP 2.2 (Supplier)	Y (Low Coverage)
EVA2	IPM: SP 1.5; PMC: SP 1.1; QPM: SP 1.4, 2.3 (Project);	Y

Table 5. CMMi-ACQ personnel assessment coverage

Activity (ID)	Related Elements	Covered (Yes/No)
EST1	GP 2.3, 2.4, 4.1;	Y (Low coverage)
EST2	MA: SP 1.1, 1.2	N
EST3		Y
MED1	IPM: SP 1.4; PP: SP 2.1; QPM: SP 1.1, 2.1 (Project);	Y (Low coverage)
MED2	IPM: SP1.6 (Team)	N
MED3	GP 2.8, 4.2;	Y
MED4	MA: SP 2.1	Y
EVA1		Y (Low coverage)
EVA2	PMC: SP 1.1, 1.2; QPM: SP 1.4, 2.3 (Project)	Y

its elements to analyze the evaluation of the performance of human capital from the perspective of this model.

The elements of CMMi-ACQ used for the analysis are the practices, both generic and specific, based on which, and using the checklist, the following results are obtained (Table 5):

Examining the results obtained, it can be concluded that CMMi-ACQ does not completely cover the human capital evaluation process. The model does not cover the evaluation of performance at joint level, and its coverage at individual level is scarce. The conclusion in this case is that this model exclusively covers evaluation of performance for the group framework; teams, projects, services. To realize the analysis, the characterization of CMMi-ACQ has been considered focused on the acquisition of projects; this has been translated into the conclusion that only performance evaluation practices for groups are considered in this model, as well as for work teams, projects and services.

4.5. Capability Maturity Model Integration for Services (CMMi-SVC)

CMMi-SVC is a maturity model which covers the activities necessary to manage, establish and deliver services (CMMI, 2009). Similarly to CMMi-ACQ, it is a model based on CMMi to adapt itself to the requirements of organizations which provide services. Given that its structure is based on the CMMi Model Foundation, it is possible to analyze performance evaluation of human assets in this model in the same way as in the two previous models. CMMi-ACQ contains elements in common with CMMi-DEV and CMMi-ACQ, and adds objectives and practices specific to the provision of services.

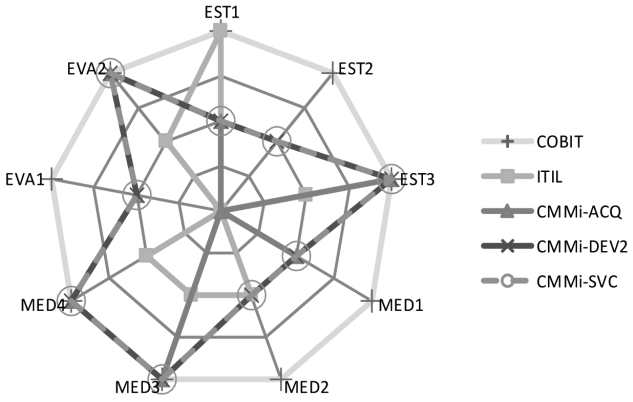
The elements of CMMi-SVC used for the analysis are practices, both generic and specific, based on which and using the checklist, the following results are obtained (Table 6):

Taking into account the results obtained, it can be concluded that the CMMi-SVC model covers the entire human capital performance evaluation process. The model lightly covers the evaluation of performance at joint and individual level. Therefore, the conclusion is that the model covers performance evaluation for the group model; teams, projects, and services. To realize this analysis, the characterization of CMMi-SVC has been as being centered on service provision projects; thus performance evaluation from a group perspective is considered for this model, as well as work teams, projects and services, and units for suppliers. To finalize, Figure 1 includes a graphical vision of the coverage of the elements of Personnel performance assessment in the models analyzed.

Table 6. CMMi-SVC personnel assessment coverage

Activity (ID)	Related Elements	Covered (Yes/No)
EST1	GP 2.3, 2.4, 4.1;	Y (Low coverage)
EST2	MA: SP 1.1, 1.2;	Y (Low coverage)
EST3	SSD: SP 2.2	Y
MED1	SAM: SP 1.3 (Supplier)	Y (Low coverage)
MED2	IPM: SP 1.4; QPM: SP 1.1, 2.1 (Project);	Y (Low coverage)
MED3	IPM: SP1.6 (Team);	Y
MED4	CAM: SP 1.2; SD: SP 1.2 (Service)	Y
EVA1	GP 2.8, 4.2;	Y (Low coverage)
EVA2	MA: SP 2.1;	Y

Figure 1. Results of the analysis



5. CONCLUSION AND FUTURE WORK

This paper presents a study carried out with the aim of finding out the coverage of diverse models related to IT management with respect of personnel performance. Results show dissimilarities with regard to coverage of the global process. COBIT is the only model that covers the entire evaluation process exhaustively, while the CMMi-ACQ and CMMi-DEV models cover personnel performance, but presents weaknesses with regard to individual and joint levels, and lastly, ITIL does not cover the process satisfactorily. However, results, in spite of the overall differences, present certain similarities. Thus, all models cover the establishment of measures for individuals (EST1), the storage of the performance measures (MED4) and the evaluation of performance at group level (EVA2). Regarding the differences, not all of the models cover the establishment of measures for units (EST2) and groups (EST3), some lack elements for the measurement of performance in the three categories (MED1, MED2, MED3) and only COBIT covers the evaluation of performance at individual level (EVA1).

As future research lines, three different study areas are proposed. In the first place, it is proposed to extend the work to other models which are considered of relevant application in the

ICT field, and in particular, applicable to Chief Information Officer, such as COSO, for the case of risk management, PMBoK and PRINCE2 in project management and ISO 20000, eTOM and BPM for IT services, operations and infrastructure. In the second place, a study is proposed which covers the personnel competencies cycle in the context of evaluation, focusing on fields such as compensation and the management of competencies for the alignment of the performance and job position. Lastly, and as principal future research line, the development of a standard which includes recommendations for the integrated inclusion of management measures in the context of management tools for ICT is proposed.

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Chapter 21
Investigating Temporal Structure Usage in Individual Time Management Practices:
Two In-Depth Field Interviews

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INTRODUCTION

Researchers in management and organizational behavior have shown that temporal rhythms and norms exist and that they collectively impact multiple aspects of an organization. They have also shown that individual productivity is hampered if temporal cycles clash. This suggests that individual time management is related to the temporal structures that govern and constrain an individual's life. At its simplest form, individuals use external records to capture explicit temporal structures that allow them to view this constraint. This external record then allows individuals to view the relationships between the temporal structures affecting their lives and the relationships between the different temporal structures. Thus, knowing these relationships can help an individual build a personal schedule in a calendar tool that optimizes his or her use of time while still abiding by the temporal structures that cannot be controlled. It is expected that people who are very busy or very interested in personal advancement want to optimize their time usage and, therefore, spend time learning about the myriad of temporal structures that affect their lives so that they can best control them. It follows that people who are effective time managers are likely to use and understand temporal structures in a more sophisticated fashion than people who are not. This research investigates this possibility through two sets of intensive field interviews with a group of academic professionals at a U.S. public research university. The focus of this work is on investigating types

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of temporal structures being used in individual time management with calendar tools.

The chapter has this focus because its underlying motivation is that of developing new information technology to support better personal time management. In particular, this research is designed to provide evidence that offering the support of additional temporal structure features in electronic time management or calendar tools will help users be better time managers. It recognizes that being an effective time manager also involves personal commitment. This research seeks to find evidence that additional temporal structure management tools will help such a person better achieve this goal. Therefore, it mainly focuses on collecting temporal structure requirements at the task analysis stage in the systems analysis and design process through intensive user studies.

This research examines (1) how the temporal structures discussed in the literature review are used in personal time management, (2) what types of temporal structures are being used in individual time management practices, (3) what kind of support the current time management tools provide for capturing and managing the temporal structures, and (4) what design implications can be drawn from human studies for the inclusion of multiple types of temporal structures in electronic time management or calendar tools. In the field study, twenty busy professionals from a U.S. public research university were interviewed about their time management strategies and time management tool usage.

LITERATURE REVIEW

Temporal structure has long been regarded as a complicated instrument of activating and structuring asynchronous differentiation to achieve organizational goals. Temporal structure is defined as patterned organization of time used by humans to help them manage, comprehend or coordinate their use of time (Wu et al., 2005). It is a primary concept in organization behavior and organization change (Bluedorn & Danhardt, 1988; Clark, 1985; Orlikowski and Yates, 2002). In particular, considerable management interest has been observed in today's organizations, which are facing globalization, technological innovation challenges and uncertainty pressures. As Jones et al. (2008) mentioned, "*Specifically, attention has focused on accelerations in the pace of organizational activity (e.g., speeding up of information transfer and processing); reductions in cycle times (e.g., decreasing 'wait times' in business processes); shifts in when and where work is performed (e.g., distributing working geographically); changes in significance of deadlines (e.g., generating expectations of immediate response); and intensification of work experience (e.g., increasing the availability and accessibility of people, products, and services) (e.g., Cusumano and Yoffe, 1998; Fine, 1998; Gleick, 1999; Green, 2002; Hongladarom, 2002; Whipp, Adam, and Sabelis, 2002; Yeh et al., 2000)*" (p. 2). These changes have altered a number of aspects and dimensions of temporality in organizations. For example, more tensions are created with established work processes (Sawyer and Southwick, 2002; Scott and Wagner, 2003). As the main actors in organizations, individual professionals, who are responsible for responding to and implementing these temporality changes, constantly face more time pressures to meet their hectic and ever-changing deadlines. In other words, people are restricted by their external temporal structures. Orlikowski and Yates (2002, p. 686) proposed that "*people in organizations experience time through the shared temporal structures they enact recurrently in their everyday practices*." In theory, the temporal structures provide a foundation that human beings use to construct the regularity of their society and reduce the uncertainty of human perception of time. In practice, "*a challenge individuals and organizations face is reconciling these different temporal structures to make it possible to work and take part in non-work activities*" (Saunders and Kim,

2007, p. iv). In their personal time management practices, professionals need to understand and manage their various temporal structures to maintain and enhance the competitive advantages of their organizations.

Two key temporal structure categorizations in prior research provide a theoretical foundation for us to further investigate how users capture and utilize their internal and external temporal information and construct their own time management practices, which inherently involve many temporal structure management activities. One such categorization proposes that temporal structures are composed of three components: (1) *explicit* schedules, sequencing patterns, and deadlines, which are typically encoded in personal calendars; (2) *implicit* rhythms and cycles of behavior, which are understood time patterns that are never explicitly stated or written but which are learned and understood by a population of individuals; and (3) *socio-temporal,* which include organizational cultural norms about time (Blount and Janicik, 2001). Orlikowski and Yates (2002) categorize temporal structures into *clock-based*, *event-based* and *practice-based* time. *Clock-based* temporal structures are geared to calendars and clocks, such as schedules for meetings and classes. *Event-based* temporal structures are events that have a specific time and place associated with them but also have an overall structure of time usage around the event. For example, a couple planning a wedding may set a wedding date, but then have to schedule multiple activities preceding this date. The date can be moved around in time, thereby moving all of the other associated activities in time. *Practice-based* temporal structures are a combination of clock- and event-based temporal structures (e.g., scheduling summer vacations when children are free of school obligations). This research utilizes these two studies as a base to analyze the qualitative data in later data analysis section.

Other researchers have provided insight on temporal dimensions of different activities in organizations. Zerubavel (1981) differentiated temporal activities based upon their sequential structure, duration, temporal location and the rate of recurrence. Bluedorn (2002) characterized activities to be either monochronic or polychronic, meaning that multiple activities are carried out one at a time or undertaken simultaneously. Schriber and Gutek (1987) utilized deadlines, punctuality, autonomy, reutilization, and future orientation to characterize temporal norms in organizations. Jones et al. (2008) recently reported significant temporal structure changes in the traditional newspaper industry because of the use of ICT technologies. The work shift for the newspaper professionals has been changed from a once-a-day collective deadline to continuous deadlines, regular updating and almost instant publication. Online news is regarded as a consequence acceleration in the pace and immediacy of temporal structuring. This change reflects what Castell (1996) called "*timeless time*," which is now changing people's expectations on work pace, duration, timetable, deadline and sequence. The immediacy, intensity, and impermanence of "*timeless time*" in contemporary forms of work activities challenges the established expectations, meanings, and norms of the temporal organization of work.

For individuals in a workplace, work time is created by the organization members who establish and regulate the temporal structures. Individuals experience different regular deadlines, engage in routine activities, and take seasonal vacations. However, it seems still a mystery that how individual professionals respond to these temporal demands and constraints set up by their organizations. This research takes the definitions of temporal structures and relates them to individual time management practices. This research is to ascertain the evidence for what types of temporal structures are being captured and utilized to guide individual time managers, and determine what design implications can be made to provide more intensive features of temporal structure management for enhancing current electronic time management tools, such as electronic calendars.

RESEARCH APPROACH

This section presents the main research approach—two sets of in-depth semi-structured interviews conducted with twenty professionals in a U.S. public research university. Data was collected on each individual's time management strategies and the types of temporal structures they experienced and used.

Participants

It is argued that a university is an appropriate source of information for this research because a university has a collection of conflicting temporal patterns. It is a complex environment with multiple departments setting their own temporal structures (e.g., department meetings and seminars take place in addition to a seasonal cyclic structure that is imposed on the university by term start and end times and U.S. designated holidays). Compared to other types of organizations, an academic environment is supposed to provide a more structured setting because of class schedules, graduation ceremonies, research paper deadlines, etc. This research population choice should provide a rich and detailed collection of temporal management requirements.

Twenty professionals were recruited via email and/or personal contact. All were considered active and extremely busy employees (See their weekly work hours' distribution in Table 1 below). Their roles ranged from receptionist to organization president and spanned a diverse set of occupations. The interview focused on individual time management strategies (those involving weekly, monthly and yearly scheduling).

Table 1. Interviewees' weekly working hours

Percentage of the Interviewees	Number of Working Hours/Week
5%	40
15%	40-50
25%	50-60
20%	60-70
35%	>70

Procedure

Interviews lasted from twenty minutes to two hours. The major focus was on general time management strategies and types of time management tools people used. In particular, we investigated all types of temporal structures that people are experiencing and using. We also investigated utilization, perceived effectiveness and satisfaction with various time management tools. During the interviews, individuals' daily and weekly schedules were also examined through a retrospective procedure.

With the consent of each participant, all interviews were audio recorded. All individual information was kept confidential. Each participant was assigned a subject code and names were removed from interview transcripts.

The first set of interviews focused on short-term time management strategies (those involving the current day's scheduling and temporal coordination activities). The second set of interviews focused on long-term time management strategies (those involving weekly, monthly and yearly scheduling and long-term time management plans). At no time in the interviews were temporal structures or norms mentioned. When the short-term time management interviews were conducted, each interviewee showed the interviewer the schedules recorded in their electronic calendar tools (e.g. Outlook, PDA etc.). Using the interviewee's personal schedules, they were asked to explain how and why they scheduled and allocated time on specific meetings, events or other items found in their calendars or scheduled in their life for the coming week. Each interviewee was interviewed somewhat differently because of their different personal daily schedules (Note: a

complete interview guide is attached in Appendix B in this book).

Because individual interviewees worked on various schedules for their daily work, the following interview questions were used as a guide to gather their short-term time management strategies:

1. What are the most time wasters in your daily work?
2. Does this daily work mirror most of your ordinary life?
3. Can you please tell me how you get rid of these time wastes?
4. When do you feel losing control for your time management? If yes, please indicate some situation.
5. After viewing your time management planned and completed tasks, are you going to change your time management strategies? How?

Individuals were asked about long-term time management strategies in the second set of interviews which took place a month later. The interview questions used to gather information on long-term time management strategies are as follows:

1. When you have too many things to do, what kind of time management strategies do you use to get your work done on time?
2. When you have important deadlines, how do you usually handle your family demands?
3. When you have many unproductive meetings, how do you deal with more important work?
4. Do you feel you lose control of your time management? If yes, why? If no, why not?
5. Do you usually participate in social events when you are too busy? If yes, why? If no, why not?

FINDINGS FROM THE INTERVIEWS

The purpose of the interviews was to determine the types of temporal structures (explicit vs. implicit) used by organizations and individuals. *Explicit* temporal structures were further broken down to *clock-based* and *event-based* temporal structures. *Implicit* temporal structures were subcategorized to *practice-based* temporal structures and *social temporal norms*. This information was then used to develop an instrument for measuring the temporal structures in use in the organization studied, how the temporal structures are being used and what effect their use has on time management.

Types of Calendar Tools Being Used

Among the twenty professionals interviewed, five people still kept traditional paper-based calendars for managing their time, but they planned to switch to electronic calendars. The majority of the interviewees were using some form of electronic calendars or a combination of desktop and mobile time management tools to organize their time (see Table 2). In terms of their perception of satisfaction with and effectiveness of their time management tool, the electronic forms obtained a much higher rate (approximately 4.5 on a 1 to 5 scale with 5 being the best), than the traditional paper-based tools (about 3 on the same scale), simply because of the lack of ability to further edit, visualize, duplicate and share features available in the paper-based tools.

In addition, about half of the interviewees were using a mix of different time management tools. Many users complained about inadequate integration between the tools; the current electronic calendar tools only met part of their time management needs, and no proper integration was available for them to customize their time tasks using a single electronic tool. For example, a key advantage for having a mobile tool was the ability to access calendar information anytime and anywhere. In the meantime, desktop time management

Table 2. Calendar tool distribution

Type of Time Management Tools	Number of Users
Paper-based Tools	
Pocket-sized	4
Wall-sized	1
Computer-based Tools	
Single Tool	
Private Desktop Calendar	2
PDA	3
PDA (mainly rely on memory)	1
Mixed Tool	
Private Desktop Calendar + PDA/PDA Cell phone Combo	7
Public Online Calendar + PDA	1
PDA + White Board	1
Total	20

tools were also used because the larger screen allowed users to see more of their schedule and make strategic decisions that involved multiple weeks or months of time scheduling. The interviewees mentioned that they can synchronize their mobile devices with their desktop calendar tools. Upper administrators often have secretaries or office managers to support their scheduling. They complained that inadequate synchronization and calendar updates done by other people often messed up their scheduling.

Almost all interviewees commented that their time management tools lacked support for developing time management strategies and for assessing their time management efficiency. At the current stage, people often used their own mental notes to help them to assess their time management quality, as most of their tools only serve as a recording device to remind them of meetings, appointments, project tasks and so on. Another example of a mixed tool used by a senior administrator was the Yahoo! online calendar, which she intentionally set as public in order to manage her department. Her online public calendar served as a major communication tool to show her availability if somebody planned to make an appointment with her. This publicly shared calendar saved her a lot of time when negotiating meeting time slots with others. She also used her PDA very often, especially during her commuting time, which normally was at least 3 hours on the train. Her PDA kept her informed and sent her reminders while she was on the train. Because of her extensive use of her PDA and her online calendar, she was very satisfied with her calendar tools for managing her time.

Overall, four basic needs of time management tools were uncovered. They are: (1) portability; (2) ability to gain an overview; (3) ability to better coordinate between multiple tools; and (4) collaborative scheduling. More detailed calendar tool findings were reported in Wu and Tremaine (2004)'s AMCIS paper.

Types of Temporal Structures Uncovered

Our interviews found that all of our time management respondents were using multiple temporal structures. Some of them used more than one calendar for managing their different temporal structures, such as one interviewee who kept her husband's schedule (which was private information) on her PDA. Because of this, she was unable to synchronize her PDA schedule with her publicly displayed calendar. Other respondents re-typed university schedule times in their personal calendars. Still others annotated (but did not indicate time usage) their calendar with key temporal events generated by external entities (e.g., parking restrictions for parents' day). All respondents reported difficulty in maintaining multiple temporal structures. Some, especially new employees, reported difficulties with knowing the university's temporal rhythms.

In order to further analyze our interview data, a coding scheme (see Table 3) was designed according to the literature. The temporal structures are first classified based on whether they are

explicit (published and made known by some administrative aspect of the university) or *implicit* (understood as a norm that was followed by a university but not published or officially stated anywhere). They are then further broken down to *clock-based*, *event-based*, *practice-based* temporal structures or *a socio-temporal norm* (culturally understood time usage). Table 4 indicates some examples for each temporal structure category, and Table 5 shows the frequency analysis for different types of temporal structures among the total 475 temporal structure coding units uncovered from both long-term and short-term time management interview transcripts.

The completed interview transcripts for both long-term and short-term time management interviews contain over 250,000 words. These transcripts were reviewed and broken down to many small coding units, among which 475 temporal structure-related coding units were uncovered. Furthermore, these 475 temporal structure units were reorganized to a spreadsheet for further frequency analyses. We found that the majority of temporal structures were coded as "*explicit clock-based*" (total 272 units), the second largest temporal structure coding units belonged to the "*implicit practice-based*" category (total 141 units), and the two categories were "*explicit event-based*" temporal structures (total 40 units) and "*socio-temporal norms*" (total 22 units). Figure 1 above shows the percentage distribution for the temporal structure categories. The *explicit clock-based* temporal structure usage is almost 60% among the temporal structures being used in personal time management practices. About 30% belong to *implicit practice-based* temporal structures.

FINDINGS FROM THE USER STUDIES

The large majority of the temporal structures that we found in use were *explicit clock-based*. Most of our respondents were using some form of electronic calendar system to maintain their schedules. Explicit clock-based and explicit event-based structures were often listed in the calendars while implicit structures and practices were used to guide the allocation of time in the schedule but were maintained in the time manager's head. Complaints about schedule juggling arose when cyclic university events were not synchronized with external cyclic events (e.g., due dates for grades conflicting with grant and conference paper

Table 3. Personal use of temporal structures coding scheme

Type of Temporal Structure	Coding Instructions
Explicit	The temporal structure is externally coded, and rules can be precisely written to describe its behavior in an external time structure.
Clock-based	The temporal structure uses the framework of minutes, hours, days, weeks and months for representing its structure (e.g., staff meetings are every Monday at 9 a.m.)
Event-based	The temporal structure is organized around an event using sub-events that take place in a time structure governed by the main event (e.g., a bridal shower happens a month before the wedding).
Implicit	The temporal structure is internally known by one or more people. It may be involved with cultural behavior (e.g., how much time is allowed before someone is considered seriously late).
Practice-based	The temporal structure is a result of an established practice that people implicitly know (e.g., parents coordinate kids' activities).
Socio-temporal Norm	The temporal structure is a result of a socially established and expressed rule for using time. It often involves cultural practices or social behaviors (e.g. the acceptable amount of time one can be late for an event).

Table 4. Temporal structure examples captured from the interview data

Type of Temporal Structure	Examples from the Interview
Explicit	
Clock-based	***Example 1:*** *If I have meetings, at one o'clock … if I have a meeting at two o'clock, and I just allocate time based on the schedule.* ***Example 2:*** *But usually I meet my doctoral students once every week or once every other week.* ***Example 3:*** *I won't get an article published if I missed my editor's deadlines.*
Event-based	***Example 1:*** *There's no time for social event, but secondly, there is no compatibility.* ***Example 2:*** *On the weekends, if I have a family related event, such as birthday, or some other celebration, that takes priority.* ***Example 3:*** *There is a graduate student seminar day. We have that and that's a major activity.*
Implicit	
Practice-based	***Example 1:*** *(If I have important deadlines) I work more hours, so family demands are pushed aside for a while.* ***Example 2:*** *I try to move through my mundane or repetitive tasks quickly. I try to delegate some of that to help, and that frees up some time to do some of the research. Other times I am working…* ***Example 3:*** *Everyday, my responsibilities are to get them (my daughters) both out of bed, get them dressed, get them breakfast, get their teeth brushed, and get them ready for school…That is my responsibility.*
Socio-temporal Norm	***Example 1:*** *Now I know people are higher than me and lower than me. They expect me to be always connected, at all times.* ***Example 2:*** *I hope I can get through my Ph. D in four years. I have about half the courses, and so it's the rest of the courses and the dissertation and the research that goes with it. I think it will take about four years.* ***Example 3:*** *My boss could call me, and I need to respond to him, which will set you back in your schedule.*

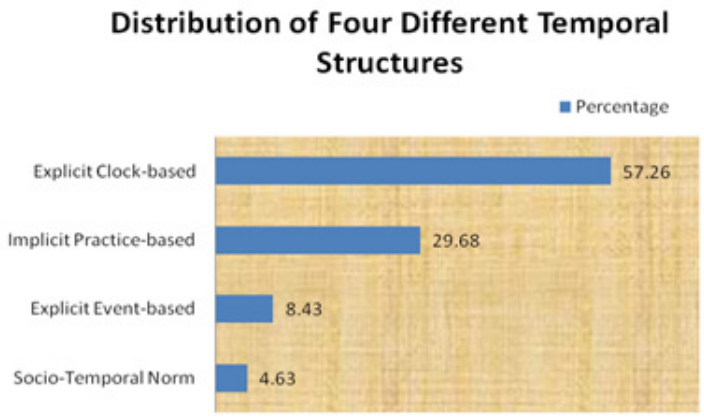
Table 5. Frequency analysis of different temporal structures uncovered in the interview transcripts

Type of Temporal Structure	No. of Total Coding Units	Percentage
Explicit		
Clock-based	272	57.26%
Event-based	40	8.43%
Total Explicit TS coding units	312	65.69%
Implicit		
Practice-based	141	29.68%
Socio-Temporal Norm	22	4.63%
Total Implicit TS coding Units	163	34.31%
Total Explicit and Implicit TS Coding Units	475	100%

deadlines) and when superiors imposed unplanned deadlines and meetings.

Within the set of respondents were individuals who complained less about the difficulty of managing their time and who also had more time for personal activities and additional achievements. Many of these individuals were in senior administrative roles, but some were graduate students and faculty. A number of features characterized their time management behavior. First, they were either better able to estimate the amount of time a task required, or to control the amount of time required for a task (that is, they did not work to perfection but to some level of acceptable standards on a product). Second, they created their own temporal structures to manage their life, that is, they allocated units of time for specific types of repeating activities. These better

Figure 1. Percentages of different types of temporal structure being used in personal time management practices



time managers also recorded more of the external temporal structures affecting their time usage in their electronic calendars.

In contrast, another subset of respondents, who complained about a lack of time for accomplishing anything significant, were much less likely to record and manage their time in a calendar system. Some of these individuals worked longer hours than the better time managers and were constantly scurrying to meet deadlines. They indicated that much of their work was overdue. These individuals were much less likely to create temporal structures of their own, much less likely to be aware of the external temporal structures that impacted their lives (e.g., one faculty member was always surprised by conference paper due dates.) Another set of respondents managed their time by simplifying the temporal demands on their life. They limited the number of external activities they engaged in (conferences, university committees and non-work activities) and (if work permitted) spent large units of time away from the work environment that they found to be interruptive. However, unless these individuals then created temporal structures of their own for managing this less demanding time schedule, they were relatively unproductive in contrast to the better time managers, that is, they produced less work product.

The interviews indicated that knowledge and use of existing temporal structures plus the creation of additional personal temporal structures aided personal time management. The interviews also indicated that electronic calendar tools could be given features to help users maintain multiple temporal structures and visualize their impact on time usage (thus, the proposed development of a temporal structure prototype described in the last chapter in this book as part of future research.)

Calendar Tool Design Implications

From the user studies reported in this chapter, it is evident that only limited temporal structures are supported by the current electronic calendar tools, in particular, *explicit clock-based* temporal structures, which are easily recorded and edited with clear time requirements. The explicit clock-based temporal structures could be either personal or public once these structures have clear and explicit time boundaries. For instance, when scheduling a meeting or a doctor appointment, users clearly know when, where and what are needed for scheduling such a time task with their calendar tools. These explicit temporal structures also could be public: for instance, many calendar tools now can directly incorporate holidays from

different cultures, and users can select their preferred holiday settings.

For those users who adopt multiple tools to manage their time, the main complaints are noncompatibility available among their different calendar tools or devices, as they serve different purposes, and each device has its own limitations. For instance, professionals who often manage several projects often need to rely on additional project management tools to support their daily tasks, but their calendar usage is limited to meetings, appointments or reminders. For managing different time tasks, it would be ideal to integrate the different time management tools seamlessly. Although there is no easy solution for this type of integration, it is needed to provide the flexibility to manage a variety of different temporal structures with the calendar tools. A possible design solution could be to give users options to define their explicit clock-based temporal structures based upon meeting, appointment, project or any needed category, and allow users to customize their temporal structures for managing their different time tasks. For example, the project management features could be incorporated into the current calendar tools to benefit users who constantly need to use additional tools to support their projects, which are often time critical and need to be managed carefully. Another way to integrate different types of temporal structures with calendar tools is to make all possible temporal-related resources available in the calendar tools. When managers try to schedule a group meeting, they often need to find additional meeting resources, such as available meeting rooms, meeting equipment, etc., but information about these is usually not available in their electronic calendar tools. Instead, they often have to call for help from people who are in charge of these resources. These additional meeting resources also have their own temporal structure features, which may cause the managers to postpone their meetings (e.g., the resources had been booked out in advance). Since these temporal structures are not explicit and reflect socio-temporal norms in such a setting, it will be very valuable if these resources can be available electronically and be integrated with the organizational calendar systems where people can check the availability of different resources and make more efficient decisions how they are going to schedule and manage their meetings.

Professionals are constrained by their organizational temporal structures or norms. New employees often complain of no simple way to access all temporal resources and requirements that they need to follow at work. Sometimes even seasoned employees perceive difficulties as well. A possible design implication to resolve users' complaints is to make seamless temporal structure integration between personal and organization-wide calendar tools. Most of organization-wide temporal structures are explicit and public, such as university graduation ceremonies, public facility opening and closing times, new semester schedules, etc. This integration is somewhat doable, as most organizations require their employees to use their organizational calendar tools, which can be shared with the public or internal units or just a group of people who have collaborative projects together. In this case, the organizational calendar tools could be customized for announcing public temporal structures which apply to every employee, and the employees could also customize their temporal structures for eliminating some irrelevant temporal structures in their personal calendar interfaces. A possible design implication is that the organization-wide new temporal structures could be designed as an icon, which users could easily download from the public website and directly incorporate into their personal calendars. Customization could be an option for easy integration.

Implicit practice-based temporal structure, as the second large group of temporal structures being used, can vary dramatically based on each individual's task priorities, life styles and work environments. Often, individuals use their mental notes and try to make their implicit temporal

structures explicit to schedule them into their personal calendars. In other words, using time management tools to support this practice, implicit temporal structures have to be converted to explicit ones first. Otherwise, people would not be able to schedule something implicit. How individuals bridge this gap relies on their ways to manage their time, but what calendar tools can support translates these implicit temporal structures to explicit ones. The only difference is perhaps the transparency level for sharing this more personalized time information. In general, this type of implicit temporal structure is being used within a very small group or just for personal practices which are normally not shared with others. When designing this type of temporal structures in calendar tools, it is important to consider privacy and security issues.

Regarding the last two categories – *explicit event-based temporal structures* and *implicit socio-temporal norms* in the calendar tool design, what we could consider is making a series of events somewhat easier to control. Since the current tools do not support automatic event changes or transformations with the tools, people need to manually type in and modify the existing series of event schedules one by one, which often causes errors. It is very easy to forget to update sub-events, and each event has different temporal structures, which could be drop-down, sequential or another type. For a better event-based temporal structure design, users could possibly select the event structures first, and then have predefined event structures available to support this task. In addition, users should still have the ability to customize the event structures to fit their personal needs. When doing event updates, the calendar tools should be able to automatically update a number of event components based on the appropriate temporal structures and the nature of the scheduled event. The key of this design is to identify proper rules for each type of temporal events. This design could possibly avoid cumbersome data entry issues.

Lastly, regarding socio-temporal norms design in the calendar tool, difficulty is expected, as people first need to decode these norms and figure out how to make the implicit socio-temporal norms explicit. Social environments are hard to capture and decode, as they involve cultures, political beliefs, management styles and so on, which are very dynamic and implicit. Only seasoned personnel could possibly have some idea of how these norms work, such as one department in the researched university, where all meetings are generally scheduled on Mondays and Wednesdays. The department research seminar is scheduled on Monday, when most people are available on campus. On Wednesday, most university-wide meetings are held and the department administrators and senior faculty members are also available. It is therefore viable to meet people, get advice or do collaborative work together in these two dates. Once the norm is recognized with this group of people, it is more practical to put this norm into the calendar tools.

In summary, this chapter reported two sets of in-depth field interviews with twenty professionals. These user study results demonstrate that it is necessary to incorporate more extensive types of temporal structure features into the current electronic calendar tools, which only support very limited temporal structures, such as *explicit clock-based*. However, these user studies only identified the need to extend temporal structure features with possible design implications. It is a challenge to decode various temporal structures of which most are *implicit* and require time and effort to convert to explicit ones. Also, understanding the underlying temporal structure rules involve in-depth understanding of local cultures, which are not easily captured and decoded. It is challenging to have a holistic view of the dynamic organizational and personal temporal structures: nevertheless, there is a need indeed.

The next chapter will present a number of individual time management profiles, which indicate how users choose their electronic calendar tools, how they use them and what issues they experience.

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Section 3
Tools and Technologies

This section presents an extensive coverage of various tools and technologies available in the field of Human Resources Management that practitioners and academicians alike can utilize to develop different techniques. These chapters enlighten readers about fundamental research on the many tools facilitating the burgeoning field of Human Resources Management. It is through these rigorously researched chapters that the reader is provided with countless examples of the up-and-coming tools and technologies emerging from the field of Human Resources Management. With 11 chapters, this section offers a broad treatment of some of the many tools and technologies within the Human Resources Management field.

Chapter 22
Team Dynamics in Virtual Spaces:
Challenges for Workforce Training, Human Resource Development, and Adult Development

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ABSTRACT

Collaboration within virtual environments is an increasingly important aspect of organizational and workplace activities. "Virtual teams" are intentional groups of highly qualified people brought together in a virtual environment in order to capitalize upon each member's unique attributes. In many instances these people represent different organizations, or branches of an organization, who work together virtually to tackle a specific problem or project. This paper examines issues that "virtual teams" encounter and identifies best practices that can positively contribute to effective and efficient teamwork within the virtual environment. The ideas and practices presented may be of value to organizational leaders, planners, human resource professionals, adult educators, and others involved in workforce training.

INTRODUCTION

The purpose of this chapter is to examine team dynamics in a virtual environment and identify ways to make them successful. Collaboration within virtual environments is an increasingly important aspect of workplace activities. It is up to organizational leaders, planners, human resource professionals, adult educators, and others involved in organizational development to identify and establish best practices that make virtual team work positive and productive.

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BACKGROUND

In the best of circumstances, teambuilding occurs naturally as people work together, form alliances and establish collegial relationships. However, in reality this is often not the case and a more attentive approach is needed. Team members are prone to experience anxiety in the team forming process. They wonder how the team will work together, whether they will be liked and whether they will like the people they are working with. Teambuilding activities can help alleviate some of these feelings by consciously providing shared experience and goals (Brown, Huettner, & James-Tanny, 2007).

When building a team it is important that everyone feels included and welcome. Team members should be involved in initial planning and goal setting. Facilitators should watch for signs of social isolation, encourage participation from everyone and create an environment that promotes active engagement. Early in the process, there should be an open discussion about team expectations, policies, and practices. Both team and individual efforts should be recognized. Some best practices suggested by Brown, Huettner & James-Tanny (2007) include:

- Negotiate goals together
- Document expectations, goals, position descriptions and contact information
- Hold regular team meetings and allow time to check in with each member at the beginning of the meeting
- Provide frequent and timely feedback
- Maintain a positive, constructive attitude even when things go wrong
- Focus on strengths (Brown, et al., 2007). Group success requires members to be willing to share their efforts and accomplishments, and work to meet clearly defined goals (Odgers, 2005). It is important that team members have incentives to participate. Some benefits of being on a team are experience, recognition, and visibility. The high-energy and motivation created through effective teamwork is contagious and leads to a special synergy whereby employees and administrators attain extraordinary results. Characteristics of effective teams include:
- The members are loyal and committed to one another and the leader.
- The members and leaders have a high degree of confidence and trust in each other.
- The group is eager to help each other develop to reach their full potential.
- The members communicate fully and frankly about everything relative to the team.
- The members feel secure and empowered to make decisions.
- The atmosphere and climate is supportive and risk free, and members put the organization first (Odgers, 2005).

Virtual teams are an important component of many corporate and educational organizations, and have evolved largely because of globalization, technology, and changing demographics (Merriam, Caffarella, & Baumgartner, 2007). Virtual teams are composed of members who are physically located in different places. They conduct most of their work through electronic technology. Team members rarely meet face-to-face and rely primarily on digital forms of communication. Effective communication that leads to a shared understanding of the teams' purpose, goals and objectives is vital for success.

For purposes of this discussion, virtual teams are defined as more than typical groups of people who work together in a virtual environment. Instead, "virtual teams" are defined as intentional groups composed of identified individuals who have special talents/skills/knowledge related to the goals of the team. Teams are brought together for a specific reason and purpose. In many instances these will be groups of people who represent dif-

ferent organizations, or branches of an organization, who work together primarily in a virtual environment to solve a common problem.

Virtual teams are intentional groups of highly qualified people who are brought together in a virtual environment in order to capitalize upon each member's unique attributes. It is rare to find teams where individuals know each other, occupy the same space, work the same hours, belong to and are paid by the same organization, have a common business culture and enjoy a history of working together. Today's teams are an alliance of talented individuals from different organizations, departments, professions, and locations. Teams are made up of people with different backgrounds, languages, cultures and education who are involved in collaborative activities in varying degrees (Thompson & Good, 2005). Shachaf and Hara (2005) write that virtual teams are groups of people who work interdependently with a shared purpose across space, time and organizational boundaries using technology. Davis and Scaffidi (2007) define a virtual team as a collection of individuals who are geographically and/or organizationally dispersed who collaborate via communication and information technologies in order to accomplish a specific goal. Nunamaker, Reinig, and Briggs describe a virtual team as consisting of "a well-defined group of individuals brought together to produce a specific deliverable…" (2009, p. 1).

The virtual aspect of teaming presents a variety of challenges that coalesce on communication and trust. Three of these addressed by Roebuck, Brock, and Moodie (2004) are:

- Lack of face-to-face interaction
- Relationship building
- Accessing and leveraging the unique knowledge and expertise of each member to achieve team goals.

Effective team building must concentrate on how team members relate to each other and how work is implemented and completed. Unfortunately, but not surprising, although virtual teams are popular and widely accepted, communication researchers contend there is no substitute for face-to-face interaction (Pillis & Furumo, 2007). The lack of, or diminished aspect of non-verbal cues, facial expression, and voice inflections can decrease trust and commitment of team members who become reluctant to share ideas and concerns. This can cause mixed or misinterpreted messages which lead to conflict, splintering of unity, and less trust. Loss of trust is fatal to the effectiveness of a virtual team (Pillis & Furumo, 2007). The literature provides us with many definitions and descriptions of virtual teams, and most of them identify trust as one of the essential ingredients for success.

Parker (2007) recognized the need for virtual teams to be made up of adaptive team players who are able to communicate with different types of people, who "subordinate their functional goals to the goals of the team" (p. 3), and who are able to quickly develop trust. Building trust quickly is a challenge for which a solution may be found within the adult and human resource development and training literature.

FACILITATORS OR TEAM LEADERS

Team leaders in a virtual environment can benefit from examining the history of andragogy and guidelines for working well with adults in their quest for success in team development and effectiveness. The work of Malcolm Knowles is well known and provides insights into team development and implementation. Knowles, writing from years of experience, advocates that administrators or facilitators of adults should exhibit some of the following characteristics:

- Have a genuine respect for the capacity of adults to be self-directing
- Derive satisfaction from the accomplishments of others

- Value the experience of others as a resource for accomplishing both work and learning
- Are able and willing to take risks involved in experimenting with new ideas and new approaches
- View failures or set-backs as opportunities to be learned from
- Have a deep commitment to and skill in the involvement of people in organizations and learning processes
- Have faith in the value of education and learning for contributing to the solution of organizational and societal problems
- Are able to establish warm, empathic relationships with people
- Engage as a good listener (Knowles, 1980).

Thompson and Good (2005) address the fact that virtual teams are not always successful in using technology to engage in effective collaboration. The teams frequently get bogged down by technology issues, communication breakdowns, reliance on out-dated work methods, and the absence of strong team motivation. Thompson and Good contend that the adoption of new technology tools without the parallel development of a new culture that supports its use is unrealistic. In effect, successful virtual teams require more than internet technology to be successful. What is needed is a culture of collaboration and cooperative learning capable of developing strategies and techniques which encourage team unity and interaction. Unless members think and act with solidarity, no amount of technology will transform inefficient teams into highly effective and productive units.

In spite of expensive technology, and sometimes because of it, virtual teams are not always successful. In fact, some of the statistics used to measure success are not positive (Thompson & Good, 2005). One problem is that leaders do not readily recognize the evolving and living nature of successful teams. Many leaders treat their teams more like machines than dynamic individuals. They are inclined to control the team and its members rather than looking at them as an evolving entity, capable of creative and innovative thinking.

Rethinking how teams should be nurtured, organized and supported is a first step toward finding effective and suitable ways of improving the productivity of virtual teams. It is important to develop team intelligence, although, superior team intelligence does not necessarily predict how successful a team will be. A distributed intelligence model uses intellectual capabilities in a collective, collaborative and cooperative fashion to support the development of team intelligence. Eventual success requires that team intelligence be supported by team members who are motivated, optimistic, share a set of beliefs and commitment, and who treat each team member as a leader (Thompson & Good, 2005).

Davis and Scaffidi (2007) discuss challenges that virtual teams must overcome. Just as with traditional teams, leaders must build group cohesion, facilitate communication and establish realistic team objectives. Davis and Scaffidi focus on member selection whereby some of the most talented employees, who have the ability, knowledge, and tenacity to enhance team performance, are recruited. They must also be experts in their field. A benefit of virtual teams is that location does not drive member selection. Team leaders choose members based on expertise not geographic proximity. In addition to expertise, interaction style is also important. Personality type impacts group productivity. Research indicated that extroverted personalities are a great addition to virtual teams but that too many extroverted individuals negatively impact productivity. Each team needs balance (David & Scaffidi, 2007).

While team members must possess superior knowledge in their field, they must also be comfortable in a virtual environment. Communication skills are a necessity, as are self-confidence, self-motivation, and self-esteem. Virtual team members must manage their schedules efficiently. They must complete tasks on time and take initiative to communicate with team members when they

are having difficulties. This communication will lead to quicker and more effective problem solving and avoid problems that are likely to affect the entire group (Davis & Scaffidi, 2007).

Creating a sense of community within a team helps to strengthen relationships and positively reinforce group performance. Research indicates that face-to-face interaction used strategically at the beginning of a relationship, as well as during key times to establish a shared vision, to overcome anxiety, and build trust is optimal in creating a sense of community. This, however, is not feasible for all virtual teams. Other practices and strategies must be explored and refined so that people may get to know each other and establish commonalities. Personalized electronic interactions are one possibility. Virtual team leaders and members must be encouraged and provided incentives to take advantage of every opportunity to build personal relationships with virtual team members (Davis & Scaffidi, 2007; Odgers, 2005; Parker, 2007).

Stronger personal relationships facilitate more productive work relationships. In order to develop a feeling of community in virtual teams, members must feel motivated and supported by their team, their leader, and the organization. Motivation is positively associated with the perception of the significance of a team member's task. Periodically and over time steps should be taken to recognize each member's contribution. If team members feel they are a vital part of the team and the organization they are more apt to stay focused and engaged. Processes must be developed to create a sense of team spirit within the group and the organization as a whole. Camaraderie within virtual teams leads to motivation, commitment, and increased productivity, and promotes a shared vision of purpose.

Shachaf and Hara (2005) present an ecological approach to team effectiveness in virtual environments. The authors state that prior studies on virtual teams use a model of input-output process based on traditional, and possibly dated, team effectiveness known as the Systems Approach (Galbraith, 1997). Shachaf and Hara seek to capture the complexity of work groups and information technology through a framework that examines environmental aspects of teamwork (social, cultural, organizational and technological) and then they propose an ecological approach relevant to teaching and learning with virtual teams.

Shachaf & Hara (2005) contend that in traditional teams trust is important, but in virtual teams it is even more important. Team members in virtual teams have to rely on other people, share a purpose and rewards, and trust their information channels. The members in a virtual team have only their shared reliance on each other to guarantee the success of their joint work. Shachaf & Hara also highlight leadership as an important factor for team effectiveness. They report that the leadership role becomes more ambiguous in the virtual team because the leader is not the gatekeeper but rather a negotiator and facilitator. In addition, in virtual teams the leadership/facilitator role may be rotated and shared.

The ecological framework consists of three components: the external environment, the internal environment, and boundaries. In on-line collaborative settings internal environments are particularly important. Team leaders should emphasize building learning communities that foster a sense of belonging through peer-to-peer interaction.

VIRTUAL TEAMS

Parker (2007) writes that in the last decade the world in which virtual teams and team players are asked to perform has changed. Team members are located in multiple locations, and cultural differences are evident. He acknowledges that the bar has been raised for team success. Organizations now expect that teams will function at a high level. There is a greater impatience among management when they observe a breakdown in team progress.

There is recognition that team success requires a support system that draws from a variety of sources. Simply creating teams will not ensure success. There is a need for a total system that includes a supportive management style, performance management processes, reward systems, and a team-based culture. The search is on for new and creative ways of selecting leaders, and appraising and rewarding team members. It follows that the organization must adopt new methods that incentivize teams, recognize outstanding team players, and incorporate performance of a team into the overall employee appraisal process (Parker, 2007).

STRATEGIES AND TECHNIQUES

When team members are identified and asked to serve, the leader or facilitator must make them feel welcome and important. The atmosphere from the beginning should be inclusive, comfortable, safe, inviting, and empowering. Each member must feel that they have been selected to participate in this very important assignment because they have abilities and strengths that will add value to the team.

Nunamaker, Reinig, and Briggs (2009) synthesize their decade long experience with virtual teams into nine principles intended to "help designers, managers, and virtual team members … improve their effectiveness" (p. 116). The nine principles are:

- **Principle 1**: Realign reward structures for virtual teams.
- **Principle 2**: Find new ways to focus attention on task.
- **Principle 3**: Design activities that cause people to get to know each other.
- **Principle 4**: Build a virtual presence.
- **Principle 5**: Agree on standards and terminology.
- **Principle 6**: Leverage anonymity when appropriate.
- **Principle 7**: Be more explicit.
- **Principle 8**: Train teams to self-facilitate.
- **Principle 9**: Embed collaboration into everyday work (Nunamaker, Reinig, & Briggs, 2009).

Nunamaker, Reinig, and Briggs' principles provide a framework that promotes productivity and trust among team members. In global virtual teams, trust is associated with the perception of team members' "integrity, ability, and benevolence" (David & Scaffidi, 2007, p. 9). Building trust is important and incorporating trust building exercises needs to be an integral part of the initial team building process. One way or another trust must be earned through optimism and respect. Helping to build trust may transpire through the effective use of virtual introductions, photographs, autobiographical sketches, and icebreakers. To help develop unity and team spirit the teams might be given names, a logo, and a mission.

If there are three or more members of a team at a common site, one person should be identified as the facilitator and be responsible for making certain the site is set up to maximize team effectiveness. Facilitation responsibilities can be rotated so that each team member serves as the facilitator over a period of time.

The meeting area should be inviting and well suited to the technology being used. Water and possibly light snacks should be available. Every member of the team should be able to hear and be heard. If video is used, every member should be situated so they can see and be seen. The room should be comfortable with respect to heat, air conditioning, lighting, glare, noise reduction, and wiring for laptops or other equipment. A white board, projector, and host computer should be available. The internet in most cases is essential. All too often, when virtual teams come together nobody is in charge and people come and go and sit wherever they want. This is a mistake. Planners

and facilitators should take as much time and care setting up a virtual meeting as they would a face-to-face meeting. Agenda and handouts should be available, attendance should be recorded, someone should serve as recorder at each meeting, and a summary should be prepared, circulated, and discussed with the local team prior to the next virtual team meeting.

If there are only one or two members at each site, the lone member, or pair, should be provided incentives for creating a comfortable and hospitable environment. They should have adequate technology support and be encouraged to bring a beverage or light snack. Again, they should take notes which are then typed and maintained as a journal or record at least until the team project is completed and the team is disbanded. This record may be very valuable for the preparation of a final written report.

Team members at different locations are frequently in different time zones. These differences must be recognized and appreciated. If people are being asked to participate during a time that is not part of their normal workday, they should be compensated by receiving extra pay, perks, or compensatory time. If the team meeting is during the normal lunch or dinner hour, some type of catering should be provided or members should be encouraged to bring in food and beverages. Many significant returns can be achieved by paying attention to realistic creature comforts.

Team members must develop a feeling that they are connected with all of the team members – near and far. At each site, members should meet between meetings and have small group discussions about the project and their role in it. They should be a team within a larger team. They should have lunch together periodically and be encouraged to get to know each other at a personal level. They should know each other's names, job description, and a little about their career. They should also be encouraged to share something interesting or unusual about themselves that most people don't know. Members might be divided into pairs or sub-groups to investigate certain aspects of the project and bring that information back prior to the next large meeting.

In the virtual environment, every member of the total team should have a recent headshot photo. These photos, along with a brief autobiographical sketch should be shared and all members should be encouraged to use them in an effort to be able to communicate more effectively with each and every member. At every meeting, members should be asked their thoughts or opinion about something, particularly if they are not a regular contributor to the conversation. Ask them what they think -- get everyone involved. Every member should have one or more assigned responsibilities so that they share ownership in at least part of the larger endeavor. Depending upon how frequently the teams meet, they should be asked to provide an update since the last meeting. This can be personal, professional, cultural, or environmental. This type of informal sharing can build familiarity and foster trust, respect, dedication, and synergism.

Dani, Vurns, Blackhouse, & Kochhar (2006) write extensively about the implications of organizational culture and trust in the working of virtual teams. They emphasize that the working practices in industry are changing, with organizations becoming more knowledge based and focused on core competence, and that they are willing to share their unique competencies in alliances with partner organizations. These alliances are facilitated through the use of virtual networks and the use of globally based teams (Dani, et al., 2006). Team members may or may not know each other so it is important that trusting relationships develop quickly.

Virtual teams represent a new form of organization that offers unprecedented levels of flexibility and responsiveness that has the potential to revolutionize the workplace. Virtual teams cannot be implemented on faith and they do not represent a perfect solution. Peter Druker, as referenced by Dani, et al. (2005), has identified changes in organizations and potential changes likely to

emerge over the next few years. The market place is complex and uncertain, and becoming more so. Traditional organization structures and management concepts of the past are no longer viable. Organizations are placing more emphasis upon trust between collaborating individuals, groups and companies. The ability to respond to change requires high levels of agility. Organizations are utilizing improved communication technology to support the increased need for agility (Dani, et al., 2005).

APPRECIATIVE INQUIRY

Periodically, members should be asked what is working well for them. Only after being asked about what is going right, should they be asked what they would like to see improved and what are their recommendations for improvement. This line of reasoning comes from the literature on Appreciative Inquiry (AI), which focuses on what is going right and what is working well (Cooperrider, et al., 2001).

Appreciative Inquiry (AI) is about the search for the best in people, their organizations, and the world around them. It involves the discovery of what gives "life" to a living system when it is most alive, most effective, and most constructively capable in economic, ecological, and human terms (Cooperrider, et al., 2001, p. 7). AI involves asking questions that help heighten positive potential and involves the mobilization of inquiry through crafting "unconditional positive" questions. The task of intervention gives way to imagination and innovation. There is discovery, dream, and design. AI seeks to build a "constructive union among people and what they talk about as past and present achievements, assets, unexplored potentials, innovations, strengths, elevated thoughts, opportunities, high point moments, lived values, traditions, strategic competencies, stories, wisdom, insights into the organizational spirit and visions of valued and possible futures" (Cooperrider, et al., 2001, p. 7). The positive core of organizational life is one of the greatest and largely unrecognized resources in the field of change management. The single most prolific thing a team can do if its aims are to construct a better future is to embrace the positive by appreciating the best of what is and dream what might be (Cooperrider, et al., 2001).

CULTURE

Additional challenges occur with virtual teams whose members reside in different countries, speak different languages, and are of different ages, ethnicity, and religions. Culture and language determines how an individual processes and interprets the environment around them. Cultural differences may also account for misinterpretations during communications. Distance and a lack of nonverbal cues intensify this situation. Cultural differences and cultural values can lead to cultural miscommunication (Davis & Scaffidi, 2007). This chapter does not address cultural miscommunications directly but it recognizes the potential for serious challenges and problems. It is essential that those involved in team building and team effectiveness and trust understand these differences exist and that they seek expert guidance on how to best overcome them.

BIOTEAMING

Virtual teams are a reality in the modern workplace and their success relies in part on ways to ensure that trust, unity, cohesion, and performance are cultivated and rewarded. Thompson and Good (2005) discussed a new paradigm for conceptualizing virtual, networked business teams called *The Bioteaming Manifesto*. They believe that in order to produce cooperative and highly motivated teams, adoption of new technology must be accompanied with the development of a new

culture that supports the delivery and interaction methods required by virtual teams.

A Virtual Networked Team should be recognized as a separate entity from its members. It is in itself a super-organism that needs to be nurtured in ways that enhance and support its complex and interconnected nature. The team is a whole that is more than the aggregation of the individual parts (Thompson & Good, 2005).

Bioteaming is a dynamic concept used to enhance team effectiveness. Bioteaming is about building organizational teams that operate on the basis of the natural principles which underpin nature's most successful teams. One key mission of Bioteaming is a review and analysis of scientific literature in search of the common traits of Mother Nature's most effective biological teams. Bioteaming is based on a distributed intelligence model whereby members are able to self-select when to use personal intelligence and critical thinking and when to rely on team intelligence. Team member motivation and optimism are important aspects of, and required for effective Bioteaming. These high performance teams are more successful when they share beliefs by which their behavior and attitude is determined:

- **Belief 1**: Clear and Public Accountability
- **Belief 2**: Trusted Competency
- **Belief 3**: Give and Take
- **Belief 4**: Total Transparency
- **Belief 5**: Shared Glory
- **Belief 6**: Meaningful Mission Value
- **Belief 7**: Outcome Optimism (Thompson & Good, 2005).

High performance team members come to believe that the other team members trust them to do their job without being supervised. This translates into, "I know what you have to do and am confident you can do it – how you do it is your business" (Thompson & Good, 2005, p. 15). High performance team members believe they can ask for help and that, with moderation, asking for help increases their standing within the team. Members expect to be kept informed in an honest and timely manner of any important issues in the project. Team members believe they should be free to express opinions about situations they are not directly responsible for and that these opinions should be highly respected and listened to.

Team members believe they are all in it together and that glory and pain will be shared. They do not believe that the leader will take an unfair portion of the credit for a success or all the blame for a failure. Each team member is equally accountable to the leader and fellow team members. The team members believe that the group's mission is significant, important and meaningful. They believe that if they are successful they will have made a fundamental contribution to their organization. This is not just about business as usual. The task must not seem trivial or unnecessary (Thompson & Good, 2005).

Team members also feel that they are the best people in the organization to succeed in accomplishing the identified task. The members are confident they will succeed in delivering a positive outcome for the project. The teams work better if they develop a deeply shared set of beliefs and a commitment by members to put in the necessary amount of work for the project to succeed. If the team feels trusted, it acquires self-confidence and adopts a meaningful, positive and responsible attitude toward successful completion of the mission (Thompson & Good, 2005).

Bioteaming works as the implementation process for leaders who want to make their virtual business teams more productive. Four action zones have been identified which generate repeating patterns common to all living things. These include:

- Leadership zone
- Connectivity zone
- Execution zone
- Organization zone

In the Leadership Zone every team member is treated as a leader. The rule is to stop controlling and to communicate information not orders. Team members are trained to judge for themselves what they should do in the best interest of the team. Team members achieve accountability through transparency not control.

In the Connectivity Zone team member are synergistically connected with other team members, partners, and networks. Information flows freely. Team members are selected carefully but once they have committed to them they treat them with full transparency and trust. Symbiosis is achieved. Team members cluster and pay attention to the collective networks and relationships of each team member. They are truly a team and not just a group of individuals.

In the Execution Zone team members experiment, cooperate and learn. For a team to be effective it is critical to count on the ability of the team to guarantee a pre-defined set of key tasks in a reliable and systematic fashion. Members take a proactive and responsible interest in anything which might affect the ultimate success of their project whether it is within their defined role or not. Win-win is an outcome not a strategy. Traditional teams believe that analysis is the best way to get things right. These bioteams believe that live controlled experimentation is the best way to get things right. In this environment teams quickly experiment with multiple alternative courses of action to find out what works best. After they have collected sufficient data they build on and methodically apply the most promising results.

In the Organization Zone teams define their goals and roles in terms of the transformations they intend to make in the people and partners they engage with. In a bioteam environment members select the other members and recognize that the team will change and emerge over time. They keep looking for new and useful team members through the team life span. They tend to seek out part-time members as advisors, experts and allies who can help them just in time as necessary. Members are aware that growth cannot always be managed or controlled. The leaders and members treat their own team like a living thing and watch for and facilitate natural opportunities for growth (Thompson & Good, 2005).

TECHNOLOGY

Many technological tools and resources exist to support the interaction of virtual team members. The chosen applications and technology hardware should depend upon what works best to achieve the team goals and objectives. Uniformly, a digital network is required with appropriate bandwidth and security features. Newer forms of communication tools rely upon computer networks and digital tools, and provide virtual teams powerful forms of interaction. These include innovative technologies such as those used to facilitate interaction between individuals in 3-D virtual worlds, to more common but important means of communication such as the use of email. Within this spectrum lie a plethora of other tools, examples include instant messaging, webinars, shared whiteboards, chat rooms, asynchronous discussion boards, wikis, meeting software, video streaming and web pages. Not mentioning other forms of communication tools available to virtual teams would be remiss. Some of these non-computer based media include interactive video or video conferencing and the use of the telephone bridges. Variety helps keep people interested and engaged, thus consideration should be given to using more than a single communication tool.

Effective engagement in 3-D virtual worlds requires computers with good graphics ability and high-speed internet access. It also requires participants to learn how to navigate and interact within the virtual world which may require more training than other forms of communication. Although, because virtual teams meet regularly and intensively, the benefits of engaging in a virtual world may far exceed the additional investment

needed in training. At the other end of the technological sophistication spectrum are telephone bridges, which are relatively inexpensive but do not work well with more than seven or eight people. A webinar combines attributes of a telephone conference call with online digital content and is effective in certain situations. Meeting software, instant messaging and chat rooms allow people using individual video cameras and microphones to see and talk with each other one-on-one or in small groups. Organizations are using Blackboard, social networking sites, and internal blogs to share information. Video can be produced at one or more locations and distributed on demand through collaborative websites or email.

While email may not be the most effective way to facilitate virtual team relationships, it remains a useful tool. Daily or weekly updates sent regularly to all virtual team members contain pertinent business information to keep them updated and connected to each other and the project. To promote personal relationship building, at the end of the update the facilitator and the team members are encouraged to write something that happened to them personally during the week. These personal stories help to develop collegiality and trust within the team (Davis & Scaffidi, 2007).

When working with video conferencing technologies from multiple locations, teams must plan ahead and work smarter rather than harder. At each location there needs to be a facilitator, or at least facilitator guidelines. People should position themselves around the room in such a manner that ensures the greatest likelihood that they can be seen and heard at the remote sites. In many cases one microphone may not be sufficient for the audio needs of the meeting, work with the IT people to obtain sufficient types and quantities of microphones. Have a podium or location, where the camera and the microphone are well situated to capture the speaker. When people are giving a report or discussing important issues they should move to that location so that team members everywhere can see and hear them clearly. It is important that people are able to be seen, distinguished from each other, and heard at remote sites. In video conferences, every member should be expected to be an active participant. This participation requires that they come to the meeting prepared to engage and contribute in some way. The meeting facilitator, as well as team members, should engage with other members and ask for their opinion frequently if they do not volunteer information.

VIRTUAL WORLDS

Virtual worlds are difficult to define in narrow terms (Wilson, 2009). A range of names have been used for them that include virtual social worlds, massively multiplayer online role-playing games, multiplayer online games and 3-D Internet (Krell, 2007). The variance in names indicates the wide array of applications that virtual worlds offer. Virtual worlds are three-dimensional spaces in which users interact with each other through an avatar. Avatars in these spaces are three-dimensional (3-D) representations of the user. They are user created and may appear in any variety of forms, including a realistic human representation, a fanciful embellishment of the human form, or a completely imaginary creation. The three-dimensional environment in which they interact may be fixed, or be open-ended and generated and manipulated by the user.

There are key words that are associated with virtual worlds. They include Business ready, On the radar, and Upcoming. Wilson (2009) identified a number of virtual worlds that are business ready, meaning they are established and organizations are using their services. These business ready virtual worlds include: Active Worlds, OLIVE, Protosphere, Qwaq Forums, Second Life, Web Alive and others (Wilson, 2009). Substantial investment into companies involved with providing virtual world platforms and services is occurring, for example, in the fourth quarter of 2007 more

than $425 million was invested into virtual world companies in the United States alone (Tampone, 2008).

Corporations around the world recognize the value of teams working within virtual worlds to hold meetings, conduct training, or build prototypes or simulations in a safe learning environment. Although a variety of virtual world platforms exist, for purposes of this discussion we are going to concentrate on one, that being Second Life. Second Life is not without its critics, but "for inexpensive, non-critical applications Second Life is far ahead of the pack" (Wilson, 2009, p. 13). Despite any flaws, both business and educational organizations use Second Life for meetings, trainings, simulations, conferences and exhibitions. Recommendations from Wilson (2009) are that businesses and educators use second life to get a feel for virtual worlds. He recommends using the platform quietly and privately at first and to be aware of text-chat logging and other security concerns.

SECOND LIFE

Second Life is a virtual world developed by Linden Lab in 2003 that is accessible via the Internet. A free program called the Second Life Viewer enables users, called Residents, to interact with each other through avatars. Residents can explore, meet other residents, socialize, participate in individual and group activities, and create and trade virtual property and services with one another, or travel throughout the world, which residents call a grid. Second Life provides an open-ended environment that can be manipulated and customized and is available for users over age 18. A three dimensional modeling tool is built into the software which allows residents to build virtual objects (Wikipedia, 2009).

In 1999 Linden Lab's founder, Philip Rosedale, developed software that enabled computer users to be fully immersed in a 360-degree virtual world experience. By September, 2008 more than 15 million users had established accounts and Second Life was honored at the 59th Annual Technology & Engineering Emmy Awards for advancing the development of online sites with user-generated content. Second life can take you to a place and event you would otherwise not be able to attend, and put you in contact with people you otherwise would not have any contact with.

There is no charge to create a Second Life account or for making use of the world for any period of time. A premium membership of about $10 per month facilitates access to an increased level of technical support. Avatars may take any form including being made to resemble the person they represent. A single Resident account may have only one avatar at a time, although the appearance of the avatar can change. Avatars can communicate via local chat or global instant messaging. Second Life has an internal currency, the Linden dollar, which can be used to buy, sell, rent or trade land or goods and services with other users. Because of Second Life's rapid growth rate, it has suffered from difficulties related to system instability. Second Life is used as a platform for education by many institutions such as colleges, universities, libraries, and government agencies.

Second Life encourages engagement between users and provides exciting new means for conducting meetings and conferences, conducting focus groups, executing customer research and recruiting, as well as fostering interactive engagement among colleagues and target audiences in an immersive 3-D environment that includes voice, text, video, and other collaborative tools (Second Life Grid, 2009).

With Second Life individuals can publicly communicate with each other in text or 3-D spatial voice chat while private conversations can be held among designated groups or with one-on-one texts and voice channels. It allows keynote speakers to address an entire group while subgroups can maintain communication and share thoughts, ideas and reactions. The platform supports multiple

languages and real-time translators are available. Second Life provides a safe and powerful platform for interactive learning experiences whether in a classroom setting or in a dangerous or expensive environment for experimentation. It enables people to learn new languages, rehearse presentations, try out new ideas, practice new skills and functions, and learn without risk of damage or injury.

Second Life brings a new dimension to training events, research, professional certification, and compliance. Trainees can participate in team building activities and training from locations anywhere in the world. Learning and interacting together in 3-D space creates the sense of immersion. This shared experience may improve motivation, training retention and teamwork as a result of heightened sensory engagement and the opportunity for collective activity and communication. Unlike other e-learning technologies, Second Life can bring trainees and their instructors into the same "physical" space where they feel as if they inhabit the same world at the same time. Using Second Life simulations and models avoids the expense of real world training sites.

Corporations and educational institutions of all types choose the secure Second Life Grid software platform to build online 3-D virtual worlds. Business, education, government, and nonprofits create both public and private spaces using the tools and technologies powering Second Life, the largest virtual world community. Many report better collaboration, high productivity, reduced costs, and greater innovation. The advantages include:

- Hold meetings without leaving the office using real-time 3-D collaboration
- Construct product and process simulations so participants from all over the world can test new designs and concepts
- Conduct employee training
- Offer seminars and symposia that include distant participants
- Meet with global partners at your virtual headquarters
- Receive product feedback from clients
- Engage different constituencies and raise funds
- Build community (Second Life Grid, 2009).

Although the advantages of using Second Life or other virtual world platforms are intriguing and may far outweigh any disadvantages, those venturing into this arena should be aware of the potential challenges. Some of these include the need for adequate technological equipment and support, a shift in organizational culture, a relatively steep learning curve for users, and the need for designated time to allow users to create their account and the virtual world environment in which the team will meet. One specific example of how the use of virtual worlds can consume a considerable amount of time is seen in the process of creating a user's avatar. A visit into Second Life quickly reveals people's need to represent themselves through their avatar in an attractive manner. Although visual representation is important, the "good looking" avatars typically require a fair amount of time to develop. It is true that user can simply use the default avatar, however, it should be expected that the majority of individuals will want to customize theirs in some kind of appealing manor, and that this customization is likely to consume a considerable amount of time. In some ways this is no different than dressing appropriately for a professional work environment; however, adopters should expect a larger investment of time for this endeavor than required to simply put on a business suite. If an organization adopts the use of virtual world technology, and employs systematic and efficient processes for helping its users overcome these challenges, then they may in fact turn out to be minor in comparison to the rewards.

Planning and building a virtual world can be complicated but Second Life makes the process relatively straightforward. Here is how to do it.

- Plan Well. It is important to clearly identify project objectives and goals. Understand what you want to achieve, who you want involved, and the Return on Investment you expect. You need executive support with Virtual World activities if you are to have successful in-world experiences.
- Understand the Technical Requirements. Some organizations have strict firewall policies that prevent Second Life from running on business or government computers. It may be necessary to work with the IT department to authorize Second Life into the network. As with all three-dimensional type applications, Second Life runs best on newer computers with advanced graphics cards.
- Join Second Life. Go to the join page and register. You need to choose a standard avatar, an in-world name, and provide basic contact information before you can download the Second Life viewer. The Second Life viewer is your Second Life browser.
- Learn to Work in a Virtual Space. Once you download the Second Life Viewer, you enter the Second Life environment on Orientation Island. It may look and feel unfamiliar to you. The best resource for beginners is in the Support section.
- Design Your Avatar. An avatar is a virtual representation of you. Using your basic avatar you can then change nearly every element from body size to hair color to clothing, and more.
- Find a Solution Provider. Second Life has a community of over 300 Solution Providers to help you plan, design, and build a custom environment in Second Life to suit your purposes. To find a Solution Provider search the Solution Provider Directory.
- Purchase Land. Purchase land or space where you can build your work or learning space. You buy land from the Land Store.
- Help. If you hit a snag the Second Life Knowledgebase and Second Life Wiki have a wealth of information about how to create and run a business in Second Life.

CASE STUDY

Many organizations are using virtual world technology to engage in significant interaction with others and IBM is one of the most prominent. IBM's investment in virtual worlds is significant. They have thousands of employees using several virtual world technologies on a regular basis. IBM is building green virtual data centers as well as running large internal conferences. IBM's Academy of Technology has 300 members within the organization who define the technical agenda for the company.

An example that highlights some of the benefits of the use of virtual worlds is IBM's use of Second Life to conduct a virtual conference. The challenge was to determine how to hold two, multi-day meetings, each for 150-300 IBM employees from dozens of countries, without the need for anyone to travel. The solution was to run a version of Second Life behind IBM's corporate firewall and host the events entirely virtually. Employees participated in conference activities such as keynotes, breakout sessions, poster sessions and networking opportunities.

IBM estimates they saved approximately $250,000 by holding the Virtual Worlds for Business conference virtually. Karen Keeter, a spokesperson for IBM's Digital Convergence group, reports that all the event cost participants was time and much less of it than had they traveled to a physical conference. The Annual General Meeting (AGM) ran for 3 days with 120 poster sessions, social events and over 300 registered attendees for dozens of different countries. It is

reported that engagement was high with the conference running 4 hours in the morning and 4 hours in the evening each day. The virtual conference saw over a 100% increase in attendance from prior years. People hung out in the virtual plaza and other social areas where video conference calls and networking took place.

IBM surveyed participants of the conference and asked them how the virtual conference compared to face-to-face conferences on the following four levels: content, presentation style, learning, and networking. The results were surprising and very positive towards the use of virtual worlds. The participants responded as follows: 96% said content was the same or better; 85% said presentation style was the same or better; 78% said learning was the same or better; and 62% said networking was the same or better. These results are impressive.

An Executive Summary of the IBM experience is entitled *A Fifth of the Cost, and No Jet Lag*. The report states that in late 2008 IBM held a Virtual World Conference and an Annual Meeting hosted in a secure Second Life environment with a conference space specially designed by IBM for keynotes, breakout sessions, a simulated Green Data Center, a library, and various areas for community gathering. The participants were offered pre-conference training on the basics of Second Life to make them comfortable communicating and navigating within the environment. IBM estimates the ROI for the Virtual World Conference was roughly $320,000 and the Annual Meeting cost one-fifth the cost of a real world event. Many IBM staff are reported to have been converted into virtual world advocates. They realized that virtual environments are much more than an interesting gaming environment or social networking tool. Virtual environments have the potential to change the way business is done globally and are worthy of in-depth exploration (Second Life Grid Case Studies, 2009).

CONCLUSION

New and emerging forms of technologies influence the way people interact and work within organizations. Virtual teams are enabled by technologies that allow for the sharing of text, audio, video, and workspaces within a virtual environment. It is important to choose appropriate technologies to support collaborate efforts. In some cases, the use of virtual worlds (e.g., Second Life) may be an appropriate and effective median. In other situations, it may be best to use alternative technologies that have less of a learning curve than those required in virtual worlds, or less of an organizational investment. Virtual team effectiveness and success however, rely on more than just technological tools. The achievement of these teams is dependent upon the types of processes, practices, and incentives that guide their work, that promote a sense of common goals and community, and that nourish individual and group motivation.

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KEY TERMS AND DEFINITIONS

Appreciative Inquiry: Appreciative Inquiry (AI) is about the search for the best in people, organizations, and the world around us. It involves the discovery of what is taking place when an organization and its people are most alive, most effective, and the most positive about the future. AI seeks to build a constructive union among people and what they view as past and present achievements, assets, unexplored potentials, innovations,

strengths, elevated thoughts, opportunities, high point moments, and lived visions of the future.

Avatars: Avatars are three-dimensional (3-D) virtual representations of the user. They are user created and may appear in a variety of forms including a realistic human representation, a fanciful embellishment of the human form, or an imaginary creation.

Bioteaming: Bioteaming is a dynamic concept used to enhance team effectiveness. Bioteaming is about building organizational teams that operate on the basis of the natural principles which underpin nature's most successful teams.

Second Life: Second Life is a virtual world developed by Linden Lab in 2003 that is accessible via the Internet. Second Life is a free or inexpensive way for people, called residents, to interact with each other through avatars. Residents can explore, meet other residents, socialize, participate in individual and group activities, and create and trade virtual property and services with one another, or travel throughout the world, which is called a grid. Second Life provides an open-ended environment that can be manipulated and customized. Second Life encourages engagement between users and can be adapted for use with a wide variety of audiences.

Team Dynamics: The interaction among and between team members as they engage and work together toward a common objective.

Virtual Environment: A non-physical setting within which individuals interact and work. Virtual environments are typically computer based and rely upon the Internet for functionality.

Virtual Teams: Intentional groups composed of identified individuals who have special talents/skills/knowledge related to the goals of the team. Virtual teams are groups of highly qualified people brought together in a virtual environment in order to capitalize upon each member's unique attributes. Virtual teams are an important component of many corporate and educational organizations and have evolved largely because of globalization, technology, and changing demographics.

Virtual Worlds: Virtual Worlds are three-dimensional online spaces in which users interact with each other through an Avatar. Corporations around the world recognize the value of teams working within Virtual Worlds to hold meetings, conduct training, or build prototypes or simulations in a safe learning environment. A variety of virtual world platforms exist and more are being developed or improved at a rapid rate.

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Chapter 23
Evaluation of Corporate Structure Based on Social Network Analysis

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ABSTRACT

Social network analysis provides helpful reports and comparisons, which may support the corporate human resources management. Several ideas, measurements, interpretations and evaluation methods are presented and discussed in the chapter, in particular group detection, centrality degree, location analysis, process management support, dynamic analysis, and social concept networks.

INTRODUCTION

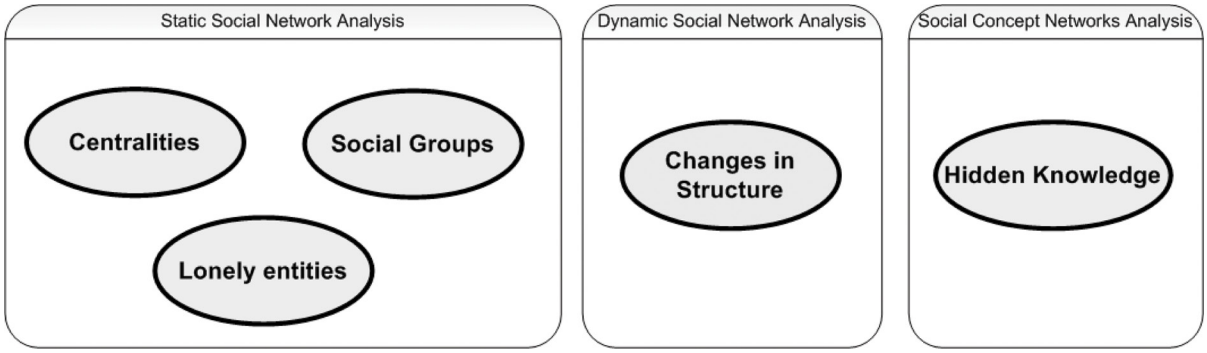
Over the past few years, corporations have evolved from sets of individual units to collaborating social beings. Recent companies are implementing various ideas to help their employees to get known and co-operate with each other and therefore improve performance of their work. Some of them are company integration events, trips and more fresh as well as less expensive intranet social websites.

Hence, people get into various relationships due to their different job activities. Based on these relationships, a typical social network describing organizational connections can be created. These social connections between employees can be extracted from the data about pure communication like email exchange, phone calls, instant messengers or teleconferences. This paper describes a general social network approach to help analyzing the knowledge flow in the organization (Musiał, 2008) and therefore supporting corporate management.

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Figure 1. Social network analysis in organization



Each company or organization can be compared to a living organism (Gloor, 2004). Like in the nature, each unit is dependent on others and only altogether they really form a complete system. Nevertheless, the essential part of a human body is the nervous system which steers and supervises all other processes. The similar role plays the knowledge flow for the corporate lifecycle. Thus, analysis and optimization of communication efficiency within organization is very important. Such analysis can detect invisible anomalies and suggest some improvements in managing corporate policies, hierarchy structure and social approach to employees, which may result e.g. in achieving competitive edge, making the organization more flexible. or friendlier to its employees.

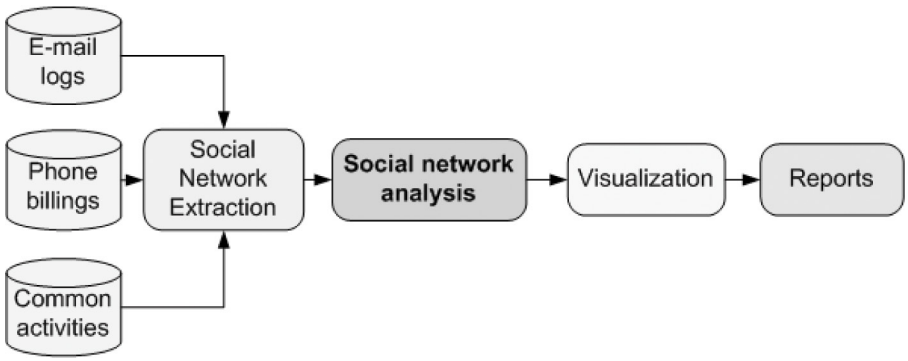
SOCIAL NETWORK APPROACH TO CORPORATE ASSESSMENT

Social Network Extraction

A corporate social network can be extracted from various IT systems utilized in the organization, in particular from internal communication like email logs, phone billings and from common activities, e.g. events, meetings, projects, etc. Some other sources for the social network extraction may be intranet community forums and physical location of workplaces, i.e. fact of sitting in the same office room.

A process of generating social network requires to determine the objects connecting people – concentrating humans activities. These can be an email message, for which two roles of users can

Figure 2. System architecture overview



be distinguished: email sender and email recipient. Some additional recipients extracted from fields 'To', 'Cc', 'Bcc' can, in turn, effect relationship strengths. A phone call object can be treated similarly with roles of caller and receiver. These two object types (email and calls) are an example of direct relationships where actors through their mutual communication directly know about their connections.

In specific cases, there may be a need to perform additional preliminary processing on social network members. For example, if most of CEO's correspondence is sent by the secretary using secretary's own email address, both the secretary and CEO may be treated as a single social entity – one network node depending on general analysis requirements. Another example is the automatic correspondence sent by different kinds of applications, which has no important meaning in social network – those entities (nodes) may be removed from further analysis, because they even do not exist in the corporate hierarchy as well.

Some other objects are container type. People are connected indirectly through them by being a part of an activity and it is not certain that they communicated directly at all. These objects are common events/meetings/projects in which some employees can participate in. For example, if two employees are both the team members in the same project, they are thought to be in common social relationship. The same approach can apply to Active Directory or ERP system group memberships, forum discussions and even office room co-workers.

Comparison with Corporate Hierarchy

In most corporate information system structures, directory services are used to reflect internal hierarchy (Carter, 2003). These directory services allow the administrator to build a hierarchy tree of organization units, departments, teams and individuals; leafs in this tree are single employees. The most common implementation of LDAP/X.500 directory services is Microsoft Active Directory (Iseminger, 2000). Assuming that information contained within directory structure is correct and up-to-date, the organizational hierarchy derived from Microsoft Active Directory can be directly used in structural comparisons, Figure 3. This comparison confronts the known and visible organizational structure (extracted e.g. from Microsoft Active Directory) against the real but invisible social relationships computed from communication and common activities (structure of the social network).

If the organization maintains no directory service (or it is outdated), there are also other options available: extracting this structure from HR system or even manual import of the corporate hierarchy from organizational documents.

Figure 3. Social network vs. corporate hierarchy

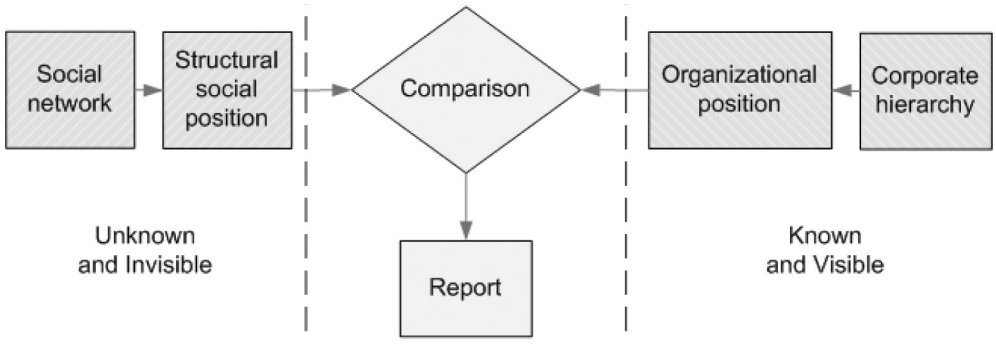
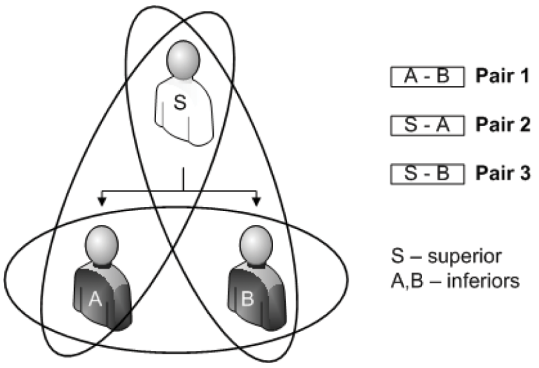


Figure 4. Extracting of pairs from the organizational hierarchy for comparison



Having both the formal structure of the organization and the structure of the social network we can estimate their equivalence. To be more accurate, we would like to know whether the positions and roles of actors in the network structure correspond to their official roles and positions. Summing up, all needed data can be divided into two groups: a) the data necessary to build the social network, b) the additional data for comparative analyses. Note that both source types can be automatically processed using data available in appropriate IT systems.

Equivalence Measurement Methods

Two main approaches to measurements of equivalence between corporate structure (hierarchy) and social network (graph): comparison by pairs or by ranks of employees.

Instead of considering the whole network, the first method focuses on comparing employees pairwise. People in a pair must be very close in the organizational hierarchy and are either in the direct relation superior-inferior (Pair 2 and 3 in Figure 4) or are at the same level and have the same direct supervisor (Pair 1 in Figure 4). Then, for both pair members, we analyze the difference between their social measures, e.g. centrality degree, clustering coefficient, etc. These measures can be compared separately or weighted and combined as proposed in (Rowe, 2007) (Figure 5). Pairs where social metrics differ more than a given threshold are supposed to be at different levels of the hierarchy. Otherwise, if the social score is similar, it means they are even in the terms of organizational structure. Comparing these to the real hierarchy will point out anomalies e.g. when a superior is at the level of his/her inferior or even below.

Second proposal compares two ranks, e.g. using well-established comparison methods (Fagin, 2003): Kendall's coefficient of concordance (Kendall, 1948) or Spearman's rank correlation (Spearman, 1904/1987). These rank correlation measures answer the question how similar the corporate hierarchy (the first rank) and the social network (the second rank) are in the organization. The first rank is derived directly from the corporate hierarchy – each level of the hierarchy should have weights assigned, starting from the top level (tree root) to the lowest one (leaves). Later, these weights are assigned to all employees work-

Figure 5. Difference between social measures: centrality degree (1), clustering coefficient (2) and combined (3)

$$(1)\quad Diff_{Cen\ A\text{-}B} = Cen_A - Cen_B$$
$$(2)\quad Diff_{Clu\ A\text{-}B} = Clu_A - Clu_B$$
$$(3)\quad Diff_{Comb\ A\text{-}B} = Cen_A \cdot w_{\mathrm{Cen}} + Clu_A \cdot w_{Clu} - Cen_B \cdot w_{\mathrm{Cen}} + Clu_B \cdot w_{Clu}$$

Cen_X – centrality degree for node X;
Clu_X – clustering coefficient for node X;
w_y – weight for measure y.

ing on the particular levels. So, probably, on the top of the first rank will be CEO, then directors, managers and regular employees at the bottom. The second rank is built by using social network analysis (SNA) and one or more structural metrics regarding the node importance. An exemplary combined and normalized metric (Social Score) is proposed in (Rowe, 2007), and can be used to build social network rank. If the rank comparison result (Kendall's or Spearman's coefficient) is close to1, both ranks appears to be very similar. It means that the corporate structure and social network well correspond with each other. If the result is near 0, there is almost no similarity between both structures.

However, as noted in the Conclusions section, the decision about changes in the corporate structure should not be automatically made based only on the proposed equivalence metric results.

STATIC ANALYSIS OF SOCIAL NETWORKS

Centralities

There are several structural measures which can be applied to static social network analysis (SNA). Primary benefit from applying graph theory analysis to social networks is the identification of most important actors (Kazienko, 2009; Musiał, 2009; Wasserman, 1994). In one measure, a central node of the graph is the one with the greatest number of connections to other nodes. Therefore, a central person in the social network is the most popular person in the certain community (local centrality) or in the whole network (global centrality) (Klein, 2004; Scott, 2000). However, the main goal of the concept presented in this paper is not to detect such actors, but to point out differences between the invisible social position (extracted from the social network in the analytical way) and the official, visible position in the organizational structure. It is suspected that the most important people in the corporation should probably be the department directors or team leaders. What happens if there are some other people with the higher centrality degree than them? Conclusions can be ambiguous. It could mean that there are some "hidden natural leaders" who may not fulfill their potential and their role in the official hierarchy may be too low (Balkundi, 2005). However, it may also mean the opposite; the real leader position is too high for his abilities. It depends on the scale of difference between centrality degree of the real leader and the potential one. If this difference is small, there is probably no reason to apply any changes into organizational structure. For example, there can be a secretary who manages most of the business cases for the leader. Nevertheless, if the difference is high, it is highly probable that some serious changes in the hierarchy structure need to be performed to optimize team's performance. (Figure 6)

Social Groups

A social network can be divided into smaller groups (subgraphs, communities). The equivalent structures in the corporate hierarchy are subtrees of teams and departments. As a result, corporate analysis of groups includes comparison of social network groups and hierarchy subtrees to detect differences. One of the possible scenario in such case is when a person is more connected to the other team members in the social network than it comes from the organizational hierarchy. As in the example in previous section, the possible set of actions for the management depends on the difference between link strengths to the own group in opposite to strengths of the links to other groups. If this difference is significant, then the system may suggest to move this employee to another department/team in order to improve his or her efficiency. (Figure 7)

Other scenario is linked to the idea of developing swarm intelligence in the form of Collaborative Innovation Networks (Gloor, 2004; Gloor, 2006). The groups, which are not present in the

Figure 6. Comparison between two structures: an organizational hierarchy and a social network graph (employee B has higher centrality measure than his superior S)

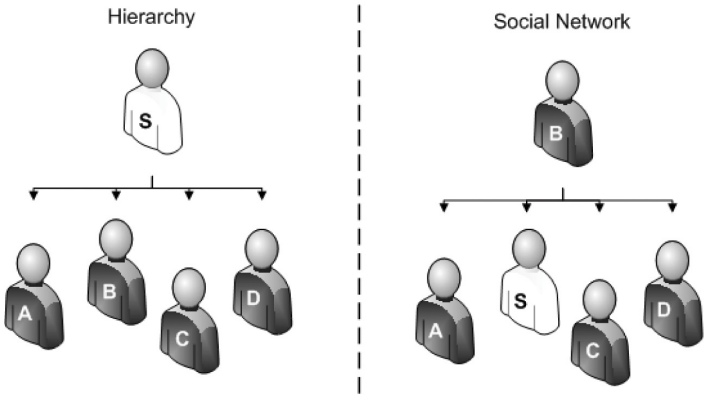
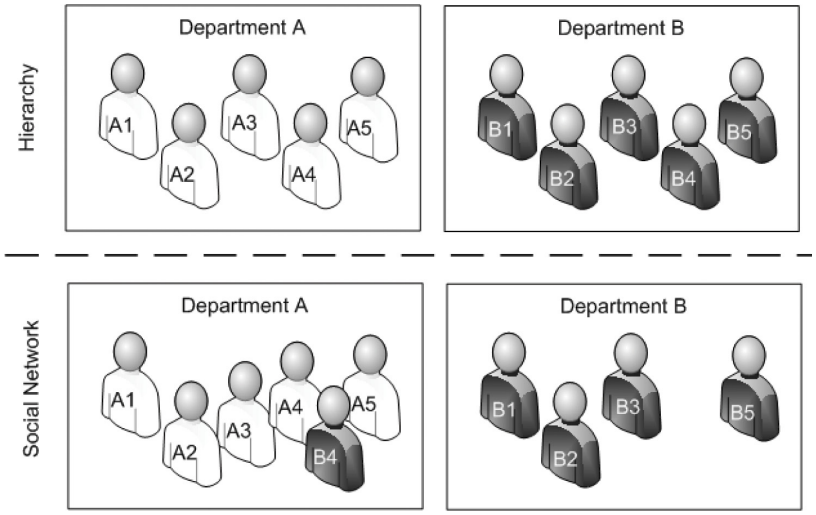


Figure 7. An illustration of group comparison shows anomalies (B4 has stronger relationship with Department A)

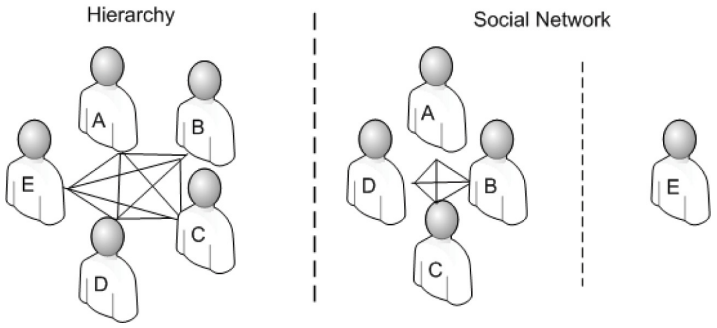


corporate hierarchy can be recognized as independent collaborative initiatives and, if given a free hand and the friendly environment, may lead to creation of new, fresh ideas. A perfect example of such structure is the Linux kernel developers community, where members of different corporations in the whole world are working together on new ideas and taking knowledge development to the higher level based on their interests (Lee, 2000).

Lonely Entities

In each society, there are "outliers" - people who are not fitting well into their group. Such actors can be easily detected in the social network. Because of their weak ties to other people, they usually far from the centres of the network (Musiał, 2009). According to psychological studies, it is obvious that teamwork is not performing well because of them. Unless they are real geniuses, it is required to find out reasons of this behavior by doing internal

Figure 8. A lonely entity E in the social network



investigation and take steps to deal with it, e.g. move them to another team or dismiss. (Figure 8)

Process Management Support

These days, more and more companies are transforming their own management style in order to be more process-oriented. To achieve it, the knowledge gained through the static analysis of social networks may be very helpful for the management staff. If a company does already have its own processes defined in some formal way and these processes may correspond to different layers of social network, an analysis may show whether they are really used. For example, if a process should be carried out in the group of three employees on some chosen layer, the existence of the ordered path between these employees may confirm (but not definitely) that this process does work. However, if there is no such path, the company management needs to perform some steps to find out why the process fails and to fix this problem: to redesign the process or to enforce employees to follow the procedures.

Location Analysis

Apart from the hierarchy structure management and proper employees' selection, companies have to deal with yet another problem. If we would consider the organizations bigger than small family businesses, where employees are counted in hundreds or thousands, the optimal office allocation arises as a significant issue. It is very important to establish effective communication between two closely collaborating departments as easy as possible by placing their offices next to each other. While the close relationships between e.g. sales and finance departments are fairly obvious, some other inter-department links may not be so clear. This is where the analysis of the social network can be very helpful. A frequent communication between two social groups indicates that they have got many things in common. They may work on the same project, discuss some financial issues or plan ahead future marketing moves. However, the distant collaboration can be less effective if their offices are far away from each other, even in different buildings. The detailed SNA report may point out the strength of relationships between entire departments and, after confronting it with the physical locations, may facilitate some adjustments. Department A can be moved closer to department B to improve their communication. Department C, in turn, whose link to A is much weaker, can be placed in the location where its members can easily discuss project details with departments D and E using a new conference room in another part of the building. Possibilities are only limited by the infrastructure.

DYNAMIC SOCIAL NETWORK ANALYSIS

Studying dynamics of changes in social networks over time is currently one of the most interesting research topics (Wasserman, 1994). Even in stable environments, social networks evolve. People establish new friendships as well as break others. Anyway, this paper focuses on changes caused by HR management. Moving employees to other teams/departments, hiring new workers, dismissing others, promoting, relegating – all of these actions have a huge direct impact on social network structure. It usually requires some time to gather the appropriate data but after it happens, managers have a very powerful knowledge of rules linking HR management with corporate social structure. The analysis of dynamics in the social network, which is extracted from the long term data about user activities and communication, provides the answers to some tough questions. Which employees should be promoted? Which ones should be relegated? Which people should be fired to strengthen the others and their social ties? Which workers should be assigned to a new project? The more and diverse data is available for analysis the better prediction accuracy.

However, the length of analyzed period is crucial for final results due to internal or external factors. It should be noted that there may be some departments not so active within specific periods, increasing their interactions in some other time. For example, controlling department might be in intensive contact with almost all departments while creating the next year budget whereas for the rest of the year, it might communicate only with a few key company persons. The same situation can be observed in the quality department, that maintains connections periodically in order to perform internal or external audits. Thus, the window of analysis in that case should be big enough to gather such activity irregularities or to find out if long-lasting processes are carried out properly. On the other hand, such big window may discard dynamic recent changes, which are not desired either. One of the proposed approaches is weighting of social connection with time factor so that the recent activities are weighted higher than the older ones (Kazienko, 2009).

SOCIAL CONCEPT NETWORKS (SCN)

Concept maps are structures showing which terms are connected with each other by co-occurrence in the same object such as email message (Cañas, 2005; Novak, 2008). Social concept networks is an idea of joining concept maps with social networks where the relationship between actors is based on email messages and common activities. Relationship strength is computed from the usage frequency of given terms/phrases in the linking objects. Actually, all SN-specific analysis can be applied to social concept networks. Interpretation of them is slightly different, though. For example, in this kind of social network, centrality degree identifies actors with the highest knowledge on given topic, experts.

Once keywords specific for a given project are declared, the social concept network immediately shows people with the expertise relevant to it. After comparing them to the group of people officially assigned to the project, it is possible to reveal actors with a "hidden knowledge", i.e. people who are not formally part of the project but are socially considered to be helpful. It can be a sign for the management to add these experts to this project and the future ones. Same analysis will also expose project members who are, in fact, not involved in discussions on project-specific topics.

EXPERIMENTAL STUDIES

Introduction

To test the idea of matching corporate structure and social network presented in this chapter, two

networks have been build and analyzed (Michalski, 2011). One is based on mid-size manufacturing company located in Poland source data and the other one uses data gathered from Enron corporation.

The process of building social network consists of choosing the graph type (directed or undirected) and weight calculation method between nodes. The authors decided to build directed graph with the weight of an edge between node *i* and *j* is as follows:

$$w_{ij} = \frac{\sum e_{ij}}{\sum e_i} \; w_{ij} = \frac{\sum e_{ij}}{\sum w_{ij} = \frac{\sum e_{ij}}{\sum e_i} e_i} \qquad (1)$$

where $\sum e_{ij}$ is the number of e-mails sent by node *i* to node *j* and $\sum e_i$ is a total number of e-mails sent by member *i*. It means that weight w_{ij} focuses on local neighborhood of an employee rather than on global network characteristic.

The next step is to calculate social network metrics used in comparison. It has been shown that some metrics are more suitable in matching social network to corporate hierarchy.

Final step of the process consists of comparison of social network and corporate hierarchy. It is accomplished by answering the question how many employees in social network rank are a good fit for certain level in corporate hierarchy. The basic result is made up of percentage coverage of each management level by correspondent social network rank employees. If a significant differences are found, more detailed analysis may be performed, even focusing on each employee when needed.

Companies Description

The first analyzed company is a manufacturing company located in Poland. The company employs 300 persons, whereas 1/3 are clerical workers, the rest - laborers. The period analyzed was half a year. The type of organizational structure is functional (Daft, 2009). However, due to organization operating model and its consequences to organizational structure clarity as well as logs interpretation possibility, only a subset of organization have been chosen for current analysis: 49 clerical employees not directly related to manufacturing process. Three-level management structure exists in the selected company part: management board (2 persons), managers (11 persons) and regular employees (36 persons) and they work in twelve different departments. There were no organizational changes during the analyzed period.

Enron, the another analyzed company, was one of the largest energy corporation around the world. It become especially famous worldwide in 2001 due to financial manipulation scandal. The Enron email dataset was made public by the Federal Energy Regulatory Commission during its investigation. The email dataset had a number of integrity problems which were corrected by researchers at MIT and SRI International (Cohen, 2009). The Enron hierarchy structure is still not publicly available. However, there are sources which can provide information concerning plenty of job positions of given employees and their department or division (Rowe, 2007). Because only some of employees existed in email corpus, authors have decided to analyze social network building only within limited set of managers and employees which positions - with high probability – were known.

Results

As stated before, the graphs built were directed with weight defined in Equation 1. The authors have decided to calculate most popular metrics used in social network analysis within each network their built: in-degree centrality, out-degree centrality, centrality beetweenness, centrality closeness, clustering coefficient Watts-Strogatz and centrality eigenvector (Musiał, 2009). Ranks

of social network position using above metrics have been compared to organization structure to gain information how well the organization levels had been matched. Because it has been found that none of the used metric and tested metric combinations were able to make the clear distinction between the first (management board) and the second management level (managers and directors), further analysis has focused on distinction management as a whole from regular employees. The results are presented in Table 1.

The results show that only some metrics are capable to make good distinction between management and employees. The best of them are: in-degree centrality and centrality eigenvector. It proves that the basic distinction between managers and others is based not on outgoing relations rather than on incoming relations (in-degree centrality) and the importance of employees contacting with us (eigenvector centrality).

DISCUSSION

Profile of Relationships

Throughout the process of building and analyzing the social network only the existence of mutual communication of common activities has been considered so far. However, the fact that email message sent from person *A* to person *B* does not determine itself the nature of the relationship between *A* and *B*, e.g. whether it is rather positive or negative. The emotional character of the single message should also effect relationship strength. Nevertheless, sophisticated and powerful text recognition tools would be required to examine the profile of the messages, not mentioning the advanced forms of expression like irony, sarcasm or even the meaning of the attached images or videos. There are no effective methods for these purposes yet (Krippendorff, 2004; Wiebe, 2005). This is just to point out that even a strong relationship between two people not necessarily means that they like each other. We should always be aware that connections in the artificially extracted social network do not completely reflect the complex nature of human relationships.

Decision Making

All presented analysis methods should focus on two general evaluation rates: similarity of the structural position and the role both in the social network and in the official organizational hierarchy.

Having the differences between the social network and hierarchy recognized, the management of the organization can undertake appropriate decisions to decrease these differences. For example,

Table 1. Accuracy of management level matching while using various social network metrics

	Percentage of the first and the second management level matched		Percentage of regular employees matched	
	Manuf. comp.	Enron	Manuf. comp.	Enron
In-degree centrality	85	67	94	85
Out-degree centrality	62	50	86	77
Centrality beetweenness	38	33	78	69
Centrality closeness	46	33	81	69
Clustering coefficient	15	17	69	62
Centrality eigenvector	77	67	92	85

the position in the structure can be affected by moving employees to other teams/departments. Changes of roles in the hierarchy are achieved by promoting/relegating.

Moreover, new positions and roles can be discovered in the social network which do not exist in the corporate hierarchy structure. As a result, the managers can create new positions in the organization.

CONCLUSION

Social network approach to manage problems is capable to significantly improve the Human Resources efficiency by either detection of hidden anomalies in the corporate hierarchy or making communication between employees more effective and easier. By analyzing semantics of email messages exchanged within the corporate network we are able to identify individuals with "the hidden knowledge".

Overall, social network approach to the problem of corporate management appears to be very helpful, however, all analysis need to be well interpreted to improve performance and social health of the company. This is only a tool. Still, human resources have to be managed by humans.

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Chapter 24
Social Media:
Opportunities and Challenges for Human Resource Management

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ABSTRACT

Social Media is primarily internet and mobile tools allowing people to share, collaborate and publish information. Over the last couple of years, the availability and usage of such tools has emerged substantially and led to a cultural shift, connecting people and allowing them to collaborate in ways that were not possible otherwise. To embrace social media tools seamlessly in the organizations can be a real challenge for human resource management professionals. The specific contribution of this paper is to take a relook at the opportunities which social media tools are able to create for the organizations in terms of learning and collaboration. Living and smooth working in a non-hierarchical network is still a big hurdle for organizations and can be a challenging task faced by human resource departments. This paper presents the foundational components of social media linked with human resource processes and lays the groundwork required for companies to harness the potential of social media in the long run. The ultimate objective of human resource departments is to be ready with a shift in their competency and skill sets by embracing a high degree of "technological readiness", adaptability and positive attitude towards these new social media tools. An exhaustive literature survey presents the analysis of the paper.

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INTRODUCTION

We are living in an era of unprecedented change and rapid growth. The challenges of this growth are not unique to the Web 2.0 and social media (SM). Tim O'Reilley, a media guru, in 2004, had popularized the term Web 2.0,which covers a wide range of technologies such as, wikis, blogs, pod casts, linked in, Facebook and Twitter. From the perspectives of the Human Resource (HR) professionals, these tools have immense potential to transform the way business is being conducted, leading towards greater credibility. SM is a subset of Web2.0, which falls under the broader Web 2.0 landscape of tools. One of the interesting paradoxes of social media is that its biggest impact is human rather than technological. As people adopt and leverage social media, their personal, consumer, and professional lives are changed in significant ways. The human impact of SM is not limited to individuals, however. The human capital that drives organizations will also be transformed significantly as organizations continue to incorporate new digital technologies into their operations (Hunt, 2010). It is also important to remember that the lines between work and non-work have become increasingly blurred as technology continues to advance. Many organizations have capitalized on this by enabling and expecting employees to work beyond the confines of traditional work spaces and work hours. And though employees are generally willing to accommodate those expectations, they expect some reciprocity in terms of being able to meet some of their personal, non-work needs during the traditional work day. They rightfully fail to see the logic or the fairness in limiting access to their social networks while they're at work – and as they increasingly feel empowered, they're increasingly likely to assert their rights, either directly or indirectly (Hunt, 2010).

Human resource professionals are increasingly becoming aware of the rapid changes which SM is bringing into the workplace, which is not only affecting the communication patterns of the working professionals but also affecting the rigid structures of the workplace. Changing communication patterns at the work place are diminishing the rigid boundaries between the various levels of the hierarchies at the workplace. To drive organizational success HR in its strategic leadership role need to understand the implications of the SM trends. Use of SM has created highly effective communication platforms where any user virtually anywhere in the world, can freely create content and disseminate this information in real time to a global audience ranging in size from a handful to literally millions —in less time than it takes to read this document (ISACA, 2010). SM is creating both new challenge and opportunities for HR, by helping to build in a culture of collaboration, transparency and engagement. In order to succeed in today's hyper connected environment, organizations will need to adapt to and implement SM tools not only around their business strategy, but also around their marketing and public relation efforts and information technology which can ultimately create an internal culture of collaboration and engagement. SM offers a whole new paradigm within which HR can work to engage organizations' members, investors and internal and external employees. Social media has become a powerful tool for enterprises across the globe.

In this paper an attempt has been made to highlight the changing role of HR professionals and the need of the time is to evolve to become a strategic partner within the organization. The role of the HR department must parallel the needs of the changing times and to become more adaptable, resilient and employee focused. It is important to engage the employee's interest in SM by empowering them with SM tools to exploit and explore its benefits further. In order to succeed HR must be a business driven function with a thorough understanding of the potential of SM tools for the benefit of the organization. In the present paper an attempt has been made to involve the support of SM tools to create an effective management of mainstream functions of HR department like recruitment

and selection, job descriptions and its changing nature, training and development, performance management and compensation, organization and development, culture and engagement, talent management and retention, new employee orientation, career mapping and knowledge management and maintaining relationships with alumni's. With the support of the SM tools, HR is also able to keep its employee policies and their welfare related information at a central repository from where the latest information can be retrieved by the employees at their convenience. At the same time the need of the hour is to have a clear social media policy adopted by the organizations. This paper strives to fill the gap in organizations between the HR policies, functions and SM tools which can help the organizations in not only creating a greater degree of alignment between the line and staff personnel but also across and between the departments. A strive to understand the companies' policies to measure returns on investment in social media (ROI), is quiet crucial and imperative to understand the returns of the SM gains. Hence it is crucial to understand the support of SM, which is not only revolutionizing the collaboration and communication patterns of professionals at a personal and professional front but also at the same time trying to resolve the often conflicting professional expectations of HR professionals and perceptions of utility of SM tools for employees. The flow of the paper will be as follows-First we will try to understand the impact of the social media and its linkage with the hr role and will try to share the best practices of hr functions with the support of social media tools. The next step will be to understand the return on investment as well, which is a crucial factor for the businesses to understand in order to implement the SM tools. Encouraging and supporting the implementation of SM in organizations policy can be reflective of an organization's culture –which can ultimately go a long way in building up a culture of sharing and collaboration.

SOCIAL MEDIA AND ITS STRATEGIC IMPACT

Kaplan and Haenlein (2010) define social media as "a group of Internet-based applications that build on the ideological and technological foundations of Web 2.0 and that allow the creation and exchange of user-generated content. In the words of Hart (2010), "Social media are a new breed of technologies that provide a range of services and applications that let individuals (co-)create content in a variety of formats, share information and knowledge with others in networks and communities, and support a new collaborative approach to working". Social media can take many different forms, including internet forums, web logs, social blogs, micro blogging, wikis, pod casts, pictures, video, rating and social book marking. These media are becoming more widely used by organizations to increase knowledge sharing, improve collaboration and employee voice, and connect with new generations of employees (Martin et al., 2009). According to José Carlos Eiras, former CIO of General Motors Europe, "In today's hyper-competitive markets, speed is absolutely essential. The best method for ensuring rapid and effective transmission of critical information is via social media because everyone on the network can immediately see what everyone else is doing. So if there's a problem somewhere, you will find out about it fast" (Polansky et al., 2010). The outcome of a benchmarking study conducted by Barnes (2010), on Fortune 500 lists of companies to quantify their adoption of social media tools and technologies shares a less then promising outcome. Here is the excerpt of the study:

- 23% (116) of the primary Fortune 500 corporations have an external corporate blog. This represents only a 1% increase over the 2009 study.
- Fortune 500 companies are blogging at a lower rate than other business groups, spe-

cifically the Inc. 500.While social media adoption data is not yet available for the 2010 Inc. 500, in 2009 45% of Inc. 500 companies had externally-facing corporate blogs.

- 60% (298) of Fortune 500 primary companies have corporate Twitter accounts. This is a dramatic increase from 35% of companies in 2009.
- 56% (280) of the 2010 Fortune 500 have a Facebook presence. This is the first year Facebook was included in this study, and the first time any systematic review of the entire Fortune 500 has been conducted on this issue.
- Insurance companies are most likely to be on Facebook, followed by specialty retail, food, drug and consumer products companies.
- 29% (147) do not have a Twitter account or a Facebook presence.

Hence we can see that the companies have started realizing the importance and impact of SM tools and gradually the acceptance has started taking place in many organizations. But change is never an easy journey. HR departments are facing business and technological challenges while implementing SM tools in the organizations. Business challenges can be led by uncertainty of transforming of existing organizational culture to one which embraces a culture of transparency, empowerment, openness and engagement with immediate results. Challenge also lies in immediate implementation-of the effective change processes in the organization. Selecting right kind of SM tools based on the strategic needs of the organization can be a challenge for the organizations. Lack of proper training and need of a proper social media policy for the effective implementation of SM policies by HR departments can be a real challenge. Executives all over the world are not only avid users of SM tools like Facebook, Twitter and YouTube video channels to mention a few, but also tends to be active bloggers. Effective employee communication is a leading indicator of employee engagement. In today's turbulent time effective communicators use SM tools to engage an increasingly diverse and dispersed workforce with the support of wikis and podcasts, thus enabling the companies with the potential to tackle traditional challenges associated with the culture of knowledge hoarding. In organizations there is a growing emphasis on the combined formal and informal learning with a special emphasis on collaboration, knowledge sharing, coaching and mentoring which ultimately involves a process of unlearning old attitudes, beliefs and values and relearning of new attitudes, values and beliefs. Social media platforms are ideal change management tools which are able to initiate and take the lead in listening, sharing, generating information, strengthening and engaging the workforce. With the wise usage and implementation of SM tools companies are able to gain a competitive advantage because of the privileged access to the information located on the social networks and encouraging a culture of more participation and deeper collaboration. The next step will be to start discussing the association of SM tools and its linkage with the various traditional and new HR functions combined together, like recruitment and selection, training and development, performance management and compensation, organizational development, culture and engagement and employees handbook, talent management and retention, new employee orientation, knowledge management and career mapping and wellness awareness to name a few with an innovative approach and outlook.

ORGANIZATIONAL HUMAN RESOURCE APPLICATIONS AND SOCIAL MEDIA TOOLS

As SM technologies will get integrated in to the organizational system in depth, it will become

essential for the strategic partners of the organizations to design and plan for its impact on human resources functions along with the HR professionals to include the routine HR functions like, administration policies, health and wellbeing, recruitment, job descriptions, organization development, culture and engagement, employment branding, retention, engagement, training and development, performance management and compensation At the same time new employee orientation, knowledge management and career mapping, maintaining relationship with alumni can be few innovative HR practices which are evolving with the implementation of SM tools. It becomes crucial to remember the importance of empowering of employees by SM tools. If empowered, employees can be the important advocates for their employers. We will be discussing the association of SM tools implications in HR functions one by one starting with the recruitment and selection-

RECRUITMENT AND SELECTION

"In today's rapidly changing economy, people tend to move from one job to another and from one industry to another – much more often than in the past" (Polansky et al., 2010). Integrated social media technologies (e.g., Facebook, Blogs, Twitter, LinkedIn, etc.) have made the recruiting process easier and more engaging than ever before (Dunn, 2009). Social media now allows human resource departments to aggressively seek out potential applicants. This is particularly true on linked in, which is a site that revolves around one's profession and professional training. Sites such as linked in permit human resources departments to instantly determine if there is anyone they should extend a job offer to immediately, without the need to resort to expensive head hunting services. "IBM has always been one of the first companies to experiment with new social technologies. Its recruiters use Twitter to broadcast job openings, and the company organizes its own talent communities… Cost saving is a major motivation for companies looking to bypass big headhunting firms" (Hempel, 2010, p. 2). Deloitte is taking a multifaceted digital approach to recruiting by using a blend of social networking resources and multimedia elements. A versatile introduction to their company is available at the click of a button. The program integrates several interactive social media outlets including a micro-site, a Twitter feed, a Facebook page and Linked In group, and a You Tube channel (T+D Blog, 2010). Recruiters and hiring managers are turning to Twitter to seek referrals and applicants for open positions. Twitter and social networks can spark a social effect that galvanizes community support and action. Not only can companies save a significant amount of money on listing and referral fees using traditional outlets and resources, they essentially create a presence through the practice of "unmarketing" itself through the process of seeking qualified candidates (Solis, 2010). In the words of Sharlyn Lauby (2010), "As social media becomes more defined in the business world, human resources professionals will have a significant opportunity to leverage this powerful medium in many aspects of the business". The use of social media also allows human resources to eliminate employees with a history of lies or malfeasance, since it is often harder to hide statements online. By being picky, HR departments can get the best possible candidates, as well as eliminate liars and cheats (Clyne, 2010).

New Job Descriptions

Some companies are going beyond posting tweets about new positions to using the wisdom of the crowd to actually write a new job description. At Best Buy, when they posted a job description for a position as senior manager of emerging media marketing, the qualifications included were: one year of active blogging experience, a preferred graduate degree, and 250+ followers on Twitter. The number of followers one has on Twitter is

now finding its way into a job description. At Best Buy the job description was crowd sourced, and anyone with an interest was invited to post qualifications to the job role on Idea X, a forum for Best Buy customers and employees. The final job description spoke about the traits of the social media revolution we all are experiencing: humor, collaboration and authenticity. For instance, the revamped job description included a requirement that the Senior Manager "understands the following acronyms: RSS, SEM, SEO, PPC, CPM, CPC, LOL, IMHO, WTF, API, B2C, B2B, CTR, IM, PV, RON, WWW, TTYL, LMAO, ROTFLMAO, WYSIWYG and, most importantly, RTFM." It's unlikely that Best Buy would have come up with them on its own (Meister & Willyerd, 2009).

Organizational Development, Culture and Engagement

Strong cultures bind people together through shared norms, values, understandings and discourse, thus acting as important, informal social integrating mechanisms in organizations which complement the more formal design features discussed in the previous paragraphs. In doing so, however, they also act as a form of psychic prison, often producing collective blind spots to new information and ways of doing things (Morgan, 1997; Weick, 2001). The new social media tools extend opportunities to employees, to cross the rigidities of the organizational hierarchies and thus releasing them from there self imposed mental prisons. These tools make employees voice/innovative ideas heard across up and down the various levels in the organizations, ultimately leading to higher levels of employee engagement. According to Suss (2008), social media can increase engagement in the areas of credibility, respect, pride and camaraderie. In the area of change management, the new communication channels provided by social media can help to keep organizations up to date about (or even better: to involve them in) organizational change situations. Pfizer was able to set an example in this regard. Pfizerpedia was developed few years ago by the scientists of Pfizer to develop an internal knowledge sharing repository, on the merits of wiki technology, to help them work more effectively on their projects. Retaining and tapping the potential of multigenerational workforce has never been an easy process. It will be a compelling vision of HR professionals to tap the SM tools for engaging its employees.

Talent Management and Retention

Talent management is increasingly becoming one of the most important aspects of the HR functions in organizations. In today's challenging times, SM tools can be deployed in the workplace to reach out to the people in a very short span of time. Among a number of SM tools, blogs can be a good place of showcasing a company's mission, vision, values, culture and accomplishments. To match with the real- time and transparent communication expectations of the Gen Y executives, blogs and interactive channels are being created. These channels are used by the senior leaders of the firm to reach out at the people with many formal and informal learning situations. Talent pipeline can be created in the organization through wikis, blogs and many other platforms where introverts and extroverts, both are equally comfortable in conveying their messages to the concerned person(s), through a medium of their choice. Companies like Deloitte, IBM and Ernst and Young are taking advantage of these tools to reach out and engaged the workforce. Deloitte (Brandel, 2008) is using the internal social networking by the name of D- Street, which is similar to Facebook. Employees of Deloitte are encouraged to join this internal social networking site and get connected with the other employees of Deloitte. It also keeps the employees engaged, by letting them to participate in the Deloitte film festival, to make short videos that answer the question," what is your Deloitte? Beehive at IBM is intended as a collaborative platform that emulates the physi-

cal work environment, where employees display personal items like photographs and trophies and chat about last night's game. The idea is to have a water cooler effect –which help people build stronger relationships and thus create an effective organization. Ernst and Young created their Facebook page in 2006, and currently they have more than 30,000 fans. Through their Facebook page, E&Y are trying to take care of the aspirations of the young graduates, who want to be a part of this organization.

New Employee Orientation/On Boarding/Virtual Mentoring

The new employee orientation and mainstreaming process is known as "employee on boarding". On the company's intranet, virtual new hire groups can be created and new employees can have an access on the new employee orientation schedules, materials, benefits forms, and an extensive FAQ. On the company's Intranet information can be made accessible to the new hires through chat or discussion forums. By providing relevant information in advance, organizations are able to eliminate a common source of new hire angst and give them a better chance to start off on the right foot. Virtual" Mentoring" can also be encouraged which will be able to facilitate quick and better adjustment not only to understand the work culture of the organization, but also at the same time lend a helping hand in providing useful information for shifting overseas if need be. Interactions with the senior members and peers of the clan, give the employee a chance to participate in various discussions, and also to get acquainted with various colleagues. For new employees, a focused new group, by the name of "A social group-for new hire" can be formed on Twitter or on Facebook, which will enable new employees to share their initial experiences through chat / discussion forums. Creation of wikis can also help the new joiners to get the support in getting the answers for the most frequently asked questions regarding dress code, vacation time, housing links and information about the hospitals and the good schools in the town. The overall understanding of the work system and familiarization helps in building up the confidence, comfort and trust in the organization's work processes for a new employee, even before they join the organization.

Knowledge Management and Career Mapping

In today's knowledge based economy people and organizations are leveraging social media for informal learning. Supported by organizational culture, social media tools can allow employees to contribute ideas, and help organizations to capture the various threads of knowledge being created by its employees. According to Leistner, Chief Knowledge officer at SAS,"The CKO, in his role as internal consultant, can help to build a social media strategy that is targeted towards value creation and knowledge sharing with a business focus". And to continue it further in the words of Leistner," Since social media is essentially driven by people-to-people relationships, it can be a natural platform for knowledge management programs. An experienced, insightful chief knowledge officer can maximize the benefits of a corporate social media strategy" (Polansky, 2010). Employees can use social media tools to make connections between the tasks, responsibilities and roles they want, and the skills, experience and contacts that lead to future career opportunities (Tulgan, 2007). HR department can bring a dynamic outlook to the world of training and development with the help of SM.

Training and Development

An understanding of the implementation of the SM tools in the organizations by its employees has become an absolute necessity in the organizations today. It has become imperative for today's entire workforce to have an understanding of the

usage of SM tools. A continuous and ongoing training of various uses of SM tools provided to the employees has become an absolute necessity of the day. In today's dynamic, cost-competitive business climate the value of learning is embedded in corporate environment, where leaders understand the value of a trained workforce. Providing training programs to executives all over the world has earned a place as one of the most critical issues in the training and development field which is largely driven by the needs of the clients and their initiatives and solutions. Through wikis, discussion forums and chat rooms –subject matter experts can be identified and leveraged for the new learning either from the peer group within the organization or from the outside. Telstra, an Australian Telecom giant of 40,000+ personnel has made social media training compulsory for its employees. They are able to publish their entire social media training guide online, which is an interactive tool, so that anyone can read, learn and able to make suggestions for improvement. Till now more then 12,000 people were able to complete this course (Ostrow, 2009). Providing on line training inputs to the small focused targeted group at the companies are able to have a paradigm shift in the performance based learning in the organization. Along with the e-learning training an ongoing continuous training module should be provided to the employees with a special emphasis on the rights and responsibilities. Implementation and usage of SM tools in organizations are changing the landscape of training programs in organizations which includes leadership development opportunities.

Leaders need to become the role models to lead through the informal channels of various social media. Leadership blogs, for example, can help junior leaders to learn from the philosophies, styles and experiences of senior leaders. Leaders at all levels can form virtual support groups with their peers to discuss specific challenges and opportunities in more efficient and effective ways. Leaders can be role models in understanding the changes in the balance of power created by the open and free access of SM tools. Leaders can also form groups to share best practices. Junior leaders can access leader's wikis, blogs and other tools to develop the knowledge; skills and abilities they need, to increase their efficiency and effectiveness.

Extending learning opportunities through on line games can be a novel opportunity for the trainers. According to Reeves, Malone, and O'Driscoll (2008), "Put simply, online games can be informal but realistic simulators for contemporary leadership training. In fact, companies could explicitly integrate these games into their leadership development programs in order to teach the "soft" aspects of leadership, complementing simulation tools that emphasize hard, analytic skills. The benefits would extend not only to individuals but also to business teams, which might use the games to try out various leadership structures for the group." Wikis have lots of potential for providing a base for on going training programs in organizations. It allows individuals to participate, collaborate and share ideas. Providing cross cultural training programs can be one of the biggest challenges faced and overcome by the organizations today is to reach out at the diverse and dispersed work force around the globe. According to Jestice (2009), "Cross-cultural training is one promising area for using virtual worlds to deliver efficient training as well as to cut costs and resource commitments from organizations. We may see over time that some of the features available in virtual worlds may actually increase the effectiveness of training over traditional seminars". Pod casts can be one of the social media, tools which can help in recording the training program or some missed lectures. These recordings can be heard online or can be recorded at MP3 players and heard at one's convenience later. This is a very useful medium for providing sales and marketing tips, new product development or management lectures which employees may want to hear multiple times. During a training session, it is useful to create

Twitter hash tag # and encourage participants to tweet during the session.

Performance Management and Compensation

A well-designed and disciplined approach to performance management can play a positive and constructive role in delivering sustained high performance. The culture of an enterprise is an all-important aspect of why and how performance management is used. The standard by which employees' performance is measured and compensated keeps on changing with changing job requirements and responsibilities. In the words of Hunt (2010), "Performance management systems will have to be updated to better accommodate new knowledge, skills and behavior, and managers will need to learn how to evaluate the success of their staff in achieving social media objectives. Changes in job responsibilities and performance expectations also may require associations to revisit their pay structures". According to Nesbitt and Krainin (2008), "A well-considered approach to implementing social media performance management can yield significant benefits including a more focused ream that sets goals and manages for results."

Relationship with Aluminis

SM allows each and every employee in the organization to expand their network. Setting up an alumni group on the linked in or at the Facebook gives employees a chance to be connected and gets updated on the various new facets of the company. At H&M (a Swedish clothing company), a Linked in alumni group has been created for the former employees. This group not only helps in leveraging the brand recognition with the former employees but also acts as rehiring tool. Companies like Yahoo and HP are using Facebook alumni page to stay connected. And it is also a platform to think of joining back one's company.

THE EMPLOYEE HANDBOOK

A central repository of information can be created at the organization's intranet, consisting of employee handbook of policies, procedures, benefit plans and performance appraisal forms, which are current, regularly updated and easily accessible. Linking of SM tools with intranet can enable employees to get important reminders on regular basis about the upcoming deadlines. Organizations can show their concerns about their employees' health by sharing health related updates and information through the wellness awareness portals.

Wellness Awareness

Brian Baker of "Engagement 2.0: Beyond the fire wall" (2009), has spoken about the meaningfulness of wellness awareness program in the organizations. According to this report, "Social media has created a whole new conversation on wellness that is based on two-way dialogue. According to Brian, organizations can successfully implement the following strategies in the workplace with the help of the following social media tools:

- Upload and share pod casts on healthy living, common risks and conditions, and general wellness advice.
- Survey Linked In users to compare wellness program ideas, create cross-company teams, or involve other professional groups or consortiums.
- Get daily health tips by email or text message (SMS).
- Track daily, personal progress on an iPhone or Black Berry.
- Blog about typical health and wellness challenges or post questions on the company's
- Check the company's website for who is teaching today's yoga class and connect with other colleagues who are participating.

- Allow spouses/partners and dependents to receive and send communications, take part in contests, or contribute to other dialogues traditionally only available to internal employees.

In India big IT names like HCL, Infosys, Wipro, Tech Mahindra and TCS are online and engaging with customers either with leaders sharing information via Twitter or a group of bloggers connecting with audiences. Bharti (Airtel), a leading telecom organization with over 20,000 employees switched to an SMS based intranet on an IBM tool called me-tize. The move did away with e-mail; got employees connected, increased productivity, added convenience and also contributed in a 'green' way (Verghese, 2010).

RETURN ON INVESTMENT AND SOCIAL MEDIA

The ROI is a business formula that calculates the ratio between an investment and the return. To quantify the social media ROI, we need to determine both the return and the investment in dollars, and we need to ensure that the return has a direct correlation to the investment. When an organization is able to determine and quantify the correlation between the return and the investment, one is able to quantify the ROI of SM. Companies such as Dell are not only tracking the impact of Social Media on revenue, but expanding lessons learned across the entire organization. Measurement and ROI can be one of the biggest challenges in successful implementation of the SM. A 2009 study by ENGAGEMENTdb report (2009), found that the most valuable brands in the world are experiencing a direct correlation between top financial performance and deep social media engagement. Findings of the study show that enterprises that aggressively embrace social media as part of their strategy are more financially successful. Enterprises are using social media in many functional areas of business and are enjoying numerous tangible benefits such as increasing brand recognition, sales, search engine optimization (SEO), web traffic, customer satisfaction, and revenue. According to Margaritis and Rockland (2010) while most monitor for online mentions and activity, participants generally agreed that there is no consistent, reliable approach to measuring ROI and that looking at metrics like "followers," "friends," or "views" is not sufficient. In today's fast changing world human beings need to be motivated, encouraged and rewarded by being empowered. Need of the time is to let them discover their own pace of learning with a defined strategy of policies and goals. McKinsey's new survey research (Bughin & Chui, 2010) finds that companies using the Web intensively gain greater market share and higher margins. To explain further-the benefits from the use of collaborative technologies at fully networked organizations appear to be multiplicative in nature: these enterprises seem to be "learning organizations" in which lessons from interacting with one set of stakeholders in turn improve the ability to realize value in interactions with others.

Participatory technologies have a high rate of involvement when employees from various streams of organization tend to get a chance to circulate their ideas in the organization through informal channels of social media like blogs and wikis. At AT&T, it was frontline staffers who found the best use for a participatory technology—in this case, using web 2.0 for collaborative project management. Rather than dictating the use, management broadened participation by supporting an awareness campaign to seed further experimentation. Over a 12-month period, the use of the technology rose to 95% of employees, from 65%. (Chui, Miller, & Roberts, 2009). Best Buy's example can be one of the most notable in not only empowering its employees, but also taking care of the external's customer's need with an amazing speed." A good example is Twelp force. More than 2,500 Best Buy employees have signed up

for this system, which enables them to see Best Buy–related problems that customers have aired on Twitter and respond to them. Twelpforce includes customer service staff, in-store sales associates (called Blue Shirts), and Geek Squad, the service reps who make house calls for technical assistance. Twelp force exists because Best Buy empowers its employees to come up with technological solutions. Best Buy's leaders support technological innovation regardless of where in the organization it comes from" (Bernoff & Schadler, 2010). The traditional HR employee handbook is one of the useful and handy repository tools which provide the mandatory and standardized information to all employees of the organization.

CHALLENGES AND STRATEGIES TO IMPROVE ADOPTION

Social media helps in transforming the way people tends to be connected with each other and share information with trust and openness. There are few steps which can be taken by the organizations to consider, in advance before implementing these social media tools successfully. One of the basic threats in implementing the social media at the workplace lies in employees sharing/shifting in power. A word of caution is absolutely essential here-for the smart use of SM tools. With a large number of companies using SM to interact with customers, it is important to get it right. A good and recent example is of Nestlé's fan page-where an exchange of rude and impolite remarks, landed Nestle into a public relations nightmare, thanks to SM in a matter of minutes. Any company that maintains social media tools to engage with the customers should learn from Nestlé's mistakes and try to remember that the power of balance is shifting from the hands of big brands in to the hands of consumers. The smooth implementation of SM tools in the organizations will only be possible by developing a progressive social media policy. It is necessary to have a social media policy booklet with clear directions of its usage. It is very important for employers to educate and train their employees regarding the professional and responsible use of the SM tools. In the USA an employee (Greenhouse, 2010), was fired because of something she posted on her Facebook page. In the same post of New York Times of 8th Nov 2010 another case has been mentioned of an emergency medical technician at an American Medical Response of Connecticut who was informed of violating the company policy that prevents employees from depicting the company on social media sites. Additionally, it was conveyed in the media that this was one reason for her termination and alluded that there were other reasons as well. According to the post, this is "the first case in which the labor board has stepped in to argue that worker' criticisms of their bosses or companies on a social networking site are generally a protected activity and that employers would be violating the law by punishing workers for such statements" (Greenhouse, 2010).

Thirdly, it is important to understand and respect today's workforce. There are differences between the attitudes, values and work ethic of the different generations that will now find themselves working side by side in the workplace. A critical difference lies in the way in which they communicate. It is necessary for the organizations to understand the preferences of various generations in communicating and remaining engaged. It is a two way dialogue, which helps in building up a new attitude and understanding of social media. According to Brian, (2009), "In today's 24/7 culture, there's no longer a clear line between using the web for work and non-work. People are working—whether it looks like it or not—24/7. If we let them work how they want, and if we value their work based on results, we are more likely to engage them. In other words, if employees are using social media at work and for business purposes anyway, we should capitalize on that to expand their network, build and improve our firm's reputation, and enhance our business".

The need of the hour is to build a culture of trust in the organization. The culture of trust cannot be created in a day. Gradually and seamlessly the organizational culture need to break the barriers of change. Here the senior leaders of the organizations need to be role models-who gradually tend to build and increase the level of trust. Also HR can help in intensifying the effort of building a culture of trust in organizations, by empowering its employees with these collaborative tools.

Fourth, it is important to understand the cultural nuances of a work place. Before implementing these SM tools HR departments can design and implement a pilot training program based on future culture changes in the organization. The wisdom of channelizing people's energy in to direct and honest engagement is the ultimate sum of getting everyone's volunteer participation. Changing the "culture" of an organization requires that people know what is expected of them, what they are supposed to do, and how they do it. It is essential that the expertise for these kinds of training programs, to establish the need in the first place, to be identified by the HR department, which is essential for implementation.

It will be wise for the HR dept to identify the early enthusiastic adopters, from the line as well as the staff functions. From the informal channels the supporters for these kinds of tools can be identified, who can ultimately become the role models, for applying these tools in their day to day roles. Sixth, it is important to employ "socially skilled" change agents, identified by the human resources department for implementing social media tools effectively. In the words of Verghese (2010), "To groom a pool of social media champions, find employees who are interested in contributing to the social media space either as a content provider, moderator or a guide." It will be advisable to have a trainer, who understands the business processes, is able to use social media effectively and is good in social skills. Companies--especially large ones--are slow to adopt social media to exchange experiences. It's the whole "we-want-to-control-the-conversation" thing. But, in reality, no company can "control" it's message any more: you either let people talk and exchange ideas where you have the benefit of moderating, or people will exchange ideas on their own through a social media platform.

CONCLUSION AND DISCUSSION

The role of the human resource manager is evolving with the changing times and it becomes imperative that human resource management must play a strategic role in the success of an organization. SM is changing our world and they are here to stay. Web 2.0 and SM are becoming more widely used by organizations to increase knowledge sharing, improve collaboration and employee voice, and connect with new generations of employees (Martin et al., 2009). Successful Web 2.0 initiatives in organizations are fundamentally about shifting attitudes and behaviors. Collaboration increasingly drives value creation in organizations, but for that technology is only an enabler. As such, HR will ideally play a central role in Web 2.0 initiatives. And this is a good initiative for HR for making changes in their operational and strategic goals (Dawson, 2008). Incorporating social media into HR is important in today's globalize world, especially for international companies, where social media can play a part in centralizing data/information sharing and wisely able to use the collective wisdom of employees, customers and partners to name a few.. These are engaging powerful tools that enable employees from different regions to share information at an instant. For example, managing a regional payroll faces the challenges of meeting local legislative and cultural differences. With the use of social media, it may helps to centralize the system across the different regions by leveraging on the benefits of the interconnectedness of information technology.

The previously discussed strategies are not difficult to implement. But it is essential that someone

has been assigned the responsibility of observing the interaction that occurs on social media. Rather than seeing it as another marketing platform that can achieve a certain ROI, social media should be viewed as a valuable opportunity to directly connect and engage with an organization's potential and current customers. By keeping the fundamentals of social media in front one can be in the right place to develop a well-planned and well managed social media presence that stakeholders will appreciate, recognize, and want to be a part of. The opportunity for HR professionals is to leverage new communication media and technology platforms to further organizational objectives, is almost limitless. In the hands of HR professionals, SM can be an important tool for crafting the future of one's organization. Human resources professionals must educate themselves and their management teams, acting now to set policies, develop training and benefit from this revolutionary new communications channel (Dunn, 2009). To conclude, it will be important to remember that technology does not replace people, it enhances the ability of people to do better, smarter work that leverages more of their skills. The same holds true for SM and the HR world that collectively learn to understand the complex dynamics Of the new world of power, control and discipline.

RECOMMENDATIONS

It is crucial to understand the impact and influence which social media will have continuously in the organizations at all levels, irrespective of the hierarchies Now the time has come for the organizations to take advantage of SM services in the day to day working of the workplace, instead of putting a blanket ban in the organization. Working and interacting in a non-hierarchical workplace is the need of the time. Change agents are required to facilitate the process of desired cultural change by bringing in the paradigm shift for a new realization. Today, the need of the day for HR professionals is to act as change agents. It is critical to remember that it needs a cultural change in the organization. The need of the hour is to have implementation of "values in use" in the organizations designed through participative decision making involving strategic partners from the employees and employers groups. It will be crucial for the organizations to remember that in today to be productive people will have to keep on learning through and with others. The productivity in the organizations will be measured by how effectively and efficiently the employees are able to finish the task in hand. The world has gone in to a new direction and it is of strategic importance to optimize it by joining hands with it to make the maximum leverage of the situation.

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Chapter 25
Sources of Legitimacy for the M-Government Initiatives in Turkey: Human vs. Technical Resource Management Concerns

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ABSTRACT

Emerging markets have recently been experiencing a dramatic increased in the number of mobile phone per capita. M-government has, hence, been heralded as an opportunity to leap-frog the technology cycle and provide cheaper and more inclusive and services to all. This chapter explores, within an emerging market context, the legitimacy and resistance facing civil servants' at the engagement stage with m-government activities and the direct implication for resource management. Thirty in depth interview, in Turkey, are drawn-upon with key ICT civil servant in local organizations. The findings show that three types of resources are perceived as central namely: (i) diffusion of information management, (ii) operating system resource management and (iii) human resource management. The main evidence suggests that legitimacy for each resource management, at local level, is an ongoing struggle where all groups deploy multiples forms of resistance. Overall, greater attention in the resource management strategy for m-government application needs to be devoted to enablers such as civil servants rather than the final consumers or citizens.

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INTRODUCTION

Mobile government (m-government hereafter) has been heralded as an imperative for administrative processes' modernization in emerging countries (Kushchu, 2007). Although several m-government services are already available in emerging markets, provided by both private and public organizations, little is known about the formative stages and the legitimacy/ resistance (positive and negative) civil servants are encountering in their everyday activities, from a resource management perspective, in order to implement m-government applications and strategies (Abanumy & Mayhew, 2005; Ghyasi & Kushchu, 2004; Sundar & Garg, 2005; Tozsa & Budai, 2005; Prins, 2001). In this chapter, m-government is defined as the development of new technologies, applications and services in order to create an "able society" (Kushchu, 2007). Digital technologies as resource management tools used in public administration have contributed to an improved understanding of many aspects of everyday practices, especially at local level, including digital strategies (Kahraman et al., 2007; Ferguson, 2001), impact of e-culture on e-governments (Hazlett & Hill, 2003), m-government policy issues (Yildiz, 2007; Lam, 2005), service architecture (Sharma & Gupta, 2004; Abramowicz et al., 2006), e-governance (Saxena, 2005; Stahl, 2005; Holliday & Kwok, 2004) and e-government models (Heeks, 2002).

In turn, legitimacy of ICT and mobility within public administrations at local level, in an emerging market context, point to multiple possible sources (m-GovLab, MGCI, www.mgovernment.org). The literature highlights two important aspects: (i) the difference between the meanings of mobility: mobility which is driven by personal motivation/resistance and by social factors; and (ii) the difference between mobile technological innovation and the legitimacy of institutional changes.

Consecutively, mobile technologies have attracted interdisciplinary interest centered around three main areas: domestication (Goggin, 2008; Weilenmann, 2001); mobile technology and user practices (Fortunati et al., 2003; Katz, 2003); and, at a societal level, adoption with engagement in wider spheres including politics and social policies (Brown et al., 2002; Rheingold, 2002). Further related aspects include status symbols (Dedeoglu, 2004; Ozcan & Kocak, 2003), MMS/SMS social and pragmatic aspects (Chapman & Schofield, 1998; Lin & Tong, 2008; Rettie, 2007; Sharma & Sturges, 2007), networked society (Ling, 2004, Goggin, 2008), mobile devices as fashion items (Katz & Sugiyama, 2006; Hulme & Peters, 2003) and m-entertainment (Ha et al., 2007; Harmer, 2003; Pagani, 2004).

The negative aspects of mobile technologies have also been studied including issues relating to health (Foster & Moulder, 2000), addiction (Bianchi & Phillips, 2005), lack of concentration while driving or multitasking (Esbjornsson et al., 2007), increased reaction time, psychological impact of mobile consumption on children and adolescents (Döring & Gundolf, 2005) and miss-appreciation of cognitive and/or physical demand while multitasking (Goodman et al., 1999; McEvoy et al., 2005).

Based on the above characteristics, three partial gaps have been identified from the literature. First, few, if any, studies have been conducted in the context of the public services and the role of m-services. Second, most studies examining digital resource management strategies have usually been conducted at macro level rather than at local level. Third, published work on digital resource management strategy has almost exclusively focused on the so-called 'first tier' countries, with concentration on the central North American and European perspectives. Examples of the 'second tier' or peripheral regions of Europe such as Turkey are limited.

This book chapter presents the findings of a total of 30 phone interviews which were conducted with the key civil servants working within local government organizations in Turkey during the

introduction of the first concrete m-government strategy in 2008-2009. This key period coincides with the recent transition and creation of the central e-government platform, which was launched only few months before in December 2008, in order to centralize the digital government strategy.

While the e-government activities have yet to be fully understood and implemented by all local organizations, deeper technological transitions are already requiring further evaluation, attention and changes. In this context, this chapter draws on a number of concepts such as organizational development, innovation management, strategic management, and evolutionary theory of the firm and development studies (Marcelle, 2004).

This chapter is organized as follows: Section II provides a summary about digital and m-government resource management in general and regarding Turkey in particular. Section III presents the literature review on legitimacy and the impact of the forming stage framework in shaping legitimacy and resistance to new strategies. Methodology and findings are explained in Section IV and Section V, respectively. Finally, Section VI presents the conclusion.

M-GOVERNMENT BACKGROUND

Digital government is defined as the provision of traditional government services to citizens through electronic tools such as computers, telephone and other hand held devices. The Internet is increasingly becoming the channel for delivering government services to citizens and sharing information among various administrative layers and civil servants (Melitski et al., 2005). Digital databases have been created to support back-end operations that are able to provide instant and up-to-date services which are accessible anywhere and at anytime. Recent developments in mobile technologies, especially the introduction of internet enabled mobile phones (3G), PDAs, Wi Fi and wireless networks, are creating a sustainable alternative model for managing, updating and retrieving government information and knowledge towards creating the civil administrations and administrators of tomorrow. These developments are opening a new era in public service delivery practices which is often called as New Public Management (NPM) (McIvor et al., 2002).

M-government is further defined as a strategy and its implementation, which involve the utilization of all kinds of wireless and mobile technology, services, applications and devices for improving services to the parties involved in digital government, including citizens, businesses, NGOs and all government units. In particular, mobile government gives extra added value when compared to previous methods of public service delivery, in terms of (i) lowering costs (Holden et al., 2003), (ii) increasing the efficiency of work practices, and providing the transformation/modernization of public sector organizations (Larsen & Rainie, 2002), (iii) increasing convenience and flexibility (Klein, 1999), and (iv) increasing range and types of applications (Kushchu & Kuscu, 2003). In emerging markets, active initiatives and engagements can be found in countries such as Hungary Latvia Estonia, Bulgaria, and Croatia with local referendum, road planning debate, infrastructure building competition, procurement and public health information, public administration and job advertisements as examples (http://www.epractice.eu/en/factsheets/).

More than four billion mobile subscriptions worldwide signal a great opportunity to reach and interact with broader audiences both for final user service delivery and more importantly for day-to-day resource management within public administration. For example, in Turkey, the total number of wireless subscribers is estimated to increase from 66.4 million in 2008 to 76 million in 2013 (Research and Markets, 2009). In effect, many citizens will own more than one handset.

Concurrently, examples of governance and policy delivery related activities, through which mobile phones have been used (Briseno, 2009),

include: i) SMS communication to empower people in places where censorship and violence are present; ii) social participation and advocacy purposes (the protest against former president Estrada in the Philippines, women in Kuwait advocating for the right to vote -which they ultimately won - and pro-democracy demonstrations in Ukraine and Burma are examples that have been replicated in the rest of the world); iii) voting and participatory decision making (e.g. civil society organizations have been using mobile phones for monitoring electoral processes in several countries; m-voting will soon be possible in Estonia where the Parliament approved the use of mobile technology for the 2011 elections); iv) m-government for public service delivery, which is making its case as a complementary way to reach people that remain unconnected, leads to new applications such as information consultations and requests, parking payment mechanisms and payment for local services in Malaysia and the Philippines; v) m-government is also used in data monitoring and collection in remote rural areas; vi) mobile technology has made it easier to increase civil participation and enforcement of laws; the reporting of crime in Ireland and Peru by providing real-time exchange of information between citizens and law enforcement units: In Ireland, MMS (multimedia SMS) has been used to send the photos of suspects to law enforcement agencies. In Peru, crime reporting systems have helped in the reduction of drug related crime; vii) finally, mobile technologies are also now widely used as enabling tools to save time and to be closer to citizens; benefit check, neighborhood task forces, services for the disabled and the old, as examples.

Our attention is now turned specifically to m-government in Turkey which will provide a more specific background to the analysis. The main initiatives center in the newly implemented E-government gateway (www.turkiye.gov.tr) which is a single and centrally managed website with a standard format and set of services. This platform provides detailed information about government services electronically to citizens (Table 1) and is divided into two main sections; (i) the e-government portal itself and (ii) the array of interactive e-services available.

At local level, further efforts have been made in creating and developing initiatives that provide day-to-day applications such as SMS for public announcements (e.g. regarding school activities, weather warnings, roadwork, and utilities cut) which also give information about the status of the services (Ghyasi & Kushchu, 2004). These interactive types of services allow citizens to directly receive information, updates and feedbacks.

At institutional level, rather than providing services directly to citizens, a series of initiatives and strategies such as infrastructure enabling tools (Ghyasi & Kushchu, 2004), Mobile Electronic System Integration, Traffic Information System, Mobile information Project (Ministry of education), G2G applications (mobile intranet for ministry personnel), and modernization of the National Judicial Network have been implemented (Court system integration) (Cilingir & Kushchu, 2004). After setting the scene in Turkey and demonstrating similar examples of services in other emerging countries, we now focus on the theoretical basis of this study which is formed by the concepts of legitimacy and front-loading.

LITERATURE REVIEW

Our work takes into account theories and models such as: (i) Rogers' (1995) adoption of innovation framework which identifies desirable factors for the success of a new product or innovation including relative advantage, compatibility, complexity, communicability observability and triability; (ii) theories such as the Theory of Reasoned Action (TRA) and the Theory of Planned Behaviour (TPB) (Ajzen, 1985, 1991; Ajzen & Fishbein, 1980) which provide a theoretical framework for

Table 1. E-Government gateway services in Turkey

	Service	Subjects
1	Birth	Notification of birth, registration, maternity leave
2	Education	Preschool education, primary, secondary and higher education
3	Military service	Enrollment of soldiers, military man and reserve officer operations, operations abroad
4	Job and career	Job search, employment, legal provisions, unemployment insurance
5	Social security	
6	Family	Marriage, health, register of births operations, children and young, children's rights
7	Individual and society	Women's rights, housing, traffic, civil defense activities
8	Health	Family and society health, nutrition
9	The disabled	Health, education, employment, employee benefits and services
10	Social relief and public spirit	Welfare subjects, project support programs, welfare services, the old
11	Travel and tourism	General information about Turkey, railway and highway transport
12	Environment	Forestry, nature protection and national parks, forestation, erosion check, fight against desertification
13	Culture, arts and sports	Cultural heritage, cultural activities, theaters, festivals, fairs, sports activities
14	Legal issues and rights	Legal affairs, being elector, protection of consumer rights, address registration, public notary
15	Turkish citizens abroad	e-consulate, diploma equivalence, military service, marriage
16	Foreigners	Visa and passport, travel, habitation, birth, marriage

Source: https://www.turkiye.gov.tr/portal/dt?provider=HomePageContainer&channel=icerik

understanding individuals' behavioral patterns; (iii) Studies by Davis et al. (1989) that consider users' acceptance of technology (Holak & Lehmann, 1990; Pagani, 2004; Venkatesh et al., 2003).

Following on from these theories and models, we now present the theoretical constructs of legitimacy and frontloading framework and link them to ICT resource management in public administration. We take a first step towards understanding: (i) how legitimacy is derived from m-resources; (ii) why civil servants decide to use or resist to certain m-resources?; (iii) how m-ICT is shaping the relationship between civil servants and formal government structures.

Legitimacy

Legitimacy, within the context of this chapter, is defined as "a generalized perception or assumption that the actions of an entity are desirable, proper, or appropriate within a socially constructed system of norms, values, beliefs and definitions" (Suchman, 1995, p.574). Legitimacy is a multifaceted construct; both positive and negative, short term and long term. Its meaning, opportunities and limits are located both within technological development, resource management strategy and human technology relationship (Prins, 2001). These are often depicted as contentious issues whereby a polarization occurs where winners or losers have to be defined. Technology is seen, not simply as a body of practice, but as a body of understanding. As a consequence, the nature of the evaluation (deterministic modus operandi) and selection choice become more dynamic and recurrent (multi-period) and increase in scale and scope as the initial investment grows (Ziman, 2000). Furthermore, civil servants and all other types of stakeholders in the power structure, who support the acquisition or reject certain forms of technology, ought to be explicitly perceived as part of the legitimacy rationalization. They are, in effect, legitimating the intangible investment and are the guardians of the technical knowledge

and cultural learning that form the ethos of the organization (Marcelle, 2004).

Shaping new forms of governance in the mobile information age requires knowledge of dynamics of hardware (back-end) processes and structures in the public sector as well as sufficient information about the capabilities associated with information and communication technologies in order to respond to everyday needs. At this point, the degree of relative advantages, benefits and consequences of the new innovation need to be addressed. These advantages range from increase in profits to gain in social status. As an extreme position, over-adoption, which is defined as "adoption of an innovation by an individual (or organization) that experts feel he/she should reject" (Rogers, 1995, p. 215) is also found to be relevant. From a different perspective, ethical and practical obstacles, which are related pragmatically to security, fraud, liability, free access, equality and privacy, should not be underestimated (Prins, 2001, p.3).

Following Dacin et al.'s (2007) study, five dimensions of legitimacy are presented: market, relational, social, investment and alliance legitimacy. The first type of legitimacy, "market legitimacy", refers to an organization's expanding or maintaining its place in a market. When an organization enters a new market or aims to enhance its place in a new environment, strategic alliances with already successful, experienced partners approved by the local market increase the company's legitimacy in a geographical area, technology or product market. The second aspect, "relational legitimacy", is perceived as the worthiness of an organization to attract alliance partners. Once an organization is high in relational legitimacy, it is able to attract high-quality partners whose market share and experience can be shared. "Social legitimacy" as the third type leads to getting approval from others for using resources. By engaging in strategic relationships with favorable partners, one increases in social legitimacy. Social legitimacy is more important for the organizations practices of which are questioned or are undergoing radical change. These organizations contribute to further services within given communities in order to reduce opposition and boycotts. "Investment legitimacy" means that an organization is more likely to be supported by external parties by demonstrating an increased level of investment in the particular objectives sought (i.e. hardware, software and skills provision), which in turn makes the future goals more feasible to accomplish. Finally, "alliance legitimacy" is especially crucial for the markets where a history of competition and rivalry is prominent. The use of strategic alliances for increasing legitimacy in particular technologies enables organizations to reduce risk. The legitimacy interactions of an organization or an individual determine how well the resources are: (i) deployed, (ii) integrated with other activities, (iii) reducing the risk of pervasive acts, and (iv) allowing the creation of competitive advantages (Dacin et al., 2007). Legitimacy becomes central to the engagement process. Our attention now turns to the notion of front-loading.

Front-Loading

Front-loading activities are defined as being part of a strategy that seeks to improve pre-service activity performance by identifying and solving current and potential problems in the early phases of the transition process. Front loading, as a philosophy, has been applied successfully in the automotive industry and has been particularly associated with lean production methods championed by Toyota (Thomke & Fujimoto, 2000). In other areas such as team management, front-loading activities are linked to the forming stage which includes the engagement of agents or teams in specific activities (Tuckman, 1965). Other examples, where preparatory stages have been recognized as crucial, are: (i) technology acceptance, (ii) attitude towards smoking, alcohol and drugs, (iii) encouragement towards greener disposition of garbage, (iv) systematic wearing of seat belts and bicycle helmet, and (v) fishing quotas.

Front-loading strategies concentrate on 'preliminary/preparation needs' which are crucially important to legitimize engagement and logic in future cooperation and to lower potential resistance. Themes such as project scope, investment expectations, management roles, time frame, benefits, external and internal supports as examples are assessed. Reflecting this, micro-strategies are deployed to encourage civil servants' engagement in new technologies at early stages that ought to increase the likelihood of the overall outcome success (de Kervenoael et al., 2010). Significantly, individuals want to minimize unpleasant changes during the transition process towards new ICT usage and reproduce traditional processes that allow them to retain control over their everyday work routines. In turn, hierarchical setting and historical relationships between technological services and individuals have a memory effect on learning opportunities and communication style directly shaping the transition and acquisition of novel communication know-how (Gudykunst, 1993).

In most of the organizations, the conceptualization of innovation as a learning process is rather loosely applied. The precise nature of the learning that takes place, as well as how it occurs and who learns, are matters that often remain largely unexamined (Ziman, 2000, p.119). According to Holm et al. (2002), the role of ICT for the national economies is constantly increasing and careful selection of human resource management (HRM hereafter) practices has become crucial in managing the growing population of information professionals. Studies show that there have been several alternative approaches to consider depending on how the effectiveness of HRM is defined and what the expected outcomes of the best HRM bundle are.

It is further underlined that how people identify and commit to their groups and organizations should be understood from an individual point of view. Higher management strategy, on the other hand, traditionally only tackles technological transition and change issue from a deterministic functional process. A miss-match is often found between HRM strategy at individual and organizational levels shaping illegitimacy and causing resistance to engage in m-ICT before it is deployed. How individuals' future expectations are aligned with the business strategy and how they support each other are often overlooked (Holm et al., 2002).

Rousseau's (1995) model of psychological contracts provides an interesting unifying framework for simultaneous analysis of both managerial and individual views. Two fundamental terms of psychological contracts are developed namely transactional and relational. Transactional contract is based on close-ended time frame and mutual profitability. Relational contract on the contrary is based on confidence, stability and commitment. Organizational commitment is one key element which makes the difference between transactional and relational contracts. Subsequently, commitment is defined as; i) acceptance of an organization's goals and values; ii) willingness to exert considerable effort on behalf of an organization; iii) desire to maintain organizational membership (Porter et al., 1974). Furthermore, this framework contains an additional performance requirement dimension in addition to the time frame that relates to the duration of the employment relationship (Holm et al., 2002).

Front loading activities are traditionally broken up in a series of iterative steps ranging from; (i) the learning and understanding of the current standing and relationships during change; (ii) the critical evaluation and re-evaluation of current processes benchmarked against industry leaders; (iii) the design of novel structure to allow collaborative problem solving and quicker identification of emerging problems often involving feedback loops; (iv) the evaluation of expectations regarding possible outcomes; (v) the proactive recognition that individuals are fundamentally different and that more than one outcome or solution ought to be considered before finding a solution to complex dynamic issues; and (vi) setting achievable goals for the coming periods. The concept of legitimacy

and front loading will now be discussed together within the specific context of m-government.

ICT Resource Management Considering Digital Government Services

As the availability and the accessibility of information improve and cost declines, many governments are considering the Internet as the efficient way to reach to a large group of citizens. Indeed recent reforms have lead to the introduction of approaches putting greater emphasis on ICT 'as a transition from passive to an active welfare state'. Significantly, despite the importance of technologies, it is estimated that governments' ICT spending for the 2000-2010 period stands at over $3 trillion but that between 60 to 85 percent of e-government projects will fail to deliver their expected outcomes (Gubbins, 2004). On the other hand, how this dynamic setting affects the way through which government services are accessed and offered remain unanswered. What cultural and organizational changes are needed in order to manage the transition are also important issues to be addressed which remain controversial especially in emerging market conditions.

Several key characteristics are shaping the debate including: (i) civil servants' control over the interface choice in their daily administrative work at local level; (ii) human machine synergies and the re-organization of activities and tasks; (iii) cooperation, negotiation and deliberations between administrative layers, arm length public private partnerships, NGOs and the business world; (iv) regulation and standards regarding information depository, storage and access; (v) rights that protect civil servants' privacy, promote ethical and transparent practices, and create a learning organization which maximizes the common use of ICT services across all government layers. Guarantee of an acceptable level of service quality, both by individual civil servants and new hardware and software providers, has become paramount. The integration of pre-ICT era information, the translation of administrative jargon and processes, and the match of jurisdictional structure with the new emerging ICT back end infrastructure, along with possibilities for tracking, correcting and upgrading services, are required to take full advantages of the new digital opportunities. m-ICT ought to allow, following the French example, the true creation of "the Administration á accés pluriel" (plural access to administrative services) with a greater "service de proximité" (local services or where citizens are "in the field").

In particular, m-government has been described as limiting: (i) demand to interpretation, (ii) hidden discretion, and (iii) political influence (Lenk, 1997). Such m-opportunities in turn allow a better decision making process which includes: (i) substantiation of facts by data, (ii) decision as a result of information processing, (iii) clear execution of strategy and corrective mechanisms. Significantly, m-government allows administrative cooperation: (i) over distances, (ii) across organization boundaries, and (iii) across hierarchical echelon. Technology should not be seen as the reason for resistance but only the tool which allows organizational changes (Gerst & Bunduchi, 2005).

From these perspectives, the idea of hegemony and control of power remain important. Technologies often bring radical change within organizations and power and politics are issues that cannot be neglected in the domain of m-services for municipalities (Emerson, 1962). The multiple types of shareholders ought to develop a strategic framework regarding m-governance. From this point of view, legitimacy can be re-defined as positive resistance. Resistance is, in this context, the sum of "those behaviors and cultural practices by subordinate groups within the context of hegemonic social formation that threaten to unravel the strategies of domination" (Haynes & Prakash, 1991, p.3). Legitimacy, as an m-governance issue, needs to be analyzed along a continuum including public administration history, culture and power (Hall, 1990, p 225). As a result, a novel definition

of power is emerging that is transitory, flexible and ambivalent abolishing previous boundaries and creating new territories (Law, 1997, Sack, 1986). These schematics are also utilized in Actor Network Theory giving a greater role on non-human agency and contingency (Heeks & Stanforth, 2007). Contingency represents the language, connections, flows, speed and lines of contestations. At this point, the significance of apparently apolitical standpoints cannot be overstressed. In other words, following Canel (1992), the traditional state centered locations of politics and new emerging civil society voices should not be seen as separated.

Lastly, new technical infrastructures have to be created that often involve third parties from private sector. The services and processes which are required include: (i) payment procedures, (ii) certifying agencies, (iii) protocol and interface control systems, (iv) m-signature and (v) m-legislation regarding complaints and errors. In addition, m-applications include resource management such as voice over IP, moving images, file transfer, web browsing, collaborative working, electronic agents, job dispatch, information services and still images which are all requiring 3G or GPRS technologies. Other examples of SMS/GPRS applications are email, chat, remote monitoring, instant messaging, electronic commerce, customer service and vehicle positioning.

From this perspective, the m-platform function appears more complex than originally perceived by civil servants. Simultaneously, clearer divergences from other forms of digital government such as e-government become more prominent. Indeed, many of these requirements will only become apparent during the trial period of these applications which escalate the financial risk faced by local authorities. As stated by Phipps, (2000) p 41: "A risk is acknowledged that ICT developments may reinforce polarisation and create additional division through people and communities who are 'information rich' or 'information poor', whereby the failure to get plugged-ins leads to a downwards spiral of economic activity with associated fall outs. ICT can be seen as neutral in themselves, as an enabler. Positive and beneficial applications, enhancing democracy and accountability, are an active choice and responsibility for our society". Furthermore, increase in information intensity, access reliability, urgency of information and data interactivity need to be considered within this context.

METHODOLOGY

This research is based on a series of semi-structured interviews which were conducted in 2008-2009 as being part of a wider project. This period coincides with the initiation of the first Turkish e-Government gateway portal. Phone interviews, using the notable people methodology (Kempster, 2007), were conducted with a total of 30 ICT officers within local government organizations (municipalities) in Turkey. Each respondent was interviewed in four waves. This methodology enabled us to talk to the civil servants sufficiently despite their work load. Respondents did not receive any feedback on previous surveys' results or other respondents' comments. Each interview lasted in total between 40 and 90 minutes and was audio taped.

For each respondent, a separate within case analysis was conducted (Each author's own observation). This follows Yin's (1989) ideas of pattern matching. Second, cross case comparisons to offer consistency on the issues, themes and a holistic appreciation of the data were made (Miles & Huberman, 1994). In order to operationalize the coding based on the original broad constructs identified in the literature, the authors developed and reinterpreted their coding to reach a consensus, via a series of iterative discussions with a focus on flexibility and contextual sensitivity (Merriam, 1998).

Each wave of interviews builds on the findings of the previous interviews. Following Lee and

Cadogan (2009), "analysis proceeds concurrently with data collection and theorizing, with each having an impact on the procession of the others". Moreover, this methodology is used to determine the moment of "theoretical saturation" (Strauss & Corbin, 1998) where respondents do not add any further aspects or new themes.

Themes investigated included: (i) the current usage of ICT by the municipalities and the civil servants' awareness and perception of m-services, (ii) organizational process and day to day civil practices in terms of m-ICT, (iii) mobility and ICT capability building, and (iv) m-services resource management issues in local governments (see Appendix 1 for the survey).

FINDINGS

Three broad resource management dimensions, leading to legitimacy for adopting or rejecting to the new initiatives related to m-government, emerged as the most enduring aspects; i) *Awareness and diffusion of information management*, ii) *Operating system and resource management, and* iii) *Skill, strategy and human resource management.*

Awareness and Diffusion Of Information Management

The first group of findings was related to the concepts of awareness and information diffusion among civil servants about the current and future potential of m-municipality services (investment and market legitimacy). First, interoperability was described as key to any engagement likelihood. As compatibility, the degree at which the innovation was perceived as consistent with the existing value, past experiences and needs of potential adopters remained fundamental. Fragmentation was depicted as present both from a technical perspective (e.g. back-end architecture, middleware integration and individual applications level) and from a broader cultural organizational perspective (e.g. process, practices, praxis). Indeed, technology was not viewed singular by civil servants. The adoption, resistance or legitimacy of a technological tool was an important precedent for current and future strategies. The boundaries around an initiative or an activity were often not clear cut which caused the perception of threats rather than benefits, at least in the short term.

"Transferability is an important issue to be solved. Coordination among the departments within the municipality is crucial"; "I think, m-municipality may benefit a certain group of citizens or civil servant, but I do not know what shall be done to widen the scope of the target audience".

Second, scalability to all services in all aspects of municipality life was not perceived as straight forward. Third, a re-engineering process towards a seamless m-municipality was required. To achieve the integration and automatic workflow services, IT offices and floor level civil servants needed greater and better communication channels. For m-government, the positioning of the innovation and the strategy at national level made an implementation difficult at local level. Not all stakeholders (e.g IT, financial, Technical providers) were indeed available in the local environment. While benefits were perceived for the civil servants acting in the field, it was recognized that few civil servants were leaving their offices. Traditional process required a citizen to come physically to the local office and not vice versa.

"Mobile government does not provide any advantage for municipalities compared to e-government. I still need to have the same technology, servers etc. But from a civil servant "in the field" perspective, it will provide a time saving practice".

Subsequently, it was felt by some of the respondents that indigenous local knowledge and specificity were forgotten. As described by Rogers

(1995) p. 240, "An innovation often commit the empty vessels fallacy by assuming the potential adopter are blank slates who lack relevant experiences with which to associate the new idea". Furthermore, cross national services provision through better content management is yet to be achieved in Turkey in other areas (e.g. school management). It was felt that the complexity of the changes was not appropriately understood as negatively related to potential legitimacy. This element was compounded by a lack of trialability and observability. These were highlighted by a number of respondents with issues such as:

"Cultural factors are important; all civil servants should adopt these mobile services, but what about local differences?"; "I think other civil servants know m-government services but I don't know whether they use them or not; does it fit what they need to work with?".

From the present perspective, further organizational integration was emerging as an underlying requirement. In parallel, a certain categorization of civil servants regarding to whom and when m-government would have impact on seemed to become a compelling necessity. The question of m-government initiatives' including all civil servants (exhaustive method) based on innovativeness degree to which a unit/jurisdiction has been subject in the past or using other methods such as starting in one service based on urgent needs and moving organically towards all services should be addressed.

"My colleagues are not knowledgeable about mobile services that much. As the IT office, we are more informed and knowledgeable now, my team (IT) knows but most of the people working in our municipality do not have detailed information about the mobile services"; "We are already using mobile devices and my colleagues know m-applications. I have information about the activities of other municipalities. My friends know the applications which are developed by Istanbul Metropolitan Municipality. But in general I can say that there is a trust and security concern"; "Most of the civil servants are not aware of these mobile services since they are very old. Those who are aware of these services don't have detailed information about the services offered to citizens".

In particular, a strategy needed to be devised regarding private sector's roles in supporting m-municipality applications, the role of interpersonal (political) network and its influence on both individuals and organizations. Defining leaders and champions (opinion leadership) seemed particularly relevant for the informal integration of m-government and its automation components of resource management. Legitimacy was found to be important in driving m-government through clear policy statements, official documentation and political discourse.

Operating System and Resource Management

The second group of findings centered on operating system and resource management within the set of local level activities (technology robustness legitimacy). First, the cost of running back-end services for mobile applications was described as unknown. This feeling was reinforced by a lack of homogenous pricing structure for similar services by the three m-providers in Turkey. Second, supporting m-services through mobile phones was described as tricky due to the great variety of devices and operating systems. This lack of interoperability became a psychological barrier as well as a technical limit for the civil servants. Third, mobile government activities' value added was still not perceived as superior than other traditional delivery methods by most of the civil servants. This resulted in confusion over priority and usage of technological tools such as mobile phones and traditional computers.

These were described by our respondents with the concerns such as:

"There are technical issues such as the variety of mobile phones in terms of design, operating systems, technical limits and capabilities. Therefore, it is problematic to build a common m-application base structure"; "I don't think there is problem in terms of government, actually government supports m-applications. But institutions differ a lot in their policy and attitudes towards resource management. Public institutions except municipalities are dependent on national government funding waves and therefore their ability to generate m-applications is so limited"; "The problem here is that each mobile phone does not support m-services. There is a limitation, so it is not like a computer on internet. So, even if one person likes to use the m-service, he cannot do it because of his old generation mobile phone".

Another emerging issue was linked to the level of decentralization or centralization of m-government strategy. The experience of the e-Government gateway was a move towards a centralized application in Turkey. From this perspective, peer diffusion of innovation and experimentation couldn't be sufficient and the order of service priority didn't reflect local needs. Furthermore, user self reliance was encouraged in a decentralized process which is not the case currently. Yet, it was perceived that technical expertise or quality of m-service as a proxy could be easier to standardize at central level. Cost was also perceived as high; hence an impediment in a decentralized system.

"Emerging m-service quality is good but the price level limits its usage along with security issues. Mobile signature application should also be improved"; "In mobility, cost of using a service is important (3G phone acquisition and daily use). Besides, I do not prefer to use my mobile phone for a service if I can have access to the same service free of charge through a municipal (work phone) provided device. I think the main problem is the cost also for us civil servants". "Similar to e-government, m-government will also provide labor cost reductions. It provides a better allocation of government resources. Moreover, compared to e-government, m-government will enable us to deliver public services to everyone, even to those who cannot use computers".

While implementations at local level within day to day activities were emerging, stronger strategic perspectives were required to allow legitimacy of investment both in terms of ICT resources and service range and depth. Civil servant layers within any country should not been seen as homogenous. Civil servants at public administrations, rather than the ones at organizations, do not always work together to achieve common goals. The hierarchy of power is having a deep impact on the politics that shapes each layer. M-government is related not only to internal organizational structure, characteristics of organizations and public administrations' adoption of change but also to individuals' uniqueness. We now turn our attention to this.

Skill, Strategy and Human Resource Management

The third group of findings included concepts which were related to individuality, level of confidence with ICT and strategic tools that were used to persuade civil servants to engage in m-technologies' tools and services for their daily activities at the municipalities (social and relational legitimacy). Easy learning, convenience and accessibilities were important factors. Compared to usual computers, m-devices were described as: (i) accessed anytime and anywhere, (ii) always switched on and carried around, (iii) more precise at delivering instant up to date content to relevant individuals, and (iv) more confidential since a person does not usually share mobile phone. Implications were profound in terms of

responsibility and control mechanism. The older generation perceived risk as they traditionally did not engage in technological changes and had control over the tasks.

"I think Turkish civil servants will be able to adapt to any technological developments On the other hand, technology improves so fast that older colleagues do not follow. We are curious to learn about new technological tools but usually we do not have the education and technical background to learn quickly how to use these tools efficiently, immediately".

As a secondary perspective, the findings highlighted that civil servants could be convinced to invest in m-services if a series of themes were clarified at strategy level; (i) both the civil servant users and the technical service providers need to demonstrate readiness to implement m-applications; (ii) the timing or intensity of change needed to be made by consensus; (iii) the issues such as the ranking of m-services within the whole array of digital services and the people who will make the decision regarding adoption or rejection were perceived to be political rather than technical; (iv) the impact on municipalities' service delivery regarding efficiency and effectiveness remained too vague. Evaluation of the progress or the consequences of failure on the achievement of the targets were important. Typically respondents described issues related to skills and strategy making in the following ways:

"If a municipality has budget to train us and qualified employees are recognized, then it is easy to build the required infrastructure for m-municipality. In addition, young personnel can learn technological tools more easily than the old can do that should accelerate the change in culture towards ICT resource management"; "How is all that going to be assessed? Against which criteria and by whom?"; How fast will decisions be taken?".

Interestingly, these issues were echoed in other countries as a source of legitimization for engaging in m-government. In Turkey, the changing working patterns of civil servants regarding more 'in the field' and 'closer to the citizens' as opposed to the traditional 'behind desk' position need progress.

CONCLUSION

"One of the greatest pains to human nature is the pain of new ideas. It ... makes you think that after all, your favorite notions may be wrong, your firmest beliefs ill founded ... Naturally, therefore, common men hate a new idea, and are disposed more or less to ill treat the original man who brings it". (Bagehot, 1999 as cited in Rogers, 1995, p. 335)

This chapter proposed an approach that examined civil servants as resisting gate keepers of the new promising applications of m-government. Civil servants' perspectives on the concepts surrounding legitimacy and resistance in the early stages of an m-government strategy were presented including market investment, technological robustness, social and relational legitimacy. The findings of this exploratory study indicated that the legitimacy of m-government services -in Turkey- is multi-factorial. Thus, it should be better understood that m-government resource management ought to take into account the emotional management of civil servants at local level as well as the overall organizational change brought by the concept of mobility both at national and local level. Mobility is understood more as how local governments can provide a better social infrastructure through mobile applications and services than technological tools per se. While digital government has been an important step taken by most of the governments, provision of services through mobile technologies is now inevitable and needs to be managed not only from a citizen centric perspective but also taking into account civil servants' expectations.

Although previous research concentrated mainly on macro strategy level from a citizen perspective, we argue that more interest should be given on civil servants and ICT supply chain issues.

From these perspectives, it is pertinent to consider the global policy landscapes and the convergence between countries in the widening of ICT usage which makes the engagement in innovation more important for Turkey and other emerging countries. At this moment, it is obvious that mobile services are rapidly emerging as the new frontier of change in transforming government from within. As more advanced mobile devices are becoming common and faster rates of data transfer are possible, more useful and higher value-added mobile services will be expected from all levels of governments. For this reason, understanding civil servants' legitimacy and resistance to mobile technologies and applications has become more important. Furthermore, from a resource management perspective, an evolution needs to occur that takes into account both human and technical issues which are related to change in non-homogenous organizations.

In a nutshell, the objective of this chapter was to investigate the perception of the civil servants, who are working at local level, regarding the potential for m-government services. Our findings indicated that there are many issues that influence civil servants' legitimacy to engage in or resist to m-government services. Frontloading activities at local level and national level were found to be important steps towards making m-governments' resource management initiatives successful and beneficial for both the citizens and the civil servants. Legitimacy regarding the perception of m-municipality services, mobile tools and technologies, as prerequisites for further improvement and growth in information communication technologies, was emphasized. More action is needed in order to increase the awareness and knowledge of civil servants currently delivering m-municipality services. Thus, further research should look at various types of civil servants from a qualitative perspective in order to elicit detailed issues in practice which are related to the emerging mobility phenomenon.

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APPENDIX : SUMMARY OF THE SURVEY INSTRUMENT

Wave one investigated the ICT adoption by the municipalities and civil servants' awareness and perception of m-services?

Q0 Can you provide us general information about your municipality's characteristics regarding ICT usage?
Q1 Can you summarize your municipality's ICT activities over the last 5 years?
Q2 How do you evaluate if there is a demand for mobile services?
Q3 How do you perceive the use of mobile phones for your daily tasks?
Q4 What is the most important benefit of being mobile as a civil servant?
Q5 What may be the key problems related to using mobile phones for public administration work, and from an individual user perspective?

Wave two explored organizational processes and possible causes of resistance to ICT.

Q0 What are the effects of the following barriers on your municipality's usage of ICT?
- Errors/defects in supplied equipment hardware and software
- Lack of flexibility considering ICT suppliers
- Lack of integration between applications
- Lack of qualified staff in the municipality
- Difficulties to recruit or retain ICT qualified staff
- Reluctance among staff to use ICT
- Municipality's lack of updated ICT strategy
- Lack of commitment by management
- Cost of adoption of ICT

Wave three investigated the concept of ICT capability building relating to m-services in particular.

Q0 What types of initiatives have been undertaken to introduce m-government to civil servants in your municipality?
Q1 At an individual municipality level, how are you preparing to explain the future development of m-government services? Why? Why not?
Q2 Can you describe the current ICT capabilities from a technical perspective and from a civil servant user perspective? How is technological change rationalized?
Q3 Set of questions on ICT expertise location*
Q4 Set of questions on trust in other knowledge regarding ICT*
Q5 Set of questions on coordination of ICT knowledge*

*Q3-5 adapted from Kanawattanachai, P. (2002). Formation and development of socially-shared cognition and its impact on performance of virtual teams over time. Doctoral Thesis, Department of Information Systems. Case Western Reserve University.

Wave four concentrated on the concept of m-services' resource management issues in local governments.

Q0 In your opinion, which factors influence the management and legitimacy of m-services resources, both considering technical and human factors?
Q1 How does civil servants' perception of mobility affect the resource management process?
Q3 How do you think the political pressures are shaping m-government adoption? Why? Why not? Benefits/problems?
Q4 Do you perceive any power-control issues arising from the new possibilities and opportunities offered by m-government?

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Chapter 26
Promoting Digital Competences through Social Software:
A Case Study at the Rovira i Virgili University

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ABSTRACT

In the present landscape of technological change there is increasing awareness of the need to support the acquisition of digital competences. In this chapter, we address how digital competences can be developed through formal learning. We show how to design a web 2.0 learning experience that was undertaken at Universitat Rovira i Virgili[1] and which developed both digital competences and management knowledge. In particular, the case presented focuses on the field of gender equality within the framework of labor relations in a non-real company created for this purpose, "Quadratonics SA". Through Quadratonics', web 2.0 tools and social software students improve their digital competences and, at the same time, are exposed to the most up-to-date innovations in ICT. Our final reflection is that higher education academics should continue to expand their awareness of web 2.0 applications and the role they can play in optimizing learning and knowledge creation among students, who will be the digital workers of the future.

INTRODUCTION

Information and communication technologies (ICT) are currently playing a key role in the education arena, from primary school to higher education and adult learning. Nowadays, campuses are networked, faculty post their notes on web pages, students access the library from their rooms, and entire classes can have discussions via chat software (Rice-Lively, 2000). This development was labelled under the now commonly accepted term

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e-learning, which is evolving to new models such as mobile learning.

The European e-Learning Action Plan 2001 (European Commission, 2001) defines e-learning as the use of new multimedia technologies and the Internet to improve the quality of learning by facilitating access to resources and services as well as remote exchanges and collaboration. This requires new e-interaction and e-communication competences and a reorganization of e-learning structures. The components of these structures include content delivery in multiple formats, learning management, and a networked community of learners (Gunasekaran, McNeil, & Shaul, 2002). Internet/World Wide Web have meant that opportunities have been identified for developing distance learning activity into a more advanced online environment known as Virtual Learning Environment (VLE). Higher education institutions devote substantial resources to providing students with access to internet-based information, VLEs and other forms of e-learning. These efforts are predicated upon the assumption that "university students are inherently inclined towards using the internet as a source of information within their day-to-day lives and, it follows, disposed towards academic use of the internet" (Selwyn, 2008, p. 12).

In a fast moving technological environment, the traditional approach to e-learning is currently changing from the use of VLE to learning 2.0, an approach that combines complementary tools and web services—such as blogs, wikis, podcasting, videoblogs, and social networking tools—to support the creation of ad-hoc learning communities. In this context most of the current research tends to be concerned with the potential of the worldwide web and other internet applications to accelerate university students' learning and knowledge-building, and support interactivity, interaction and collaboration (Selwyn, 2008).

This chapter aims to provide an introduction to the application of web 2.0 tools and social software on the learning process. Social software has emerged as a major component of the web 2.0 technology movement. But, how can social software play a role in higher education? To answer this question, this proposal focuses on the role of web 2.0 technologies in promoting learning and the development of digital competences among students. A pedagogical application at the Rovira i Virgili University (URV) which stems from the provision of collaborative knowledge discovery, is discussed in depth. At the same time, the chapter explores the concept of digital competence from the perspective of the competence needs of the labour market and, the role that social software plays in the learning process. Finally, some suggestions are made for future research in this field.

BACKGROUND

Social Software, ICT and Learning 2.0

The term social software includes a large number of web 2.0 tools used for online communication: for example, instant messaging, text chat, internet forum, weblogs (or blogs for short), wikis, social network services, social guides, social bookmarking, social citations, social libraries and virtual worlds. O'Reilly (2003) describes web 2.0 as an "architecture of participation" in which collective intelligence generates a "network effect" leading to websites that become more valuable as more people participate. For McGee and Begg (2008), web 2.0 "represents a group of web technologies with a user-centric focus that actively change and evolve with user participation." (p. 164). According to De Pablos (2007), social software refers to the "use of computer-mediated communication for forming communities: a web-based application is made available to a multitude of users contributing and sharing information." (p. 22). From these definitions, two basic characteristics of social software can be derived:

1. They provide support for communicative interaction, either in real time (e.g. chats) or delayed time (e.g. email).
2. They provide support for social networking, so that knowledge can be shared and constructed collectively.

The educational potential of these changes require a "thorough rethink of both the individual and collective dimension of the teaching-learning processes, rhythms of learning, new ways of structuring information for the construction of knowledge, and the tasks and competences of teachers and students " (De Pablos, 2007, p. 21), and the development of on-line learning activities based on collaborative work (Landeta, 2007). In higher education, social software is now seen as a tool that offers learners access to learning experiences which are based on active participation rather than passive reception and new forms of knowledge creation. The use of Web 2.0 tools and social software at the University is a strategy for a change towards the continuous improvement of education (Guzman, 2008) and a new culture sustained on the connectivism developed by Siemens (2004), in which knowledge is generated by means of a participatory culture or 2.0 learning.

2.0 learning involves using the web 2.0 and a variety of technological tools, mainly located on the web, for teaching and learning (Comba & Toledo, 2009). According to Cuesta Morales (2008) it is a type of learning that: (1) is not based on objects and content that is filed away; rather it is a stream that flows, which we can join whenever we want; (2) focuses on the user; (3) is carried out by immersion (learning by doing); and (4) is connected, based on conversations and interactions, that take place through social networks or virtual communities. For Haro (2009) the added value of such networks in the learning process resides in the effect of social attraction for the student—it brings informal learning closer to formal learning and private life closer to teaching life—and the simplicity of a communication model that allows for "unlimited interaction and multidirectional communication processes" (Cabero & Llorente, 2007, p. 112).

2.0 learning takes place within a sociocultural system in which people use technology to interact and learn collectively bargaining, thus encouraging lifelong learning. Some examples of how social software can help to encourage learning are (McLoughlin & Lee, 2007):

- *Connectivity*: Social networks like MySpace, Facebook and Friendster facilitate the connection between people by creating spaces of affinity in which people can acquire social and communication skills. These networks are places of informal learning that contribute to digital literacy.
- *Finding and sharing information in a collaborative fashion.* There are a wide range of new possibilities for sharing information. Social bookmarking services such as del.icio.us or Digg make it possible to create, classify and organize collections of web resources. Thus, users with similar interests can learn from one other and contribute to the growth of web-based content and knowledge.
- *Creating content:* The Web 2.0 stresses creating content above and beyond mere consumption. Anyone can create, organize and share content. Wikis allow individuals to work together to generate new knowledge by openly publishing documents.
- *Aggregating information and knowledge, and changing content*. The *Really Simple Syndication* (RSS) systems and related technologies such as podcasting and vodcasting (which involve syndicating and aggregating audio and video content, respectively) are an indicator of how material can be collected from different sources and then put to personal use. The content can be easily reformulated (mashup).

In short, as Maenza and Ponce point out (2008, pp. 4-5) these new environments are contributing to an educational transformation which implements, with no major problems, Piaget's concepts of constructivism and Vigostsky's social interaction: permanent, collaborative and active learning, in which learners are responsible for their own learning. At the same time, however, information technologies are an instrument of support and reinforcement in teaching innovation (Salinas, 2004). The new technologies make a new university model possible which promotes 2.0 learning. According to Thompson (2007), students who have grown up with the Web 2.0 (the so-called digital natives or "Web Generation Students") will eventually reform the higher education institutions.

Esteve (2009) expressed himself in similar terms and pointed out that the Spanish university, in the middle of the process of adapting to the EHEA, should continue to renew its educational methodologies and, ultimately, continue the process of change of the educational paradigm. The driving force of the ICT and the revolution of the social tools are somehow reshaping the personal learning environments of the students and generating new horizons for the development of new competences of future graduates.

As is well known, the EHEA places the student at the centre of teaching-learning process. This shift in the educational paradigm is related to a methodological change that stresses the student's active role, initiative and critical thinking. In this new context, which focuses on the student and the attainment of competences, as we have already pointed out, the information technologies play a key role, providing new contexts and possibilities for the development of these skills. In this chapter we shall explain how to carry out these processes of educational innovation and develop digital competences.

Exploring the Concept of Digital Competence

All the changes involved in the information society make new demands of individuals, because they need to acquire competences that are qualitatively different from those required just one decade ago. The information society requires new knowledge, new skills and, above all, new attitudes, which can be grouped under the term digital competence, and it also requires individuals to be able to use technology interactively. As stated by the OECD's Definition and Selection of Competences (DeSeCo) Project (http://www.oecd.org/edu/statistics/deseco) the interactive use of technology requires an awareness of new ways in which individuals can use technologies in their daily lives. ICT can transform the way people work together (by reducing the importance of location), access information (by making vast amounts of information sources instantly available) and interact with others (by facilitating relationships and networks of people from around the world on a regular basis). To harness such potential, individuals will need to go beyond the basic technical skills needed to simply use the Internet, send e-mails and so on. The twenty-first century must prepare graduates for the technology-enabled communication that has transformed the world into a global community, with business colleagues and competitors as likely to live in India as Indianapolis (Partnership for 21st Century Skills, 2003).

The "*Key Competences for Lifelong Learning European Reference Framework*" (European Parliament and Council, 2005) defines a digital competence as the "the confident and critical use of Information Society Technology (IST) for work, leisure and communication. It is underpinned by basic skills in ICT: the use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative networks via the Internet." (p. 7). Digital competence requires a critical and reflective attitude towards the information available

and responsible use of the interactive media. An interest in engaging in communities and networks for cultural, social and/or professional purposes also supports this competence. Higher education institutions and academics are responsible for fostering this interest among students.

This definition is important in that it lists five critical components of ICT literacy: access (knowing how to collect and/or retrieve information), Management (applying an existing organizational or classification scheme), integration (interpreting and representing information, including summarizing, comparing and contrasting), evaluation (making judgments about the quality, relevance, usefulness, or efficiency of information), and creation (generating information by adapting, applying, designing, inventing, or authoring information). However, apart from the ICT literacy needed to manage information, learners need additional competences to react to the challenges of a digital society. Siemens (2006, p. 113) lists the following:

- Anchoring: Staying focused on important tasks while undergoing a deluge of distractions;
- Filtering: Managing knowledge flow and extracting important elements;
- Connecting with each other: Building networks in order to continue to stay current and informed;
- Being human together: Interacting at a human, not only utilitarian, level to form social spaces.
- Creating and deriving meaning: Understanding implications, comprehending meaning and impact;
- Evaluation and authentication: Determining the value of knowledge and ensuring authenticity;
- Altered processes of validation: Validating people and ideas within an appropriate context;
- Critical and creative thinking: Questioning and dreaming;
- Pattern recognition: Recognizing patterns and trends;
- Navigation of the knowledge landscape: Navigating between repositories, people, technology, and ideas while achieving the intended purposes;
- Acceptance of uncertainty: Balancing what is known with the unknown to see how existing knowledge relates to what we do not know;
- Contextualizing: Understanding the prominence of context, seeing continuums, ensuring that key contextual issues are not overlooked in context-games.

All these digital skills go beyond obtaining, evaluating and using information. They are the basis for students to demonstrate creative thinking, construct knowledge and develop innovative products and processes. They are the competences that allow students to use digital media and environments to communicate, and work and learn collaboratively. They enable students to use the skills of critical thinking to plan and manage projects, solve problems and make informed decisions with the appropriate digital tools and resources. In short, digital competence is the ability to understand and express by making analytical, productive and creative use of the information technologies and social software to transform information into knowledge.

Working in the Digital Era: New Competence Requirements

In a society of increasing individualism, social networks are providing a communication fabric that allows people to interact with great intensity within their organizations. In a survey conducted by the Economist Intelligence Unit and sponsored by KPMG International, executives from different

sectors agreed that the adaptation of Web 2.0 tools could offer benefits in key areas (Matuazak, 2007):

- *Greater collaboration*. Most Web 2.0 technologies connect people and facilitate cooperative work, thus encouraging the exchange of knowledge and information. This sort of collaboration may help us to improve decision taking and solve problems more effectively.
- *Innovation*. The Web 2.0 tools can make it possible for a wider range of collaborators to take part in research and development (R+D) activities. Thanks to these tools, R+D may become more inclusive.
- *Improved productivity*. The Web 2.0 tools have the potential to create a network effect that will improve the quantity and the quality of work.

Undoubtedly, Web 2.0 tools and social software can increase the commitment of the members of an organization (Dawson, 2009). The improvement in internal communication systems helps information to be sent more efficiently and improves communicative skills. The main reasons are that the Web 2.0 tools encourage basic collaborative behaviour in knowledge-based work environments and that learning and development are more effective with 2.0 tools that provide easier access to new knowledge because they encourage learning processes based on connectivism as it is understood by Siemens (2006).

Working in the digital age means that, more than ever before, it is necessary to understand how organizations make use of 2.0 tools and social software in the various areas of their activity. In 2007, the survey *Enterprise 2.0* of KPMG International revealed that sales and marketing, information and research, information technology, customer service, and strategy and business development are the areas that make most use of Web 2.0 tools. Companies can go to a specific blog and see whether their products are being questioned or praised. Present-day companies, then, cannot ask themselves if this is a fashion that will last or not: they simply have to be aware that the Internet can destroy a brand, so they have to be a part of it to defend their products. And they can be a part of it by participating in the Web 2.0.

There are more and more 2.0 companies every day. Procter & Gamble, for example, use RSS systems to give news and information about the company, they publish wikis to encourage cooperation and blogs to communicate and share. Procter & Gamble also created a social network that enables its staff to find experts in specific knowledge areas (Hoover, 2007a). For its part, Motorola uses more than 4000 blogs and wikis, and nearly 3000 people are actively involved in creating content by means of social bookmarking (Hoover, 2007b). The blog McDonald's "Open for Discussion" blog brings together all those interested in corporate social responsibility. Customers, suppliers and employees all make contributions (Scott, 2007).

All these initiatives depend on the professionals who work in companies and this is where the importance of being a 2.0 professional lies. Professionals in the age of knowledge and connectivity:

- Understand the dynamics of the Enterprise 2.0 model and of a network economy in which interactive dialogue with clients has become the key to keeping clients faithful.
- Have the skills to work in the knowledge economy, master the language of the information and communication technologies, and know how to use them to discover opportunities within their organizations.
- Can cope with the challenge of hyperconnectivity in network economy communications with the purpose of making collaboration an efficient work tool that enables the power of collective intelligence to be exploited.
- Are constantly aware that business decisions must take into account the needs

of society and sustainable economic development.

These new demands of the labour market mean that the processes for evaluating the competences of higher education institutions need to be adapted to include digital competences in a framework of general competences and independently of the particular qualification. It is on the basis of these ideas that the teaching innovation experience summarized below was planned.

A CASE STUDY AT THE ROVIRA I VIRGILI UNIVERSITY

Rovira i Virgili University Competence Framework

Organizations are using competence models to "clarify organization-specific competences to improve human performance and unify individual capabilities with organizational core competences" (Rothwell & Lindholm, 1999, p. 104). Competence models can be used as a recruitment and selection tool, as an assessment tool, as a tool to develop curricula and training material, as a coaching, counselling and mentoring tool, as a career development tool, and as a behavioural requirement benchmarking tool (Yeung, Woolcock & Sullivan, 1996). The European Higher Education Area is an education model with a competence-based approach, which aims to ensure that the competences taught are those that are required in the workplace. Thus, the goal of any competence-based education is to ensure that learning is transferred to the workplace. It involves an extensive process of identifying relevant competences, after which learning activities need to be developed. In this context, the ability to choose and use appropriate ICT and social media is becoming a necessary competence for academics.

A deep understanding of what is required by the labour market needs to be matched by a common understanding of the learning outcomes achieved in different courses and degrees. Synthesising the available literature, Andrews and Higson (2008) have identified the following key 'transferable' competences that are integral to graduate employability: professionalism; reliability; the ability to cope with uncertainty; the ability to work under pressure; the ability to plan and think strategically; the capability to communicate and interact with others, either in teams or through networking; good written and verbal communication skills; information and communication technology skills; creativity and self-confidence; good self-management and time-management skills; a willingness to learn and accept responsibility. In turn these are attested to by different qualifications. The URV competence framework is a key step towards increased transparency in the competence market. Competences, which enable student to succeed and to have a university degree, will also enable them to prosper throughout their professional careers. The development of competences must be maintained and reinforced by higher education institutions.

The Rovira i Virgili University competence framework was first implemented in the academic year 2003/04 to adapt its curricula to the European Higher Education Area. The proposed competence framework divides student's competences into three different types: specific (A), transverse (B) and nuclear (C) (see Table 1 for a definition). Within each competence, various levels of mastery can be formulated. These levels express the degree of achievement of a competence throughout a degree, a course or a planned activity.

The development of competences has a complex structure. As an initial working proposal, the URV has established the competences displayed in table 2 for a variety of disciplines, as is described in the document "Guías para trabajar y evaluar las competencias transversales/nucleares en las titulaciones de Grado" ("Guide for developing and evaluating the transferable/core competences

Table 1.Definition of competences

COMPETENCE	DEFINITION
Specific	Set of competences related to the knowledge (*knowing and understanding*) and skills (*knowing how to act*) of each degree. They are not transferable to other professional fields not connected to the knowledge area.
Transferable	Set of competences related to attitudes and values (*knowing how to be)* and, procedures (*know how*). They can be transferred from one specific professional field to another.
Core	Set of basic competences required by all URV students, which may be knowledge, attitudes and procedures

Table 2. Core and transferable competences at the Rovira i Virgili University

CORE COMPETENCES		TRANSFERABLE COMPETENCES	
C1	Intermediate knowledge of a foreign language, preferably English.	B1	Learning to learn
C2	Advanced user knowledge of the information and communication technologies.	B2	Ability to effectively solve complex problems.
C3	Ability to manage information and knowledge.	B3	Ability to apply critical, logical and creative thinking and to show innovative capacity.
C4	Ability to write and speak correctly one of the two official languages of the URV.	B4	Ability to work autonomously with responsibility and initiative.
C5	Ethical and socially responsible behaviour as a citizen and a professional.	B5	Ability to work cooperatively as part of a team and sharing the responsibility.
C6	Ability to define and undertake the academic and professional project proposed by the University.	B6	Ability to communicate information, ideas, problems and solutions clearly and effectively in public or in specific technical fields.
		B7	Sensitivity to environmental issues.
		B8	Ability to manage technical or professional projects.

in bachelor degree qualifications") (Rovira i Virgili University, 2009).

Once the competences to be developed in the academic curricula of the various degrees have been agreed on, learning outcomes must be determined as an explicit statement of what students must have achieved by the end of the teaching-learning process. Students will be evaluated on the basis of these competence-based learning outcomes. If the outcomes are well defined, students will be made aware of what they need to learn, and teachers will be able to reflect on which knowledge, procedures and attitudes need to be taught and assessed. These procedures, attitudes and knowledge are defined by the demands of the labour market and the new competences required of the workers of the digital age.

Adapting the URV Competence Framework for Digital Competence Assessment

The experience described here has focused on developing the digital competencies related to competences C2, C4 and B5 in Table 2. Tables 3 to 7 present the definition and the descriptors for the skills that we have evaluated, and which have been chosen because of their relation to the development of skills for the use of social software. In this regard, it is important for students to have an advanced user knowledge of ICT, to know how to adapt their communication style to the new technological environment and, at the same time, be able to work collaboratively in virtual teams. The EHEA prioritizes collaborative work as a transferable competence in order to promote

independent, committed learning that is in tune with the changing needs of businesses today.

The Added Value of "Quadratanics, SA" as a 2.0 Learning Experience

Using the competence framework described, we analyze how digital skills can be developed through formal learning. In particular, we present a Web 2.0 learning experience carried out at the Rovira i Virgili University. The course, entitled "The Development of Professional Competences for Professionals of the Digital Age: Use of Social Software and 2.0 Web Tools" was taught completely in digital format. The students who participated in the experiment had specific learning targets about the world of management and they

Table 3. C2 Competence: Definition and learning levels

C2. ADVANCED USER KNOWLEDGE OF THE INFORMATION AND COMMUNICATION TECHNOLOGIES			
The URV has divided this competence into three areas: computer hardware, the operating system and specific software, focusing on the use of the computer as a communication tool. This third area can also be divided into two: software for off-line communication and software for on-line communication.			
LEARNING OUTCOMES (2)	**DESCRIPTORS (1)**		
	1	**2**	**3**
Can use software for off-line communication.	Is aware of the existence of text editors, spreadsheets and digital presentations	Uses basic tools for editing texts, spreadsheets and digital presentations.	Adapts software to personal needs
Can use software for on-line communication: interactive tools (web, Moodle, blogs, etc.), e-mail, forums, chats, videoconferences, collaborative work tools, etc.	Is aware of the existence of Internet and the basic tools: web navigator and e-mail.	Uses ICT for work purposes.	Habitually uses ICT and adapts them to personal needs.

(1) Descriptors are used to assess student work which cannot be evaluated with complete objectivity. Scores are always given on a scale of 1 to 3.

(2) The learning level displayed in the table refers exclusively to the third area of the competence, which is the area that has been used to evaluate the development of digital competences. In our case the evaluation has focused exclusively on the use of software for on-line communication.

Table 4. C4 Competence: Definition and learning levels.

C4. ABILITY TO WRITE AND SPEAK CORRECTLY ONE OF THE TWO OFFICIAL LANGUAGES OF THE URV			
General URV definition: competence related to the ability to produce oral and written texts with the characteristics of grammatical accuracy, textual cohesion and communicative appropriateness			
LEARNING LEVEL	**DESCRIPTORS (1)**		
	1	**2**	**3**
Can produce a written text that is appropriate to the communicative situation (1)	The type of language used is deficient in regard to the degree of formality and the channel. The text does not respond to what was asked.	The type of language used has some deficiencies in regard to the degree of formality or the channel, some information may not be entirely relevant or some essential information may be missing.	The type of language used is appropriate to the degree of formality required by the channel and it is maintained throughout the text. The information is appropriate and relevant to what was asked.

(1) Because it is an on-line course, it was decided to choose a single learning level related to the need to adapt the written text to the communicative situation. In this case it is on-line communication using the web as a channel, which requires a different communicative written style.

Table 5. B5 Competence: Levels of Mastery

B.5. ABILITY TO WORK COOPERATIVELY AS PART OF A TEAM AND TO SHARE THE RESPONSIBILITY	
URV general definition: Ability to work as part of a (interdisciplinary) team, as a member or supervisor with the purpose of undertaking projects with pragmatism and responsibility, accepting commitments and respecting the resources available.	
LEVEL OF MASTERY	**DESCRIPTION**
First level	Ability to participate and collaborate actively in the tasks of the team and to promote confidence, cordiality and focus on the joint task.
Second level	Ability to contribute to the consolidation and development of the team, by encouraging communication, the balanced distribution of tasks, internal climate and cohesion.
Third level	Ability to direct work groups, ensuring that members integrate and perform to a high standard.

Table 6. B5 Competence: Levels of mastery and learning outcomes

LEVELS OF MASTERY	LEARNING OUTCOMES
First level	Students: Identify the collective objectives of the group with their own Collaborate in defining, organizing and distributing the tasks of the group Actively take part and share information, knowledge and experience Make their individual contribution before established deadlines and with the resources available. Bear in mind the points of view of others and give constructive feedback
Second level	Students: Accept and respect the rules of the group Contribute to establishing and applying the team's work processes Act constructively to solve conflicts Contribute to the cohesion of the group with their way of communicating with and relating to others Are interested in the importance of the group's activity
Third level	Students: Take an active part in planning teamwork, distributing tasks and setting deadlines Lead meetings efficiently Propose ambitious and clearly defined objectives Facilitate the positive management of the differences, disagreements and conflicts that emerge in the group Encourage all members to commit themselves to managing and running the team.

Table 7. B5 Competence: Definition and learning levels for the third level of mastery

B.5. ABILITY TO WORK COOPERATIVELY AS PART OF A TEAM AND TO SHARE THE RESPONSIBILITY (THIRD LEVEL OF MASTERY)			
LEARNING LEVEL (1)	**DESCRIPTORS**		
	1	**2**	**3**
Ability to take an active part in planning teamwork, distributing tasks and setting deadlines	Improvises the planning and the deadlines are not realistic	Correctly plans the distribution of tasks and sets reasonable deadlines	Encourages other members to participate by coordinating their contributions
Directs meetings effectively	Coordinates meetings inefficiently (time, commitments, results)	Coordinates meetings appropriately	Coordinates meetings effectively and achieves the objectives and the commitment of the group members
Facilitates the positive management of the differences, disagreements and conflicts that emerge in the group	Cannot redress the differences expressed	Copes with conflicts by dealing with the contributions of the various team members and the differences between them	Copes with conflicts by explaining that differences are enriching and gets all team members to reach agreements

(1) In the particular case of competence B5, the three learning levels in the table have been chosen. Working with 2.0 tools and social software requires developing digital competencies related too n-line teamwork, which affects everything from the way in which the work must be planned to conflict management.

used ICTs and social software as support tools to create knowledge.

This experiment in teaching innovation, aimed at exploring the power of 2.0 learning, arose out of the idea that this teaching methodology solves two basic problems: firstly, it helps students to learn about the world of management and, secondly, it enables them to develop the skills they need to work in the digital age. The result of this process is that students create social capital and become digitally literate in Web 2.0 tools and social software. The case that was studied in the summer course, from the point of view of management, was equal opportunities in labour relations at a fictitious company created for this purpose, Quadratonics SA.

Forty students were enrolled in the online course. They worked in virtual teams. The contexts for learning in this course were interactive, collaborative, multi-disciplinary and student-centred. Students were required to solve a multimedia case, entitled "Quadratonics SA" (available at http://quadratonics.awardspace.com/.). Quadratonics SA uses a connectivist learning approach, provides an interactive learning experience, supports the development of 2.0 competences, encourages student creativity, relates academic and workplace competences, promotes the use of ICT and social software, encourages on-line collaboration and fosters changes in the learning process.

The course was held online in July 2009). Moodle[2] served as the online learning environment. The course was divided into three learning modules (Learning about web 2.0 and social software, Enterprise 2.0 and, Labour relations 2.0). All the theoretical and conceptual aspects presented and the instructions about the work that had to be done were posted on Moodle at the very beginning of the course.

The general purpose of the course was to provide students with an overview of the Web 2.0 world by working with technology 2.0 and social software. Because they worked with these tools, students were expected to develop competences 2.0 and understand how to apply this technology to solve business problems. Rubrics related to competence development were designed for student assignments (see Table 9), which made student grading fairer. The students worked in teams and had not met each other before the course. The members of the team of instructors all had different backgrounds to maximize the mutual learning experience. The final project report required teams to present their results using a blog.

The methodology used to achieve the overall aim of the project was based on social interaction,

Table 8. Pedagogical criteria for Quadratonics course design

CRITERIA	DESCRIPTION
Use of technology	Interactive content to increase student motivation and the development of digital competences.
Versatile use	The case of Quadratonics SA can be easily adapted to different degrees or curriculums.
Flexibility	Quadratonics SA is a general experience in which digital competences can be applied. It provides the opportunity for students to develop.
Interdisciplinarity	The content of Quadratonics SA is interdisciplinary: for example, business management, human relations, accountancy and ergonomics. It can be used by both social science and engineering students.
Social connectivity/e-collaboration	Quadratonics SA focuses on e-collaborative interactions between students. Students learn from each other in learner-to-learner interactions.
Real-world application	Quadratonics SA highlights real-world applications of Web 2.0 technology and social software.
Personal identification	Quadratonics SA enables digital native students to apply social software in ways that relate to their own interests.
Learning model	Social constructivism and connectivism.

Table 9. Digital competence assessment

CORE COMPETENCES	
USE OF ICT	Use of interactive tools and not only asynchronous email to communicate
	Use of specific online tools and software to support virtual team collaboration.
e-COMMUNICATION	Ability to produce a written text appropriate to the communicative situation (web environment) Design, development, publishing, and presentation of project results (e.g., web pages, blogs) using technological resources that demonstrate and communicate curriculum concepts.
TRANSFERABLE COMPETENCES	
e-COLLABORATIVE WORK (virtual team environment)	Active collaboration in planning teamwork, distributing tasks and setting deadlines Active collaboration with peers using telecommunications and collaborative tools to plan team work, distribute tasks among team members and fix deadlines.
	Ability to lead virtual meetings efficiently.
	Positive management of differences, disagreements and conflicts that arise in the team (in a virtual environment)

and in particular collaborative learning. At the same time, knowledge was constructed using the constructivist approach. Among the basic tools provided by Moodle, e-mail (the internal messaging service) and forums (for interactive discussions and conversations) were used for the purpose of constructing and transferring knowledge.

Alongside these objectives, this course was used as a base for developing a new learning resource (Quadratonics SA). Developing learning resources for web environments requires "preparing materials, reconfiguring existing materials, and drawing on a new pedagogical approach suitable for the online environment" (Samarawickrema & Stacey, 2007, p. 322). Table 8 summarizes pedagogical criteria for evaluating Quadratonics, SA as a social networking environment. They are based upon the previous work of (Bower, 2008; Hart, 2008; Storey, Phillips, Maczewski, & Wang, 2002). Most of these approaches analyse context and goals, and involve examining technology, pedagogy, learners, and resources for student development and support.

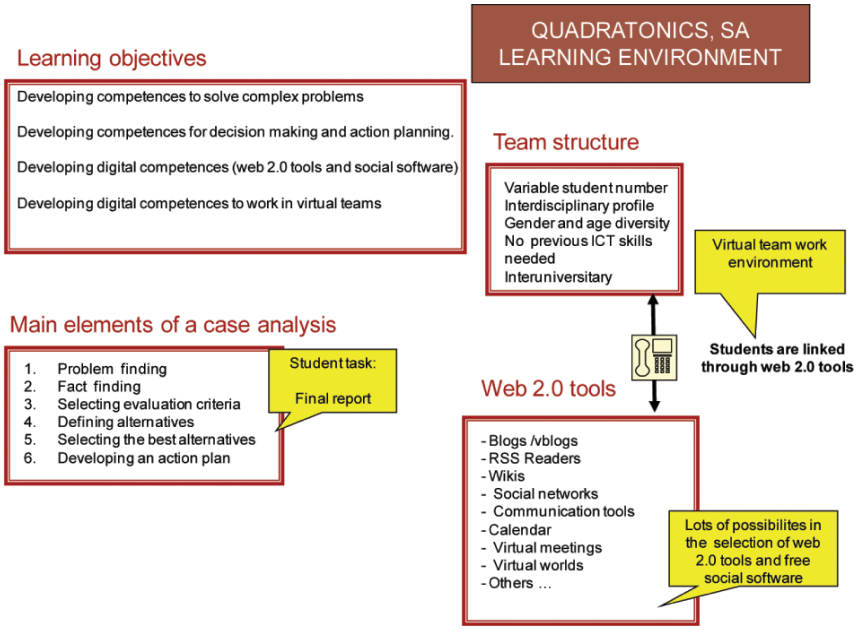
According to the constructivist perspective, knowledge is produced by the learner rather than processed from information received. It places students in a context, requires them to solve realistic problems, and makes learners acquire knowledge through interaction and collaboration. Quadratonics SA is about forming collaborative teams. Team members work together to present their findings using 2.0 tools such as blogs. If we want students to develop their digital competences, then a connectivist approach should also be used. At the same time, developing digital competences through higher education must be understood as a substitutive product of professional practice. As a result, each learning process or learning activity should take into account that it must be designed to be open to the professional world and to the development of critical thinking.

Broadly speaking, the added value of Quadratonics SA can be seen in Figure 1, which displays the key elements of the learning environment:

This added value can be synthesized in the following way:

1. As well as the typical objective of resolving a case (developing skills for resolving cases and taking decisions) there are two further objectives that are necessary to work in the digital age: the ability to use web 2.0 tools / social software and the ability to work in virtual teams.
2. The case makes it possible to apply the six classical stages of the case method but working online.

Figure 1. The learning environment of Quadratonics SA



3. The teams and their design can be applied to different learning environments and educational levels.
4. Web 2.0 tools are extremely versatile and can be used by virtual teams and selected by teachers as a function of the number of students and their experience in using Web 2.0 tools.
5. Content is flexible and can be adapted to different subjects, university programmes and other educational contexts.

Quadratonics SA is a model to help us learn in a collaborative fashion using Web 2.0 tools and social software. The technologies exist to facilitate social networking for learning and social capital. Now we just have to learn how to use these technologies to continue learning and become true professionals in the digital age.

"Quadratonics SA" Learning Outputs

The work that students had to do to be awarded the certificate for having satisfactorily completed the summer course consisted of two parts. In the first part, students were expected to be able to handle Web 2.0 tools and learn to work cooperatively, especially with the group to which they had been assigned to carry out the task. In the second part, students were asked to analyze the situation of equality in the company to be studied, Quadratonics SA, following the instructions provided. To solve the equality problems found, students had to use Web 2.0 tools provided by the Quadratonics SA website.

The students' final assignments were evaluated using the method of heteroevaluation, understood as the "evaluation that one person makes of another's work, actions or performance" and which, in our context, is the teacher's evaluation of the students.

Using the descriptors displayed in Tables 2 to 7, the learning outcomes related to the development of digital competences and the corresponding descriptors have been adapted to the world of social software, as can be seen in Table 9. The results were evaluated by a total of 7 teachers who took part in the evaluation project.

Figure 2. Average score for digital competence among URV students

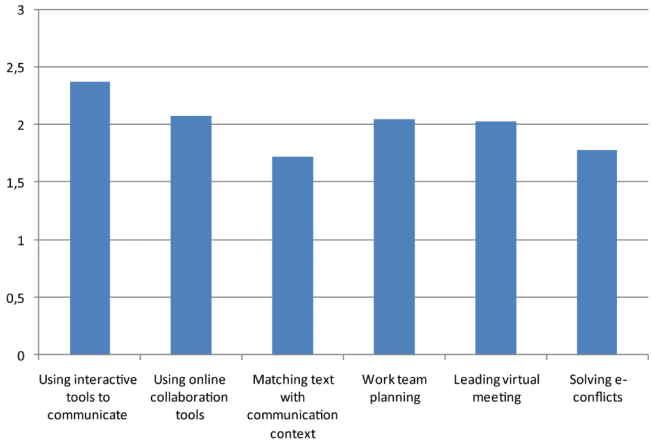


Figure 2 summarizes the learning outcomes achieved by students for each of the competences studied, which enables us to evaluate the students' learning. In turn, the figure reveals the extent to which competences have been acquired by means of a score that evaluates the level of mastery on a scale from 1 to 3.

In particular, we note that the core competence e-communication (C4) has the lowest mean score (1.73). Accordingly, on average, students have most difficulties in achieving the learning outcome: "producing a written text appropriate to the communicative situation". That is to say, they find it difficult to produce a blog with a written text on the issue to be analysed (equal employment opportunities in Quadratonics SA).

We should also point out the results obtained in the transferable competence of e-collaborative work (virtual team environment, B5), and with regard to the third level of mastery analyzed: Ability to work cooperatively as part of a team and to share the responsibility. In this case, students fail to acquire a satisfactory level of mastery for "Facilitates the positive management of the differences, disagreements and conflicts that emerge in the virtual group (score: 1.78). The results of the other two levels of learning are satisfactory, as are those for the core competence "Advanced user knowledge of the information and communication technologies" (C2). The area of competence C2 that deals with the use of "online communication software: interactive tools", was divided into two parts to differentiate between those students who use interactive tools other than e-mail, and those who use online collaborative work tools.

Table 10 summarizes the use that students have made of Web 2.0 tools throughout the summer course. Since the work was done in teams of five, the table shows, for each one of the eight groups, what the various Web 2.0 tools have been used for. We should point out that, in general, students have used g-mail for e-communication. Likewise, we should also mention that Google Docs was largely used as an online office tool, and that the Moodle forums were used by students to communicate with one another.

Finally, Table 11 shows the students' perception of the use of Web 2.0 tools in Quadratonics SA. The first column shows the opinion of the expert, and the others the opinion of the eight student groups mentioned above. This enables the expert opinion to be compared with the students' opinions and shows that the difference between them is not excessive. The conclusion is that the competences that were being evaluated have been satisfactorily acquired and that the students have sufficient knowledge to use Web 2.0 tools in a work environment.

Table 10. Use of Web 2.0 tools in the collaborative work of the summer course

	COLLABORATIVE WORK 2.0								
		Team 1	**Team 2**	**Team 3**	**Team 4**	**Team 5**	**Team 6**	**Team 7**	**Team 8**
e-Communication		Communication	Communication and organization of work	G-mail chat	Facebook chat	E-mails to distribute work	Messenger to Exchange ideas and distribute work	Communication via e-mail	Communication via e-mail
									
					Two-to-two conversations				
Project management (virtual teams)	Google grupos								
									
				To schedule virtual meetings via chat		To schedule virtual meetings via chat			To schedule virtual meetings via chat
							Project management		
	Google llocs web								
Ofimàtica (eines ofimàtiques en línia))	Google Docs	Collaborative work	Collaborative work			Collaborative work	Collaborative work	Collaborative work	Collaborative work
Blogs (shared intelligence (1)	Blogger	Communication				Communication and collaborative work			
Online presentations	slideshare								
Virtual learning environment	moodle	Forum for preliminary contacts				Forum for preliminary contacts		Forum for preliminary contacts	
							Google sites		

(1) Only those who used the blog for virtual work

Table 11. Students' perceptions: Solving problems in Quadratonics SA with web 2.0 technologies

TEHCNOLOGY 2.0 AND ENTERPRISE 2.0								
THE EXPERT VOICE (DAWSON, 2009)	**ROVIRA I VIRGILI UNIVERSITY STUDENTS**							
	Team 1	**Team 2**	**Team 3**	**Team 4**	**Team 5**	**Team 6**	**Team 7**	**Team 8**
SOCIAL NETWORKING								
To make people and their expertise visible across the firm. To facilitate social interaction and trust-building.	Linked to recruiting staff. Facebook: for constructing communities of workers.	Facebook: for connecting workers and giving new employees access to retired employees' expertise. Facebook as a tool for knowledge management.	Building an Intranet to promote collaboration.	Facebook: for encouraging a sense of royalty and establishing liasons between workers.	Developing an Intranet for higher work-related interaction.	Facebook: for community building Developing an Intranet	Facebook: for debates and collecting workers' suggestions and opnions	
INSTANT MESSAGING								
	To reduce phone call expenses		To facilitate communication among workers		To facilitate work-related interaction			
MICROBLOGGING								
Short updates that people can subscribe and respond to, building broad-based conversations.		Using Twitter as a communication tool.				Using Twitter as a communication tool.		
VIDEO SHARING								
Used for internal communication, content updates, learning programs, and sharing of social activities.	Youtube to advertise the company							
PODCASTS								
Used to provide learning content and internal communications in a format that can be listened to by workers at their convenience.		Can be used to produce educational material on equality issues						
BLOGS								
Used as internal communication and project management tool. They can also be used as an informal external communication channel to stakeholders.	Company blog with questionnaires to ask for information and participation	Can be used to provide information and make suggestions	Can be used to publish news and communications			Can be used to inform		

continues on following page

Table 11. Continued

TEHCNOLOGY 2.0 AND ENTERPRISE 2.0								
THE EXPERT VOICE (DAWSON, 2009)	**ROVIRA I VIRGILI UNIVERSITY STUDENTS**							
	Team 1	**Team 2**	**Team 3**	**Team 4**	**Team 5**	**Team 6**	**Team 7**	**Team 8**
WIKIS								
Used for collaborative document creation and project management.								
E-COLLABORATIVE WORK TOOLS								
	Google Docs for virtual team work			Google Docs for promoting teleworking		Google Docs to facilitate real -time collaboration and document sharing		
VIRTUAL LEARNING ENVIRONMENTS								
	To improve learning	To improve knowledge sharing	To improve knowledge sharing				To enable workers to learn wherever they are. To reach a large number of workers	

Students have chosen chats as an e-meeting tool. Social bonding is enhanced by using instant messenger technology and helps to bring about a more friendly communication atmosphere. The use of IM stimulates active learning.

FUTURE TRENDS

A range of subjects need to be explored in detail to step up research —educational, socio-economic and technological — in the field of learning 2.0 and in the use of web 2.0 tools and social learning in higher education.

- Special attention needs to be paid to using emerging technologies for the development of innovative applications in education and training. In this new technological environment, the question of how to motivate and socialize students as active learners also needs to be raised. As Hvid and Godsk (2006) state "e-learning platforms need an aesthetic perspective instead of mainly addressing usability and function" (p. 210).
- In the near future, portable and personal technologies will provide new opportunities for connecting people and creating new e-learning 2.0 environments. We are only just beginning to understand the opportunities that mobile technologies and social software provide for learning.
- Better digital competence rubrics and indicators need to be developed to monitor progress in the use of Web 2.0 in formal education for digital competence development. This step is needed to certify the degree of student competence.
- Another key issue for future research is to explore what forms of knowledge students obtain from social software and, most importantly, how students use such knowledge. In-depth qualitative research should be carried out to understand how it is constructed by Web 2.0 technologies. In this context, the Open University of Catalonia is studying how social networks such as Facebook can be used for course delivery.
- The concept of virtual networks for collaboration needs to be revisited. We need to understand how these communities are formed and the ways in which they can facilitate the contribution of cybersocial networking to the learning and engagement of students and teachers.
- E-learning Web 2.0 may be able to reach learners who are disadvantaged by the digital divide. It is also important to define a research agenda which takes into account individual differences in learning, and special needs education so that the potential of web 2.0 technology can be exploited to provide remedial measures in the case of disability, exclusion or difficulty in gaining access to learning, or where conventional education does not work.

Bearing in mind all these agendas, e-learning 2.0 is likely to be a fertile research field and an appealing teaching and learning environment.

CONCLUSION

The new student generation has grown up in an environment where ICT has opened up opportunities of social interaction. The emergence of web 2.0 technologies and social software has enabled students to connect, collaborate and create new knowledge through computer-mediated communication and online communities. The influence of constructivist ideas on learning (Vygotsky, 1978) has led educators to implement more motivating environments, in which learning takes place in settings closer to real-life scenarios, such as the one we have described in this chapter. Web 2.0 fits not only into a constructivist model of learn-

ing but into a connectivist model such as the one postulated by Siemens (2006). From Siemens' point of view:

- learning and knowledge resides in the diversity of individual perspectives;
- learning is a process of connecting information sources;
- learning may reside in non-human appliances (e.g. a database, but also a community, a network, etc);
- the capacity to know more is more critical than what is currently known: Learning is a knowledge creation process;
- the ability to see connections between fields, ideas, and concepts is a core skill, since the individual is participating, as a node, in a network that learns;
- accurate and up-to-date knowledge is the aim of all connectivist learning activities;
- connections need to be maintained and enhanced to facilitate continual learning.

The Quadratonics' learning experience is much more than simply adding technology to the learning process. Quadratonics SA is a learning experience for the connected society. The learning dynamics and knowledge creation that take place in virtual communities like Quadratonics SA have clear similarities to the dynamics and knowledge creation in a learning society. Finally it is important to remember that "when staff move their on-campus teaching to more off-campus and blended environments, professional development is invaluable." (Samarawickrema & Stacey, 2007, p. 329). Teaching experiences, such as Quadratonics SA can encourage academics to adopt ICT thus increasing the human capital value of higher education institutions.

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KEY TERMS AND DEFINITIONS

Collaborative Learning: An educational approach based the idea that learning is a naturally social act. The learner actively constructs knowledge by formulating ideas into words, and these ideas are built upon through reactions and responses of others. In other words, collaborative learning is not only active but also interactive. It

is a student-centered approach in which social software tools are currently used for building and sharing knowledge.

Connectivism: A learning theory for the digital era. It is based upon the idea that knowledge is networked and so the act of learning takes place inside virtual networks and communities through social interaction. It is a networked model of learning.

Digital Competence: The use of computers to retrieve, assess, store, produce, present and exchange information, and to communicate and participate in collaborative virtual networks. It requires a critical and reflective attitude towards the information available and responsible use of the interactive media.

Learning Process: Activities carried out to achieve educational objectives. They are carried out individually, although this takes place in a cultural and social context, in which people combine their new knowledge with their previous cognitive structures.

Social Capital: A cross-disciplinary concept referring to the benefits of social networks and connections. Social capital is constructed and maintained in the interaction between individuals or groups. Social networks promote different types of social capital: bonding –referring to horizontal ties between individuals-, bridging – referring to ties that cut across different communities- or linking –referring to vertical ties.

Social Software: Software that allows the creation of communities and resources in which individuals come together to learn, collaborate and build knowledge. It is also known as Web 2.0 and it supports social interaction and collaborative learning. Current typical examples include Flickr® and YouTube™ –as audiovisual social software.

Virtual Education: It includes aspects of both online and e-learning but goes somewhat further. While it is largely web-centric it does not necessarily limit itself to learners outside a conventional classroom. It uses multimedia and, besides delivering content, also enables a high level of interaction among learners, content, teachers, peers and administration both synchronously and asynchronously.

ENDNOTES

1 The URV was created in 1991 by the Parliament of Catalonia, thus restoring the Tarragona University of the 16th century. From the very first day its aim has been very clear: to place knowledge at the service of society so as to contribute to the social and economic development of its environment. The URV trains professionals under the precepts of European harmonization. It provides 52 programmes of study in a wide variety of knowledge areas for over 12,000 students. The data show that the URV is not only one of the leading universities in Catalonia but also one of the leading universities in the European area for the quality of its teaching, its commitment to continuous training and the excellence of its research, development and innovation. Further information at http://www.urv.cat/

2 According to Queiruga, Del Hoyo and Queiruga (2008), Moodle, an e-learning platform, facilitates autonomous learning and makes it possible to have access to teaching resources at all times, thus providing a delocalized education system. The pedagogical model on which Moodle is based is so-called "social constructivism": that is to say, knowledge is generated to the extent that the various communities that form around it contribute or carry out activities, debates or forums. The educational activities that Moodle provides enable collaborative learning. Moodle is a tool that is based on free software which is available together with manuals, help, installation software and various useful links at http://moodle.org.

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Chapter 27
Scientific Computing in the Context of a Successful Agricultural Research Enterprise

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ABSTRACT

Embrapa (Brazilian Agricultural Research Corporation), a governmental agricultural research institution from Brazil, is a case of successful organizacional innovation that has as main characteristics: a public corporation model of organization; scale of operation at national level; spatial decentralization; specialized research units; enhanced training and remuneration of human resources and a vision of an agriculture based on science and technology. Moreover, from the beginning the organization has always been result oriented. Among the structural and political issues that led this enterprise to reach a well succeeded position, the authors argue that the strong application of scientific computing is the underlying reason that enabled high quality results achieved in research, development, and innovation. All of these reasons are presented in the next sections.

THE SUPPORT OF THE FEDERAL GOVERNMENT

This support has been critical to the survival of Embrapa. In the early years, it took the form of the federal government having understood the importance of technology for the development of agriculture. Once the results proved Embrapa could be profitable as an option for the government, the battle for budget support remained, but it takes place in an environment where the corporation is one of the priorities of government, both in the sphere of executive and the National Congress.

In the first twelve years of its existence, Embrapa was a promise: of bold and modern design, but still a promise. During those twelve years, huge investments were made in the training of human resources and infrastructure - about six billion

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dollars in 2008 value. The federal government paid for this investment based on the promise that Embrapa could be for the modernization Brazilian agriculture. Without the support from the federal government, Embrapa would not have been possible.

But Embrapa´s management has always been aware of the risk that the lack of achievements represented. For this, it led the research centers in a portfolio of research with short-term goals and to the conclusion of research already in progress. Moreover, it also gave special attention to the dissemination of existing results. And the media had a key role in creating the image Embrapa has. It is clear that the media not only operates on top of achievements, but also upon a consistent promise, provided it is not for long. In the early years of life of the corporation, the media bore the promise consistently, even in light of few existing results. This support was crucial to create a favorable image in society and in government. So, it has to be registered how important the development of competence to relate with the press, was for the success of the Embrapa. This relationship helped the government to justify the investment, over a period of lean achievements.

In a period of many macroeconomic imbalances and non-orthodox policies to deal with then, it is surprising that Embrapa´s budget support did not falter, which only shows the decisive support the federal government gave to it. At the stage where Embrapa was only a promise, the expenditures of Embrapa evolved linearly until 1982. This was essential to consolidate its image. From 1982 onwards, the corporation was no longer a promise, and its success will explain the government's continued investments.

SCALE AND DECENTRALIZATION

Many wished that Embrapa would be small and only coordinated a research program run by the existing institutes and universities. This option was rejected because it was soon realized that, in a country of continental dimensions, the success of Embrapa depend on its size and an accumulated critical mass of researchers, diverse for talent, and branched throughout the national territory. It was understood that Embrapa needed to have the scale as large as Brazil and that it needed to have its own research network, so it could be direct responsible for the results, allowing it to be well known and evaluated on its own merits. This model would also allow for it to seek cooperation with universities, research institutes, private sector and overseas in a position of equals. Being large, diverse and decentralized, Embrapa would have conditions to represent the federal government in an area as important as agriculture and receive priority, both in the allocation of resources and with regard to institutional development.

It was very important for Embrapa to have a presence throughout the national territory. This presence helped to attract sympathy of the state governments and the National Congress. Embrapa has a marked presence in the Federal District, where are located its Headquarters and: Embrapa Technological Information, Embrapa Cerrados, Embrapa Vegetables, Embrapa Genetic Resources & Biotechnology, Embrapa Agroenergy, Embrapa Technology Transfer. The units in the Federal District are an important window of Embrapa. Being in the proximity of power, they have had important role in helping establish and solidify the image of the corporation near the central power and the international market.

A CONCENTRATE ORGANIZATION MODEL FOR THE RESEARCH UNITS

Embrapa research units are distributed throughout the national territory and are specialized in products, natural resources or themes. For example, farmers know that the unit responsible for maize research is the Embrapa Maize & Sorghum, located in Sete Lagoas, Minas Gerais. Maize producers

know where to go with demands for information and results, which will give them ownership in the center, providing help with the political leadership and the economic area of government. Similarly, researchers have the exact notion of their responsibilities, and no ambiguities regarding goals and actions needed. Even more, there are strong ties of solidarity and spirit of corps, as if all employees are committed to having a winning team. Thus, Embrapa´s model has aimed to facilitate and encourage interaction - researcher - farmer and researcher - society. It had an important role in preventing the dispersal of efforts, which is one of his pillars, and is an objective way of identifying priorities for research.

HUMAN RESOURCES

The human resources policy is one of the main reasons for Embrapa success. The policy aims to develop the human capital of the corporation and it is from this capital that Embrapa derives its success. To stimulate creativity and by creating an environment that encourages coexistence is another specific role of this policy. The policy is based on the following specific points:

1. The establishment of a career that stimulates the desire to study and progress. It has three levels (called positions), where the level I is for someone who holds only a bachelor degree, level II for those with master's and, finally, level III is for those who hold Ph.D. degree. Each level has several sublevels;
2. A level of salary that allows the researcher to have a dignified living with his family based on the salary Embrapa pays him;
3. A retirement plan, with voluntary membership, paid by Embrapa and the employee, to support old age. The plan aims to supplement the retirement of the public social security;
4. A health plan paid by Embrapa and the employees, with two purposes: support the researchers and his families for expenses in health care, and preserve the health of researchers, which is the most important capital of the corporation.
5. A series of activities to stimulate the researcher to accumulate knowledge and experience, allowing him or her to be productive and to love the Embrapa. There is a complex system of promotion on merit, based on individual, group and the research unity. The aphorism, ingrained in Embrapa, says that every year it has to deliver technologies to justify to society the investments made and produce better-trained researchers. Thus, there are two products that Embrapa has to deliver - researchers always more competent and technologies.
6. A training program at graduate and post-graduate levels, that meets both the interests of the corporation and researchers, and which seeks to train them at the same levels of the best centers of advanced countries;
7. The corporation recognizes that the technology generated incorporates the effort of all its employees. Thus, the training program is available for everyone, but graduate training focuses on researchers, but it is not exclusive of them;
8. Each research unit has a critical mass of researchers. It is organized around a specific target audience, a clear main problem to solve and the team's responsibility towards society. Each unit is in itself an instrument of concentrated effort in research and provides a work environment that encourages human development, creativity and sense of usefulness to society;
9. Embrapa seeks to stimulate the researcher to be an entrepreneur in his field, to seek resources, to interact with the outside world and ensure the dissemination of technology. Commands another aphorism: research results in the drawer of the researcher, means

that; it did not result in anything or the researcher is not good enough, or both;

10. Embrapa´s communication program aims to provide accountability for work, actions to disseminate research results, giving the corporation visibility and transparency and valuing its employers. This communication program is organized around many ceremonies, some connected with the anniversary of the corporation and the research units, carried out in other seminars, symposiums in Brazil and abroad, and they all provide opportunities for learning and enhancing the employers. Thus, the communication program is also considered part of the human resource development policy, but with independent living;
11. Although the corporation is always looking for opportunities to improve its human capital, one has to plan for the future and the principle of orderly replacement has to prevail. In Embrapa´s case the goal is to maintain an average age of 45 years old for the PhDs, imagining the following guideline: on the average a researcher should be finish his Ph.D. work around 30 years old, which would leave him with a horizon of around 30 years of productive work. Half of this is 15. So, 15 years should be added to 30, comprising 45 years. Thus, on average, a young doctor has 15 years of work alongside senior researchers. A complementary strategy is for the creation of conditions that would allow for competent and outstanding retiring researchers to continue to do some kind of work with Embrapa. There is much to be done in this regard.
12. In the beginning, an enormous effort was made to integrate the researchers to the spirit of Embrapa, in training courses, meetings and direct communication from the direction of the corporation. As the corporation was young, a world of opportunity was opened to those who joined the effort. The leadership did not have time to stratify on a separate level. For this and by having the support of society, there were no major difficulties to develop the spirit Embrapa. Today, the fame of Embrapa helps to develop the spirit Embrapa, but we should not overlook this point.

In research, it is natural over time that seniority develops, that is how leadership solidifies, founded on knowledge and recognition. If these leaders do not have the ability to integrate with new researchers as part of their work, they will be disappointed to learn that they have no help to develop their careers. This disappointment can be transformed into rancor, leading quickly to an anti Embrapa attitude. This kind of problem cannot be solved by employing more democratic procedures. What should be done is to find mechanisms for promotion for those who can work in teams and spread their knowledge. Procedures have no place in making a competent researcher share more than what he has already reported in text or oral communication. However, a competent researcher has much more to offer.

SCIENTIFIC COMPUTING

Scientific computing is the field of study concerned with constructing mathematical models and quantitative analysis techniques and using computers to analyze and solve scientific problems.

Much of agricultural research is based on decision under uncertainty. Modeling in such a context depends heavily on quantitative methods and ultimately on scientific computing. Sciences like Statistics, Econometrics, Operational Research and Biometrics among others are of importance to scientific computing.

With the increasing availability of computer resources new techniques of analysis have been developed to analyze data in general from which agricultural research has much to benefit. Research

data accumulated for years can now be accessed via data mining and experimentation optimized with the help of simulation.

Scientific computing allows complex modeling of world markets of commodities and the evaluation of trends and demand and supply elasticities of ultimate importance for the implementation of public policies.

In Brazil of today we experiment a revolution in scientific computing. This goes from teaching in elementary schools to research in general. Agriculture is no exception. Indeed Agriculture has been a leading sector in the usage of scientific computing. As early as 1976, close to its very foundation, Embrapa – the leading state company responsible for applied agricultural research in Brazil, had already realized the importance of scientific computing in agricultural research, and created a quantitative methods department – DMQ, embracing four divisions: statistics, operations research and software analysis. The main objective of this administrative structure was to provide continuous support to experimental research, mimicking the operations of other successful institutions like Rothamstead in Great Britain. The new DMQ was filled with the best possible in human resources. The department was so successful that its development spilled over other research groups in Brazil. Indeed DMQ's research and support activities seeded the graduate programs of Statistics, Operations Research and Computer Science in the University of Brasília. In the 80's all research groups in the country engaged in agricultural research were associated with Embrapa in general and with DMQ in particular.

Today, DMQ, regrettably, no longer exists, but its inheritances are still present. From DMQ were originated Embrapa Agriculture Informatics, located inside the University of Campinas in São Paulo, a leading educational institution. This new entity certainly has less statistics and operational research but is still competent in the development of support software to agricultural applications.

Although critical to the analysis and development of agricultural research, scientific computing and its roll of disciplines, remains a bit obscure to a big chunk of the population of agronomists, foresters, agricultural engineers, zootechnicians, veterinarians and administrators responsible for research in agriculture. This is a symptom felt at the market and at the universities as well. This is the truth for Brazil and elsewhere. Quantitative methods require proper education. In essence they are pure art, servicing science and society, but they require sensitivity and intelligence for proper understanding and recognition of their necessity. When Embrapa was founded these features were abundant in its administration. It is of crucial importance to maintain agricultural research quality at a high level.

OTHER IMPORTANT FACTORS

Without any further discussion we are going to nominate other factors that were important for Embrapa success. They are close integration to international research, ample exposure to the media and, at the first ten years, some research results that impressed Brazilian society such as the development of modern agriculture in the savannah region, nitrogen fixation in soybean to the point of 100% fixation of the plant needs and technologies that reduce the application of agro toxic and protect soils against erosion.

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Chapter 28
Introducing a First Step towards a Holistic Talent Management System Architecture

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ABSTRACT

As one of the top issues for executives nowadays the recruiting, retaining, and skilling of scarce talent has received a lot of attention both in research and practice. While companies are in dire need of new strategies and integrated approaches in human resources, research has predominately observed the skill profile and general attitude of professionals to their work, their individual incentives, and consequentially, their turnover intention. We aim to relieve these needs in practice by introducing a first step towards a holistic system architecture of recruiting, retention, and development processes. For this purpose we use a design science approach to develop a talent management system architecture containing all respective processes and their related subsystems based on the next-generation holistic e-recruiting system invented by Lee (2007). This architecture could increase knowledge transfer and thereby improve the adjustment and performance of the entire HR process. Furthermore the increased amount of data gained through new implemented performance measurement subsystems offers management a variety of new strategic options for continuing to battle in a global "War for Talent."

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INTRODUCTION

Threat pinpointed, threat averted – end of story? Not really. Already since the late seventies the potential threat of a *talent shortage* for specific profiles as IT was recognized by corporations as well as research (LaBelle et al., 1980). Today, more than three decades later, the threat not only still exists but gets even worse. In terms of IT talent in the early stages Igbaria and Siegel (1992) advised organizations to keep an eye on the growing shortages of IT personnel and the increasing demand on the labor market. But they also identified that there might be multiple forces within these organizations which delay this process and distract from its importance (Igbaria & Siegel, 1992). A study of the career anchors of IT personnel predicted that due to labor shortages staff turnover will become an even more critical issue in the near future (Crepeau et al., 1992). Despite being recognized by several researchers and a few corporations, public institutions in the States like the General Accounting Office (GAO) still raised questions about the validity of the shortage estimates and the methodologies applied in the market surveys that were conducted (Garner & Weldon 1998; Ferratt et al., 1999). Further organizations, labor market analysts and external experts showed similar concerns about the various estimates of the talent shortages as well, but after a while they started to identify the problem and deduce that a talent shortage really exists (Cappelli, 2000b; Brock, 2003; Sadin, 2003; Frank et al., 2004; Farrell & Grant, 2005; Acharya & Mahanty, 2008).

Given this situation, top management is compelled to develop new effective strategies to remain within this "War for Talent" (Chambers et al., 1998; Keim & Weitzel, 2006). The talent shortage demands that the companies compete effectively against competitors on the job market (Patel, 2002). One way is to use information technology to gain a competitive advantage regarding the recruiting of employees. A study with Germany's Top-1000 companies indicates that there is an increasing usage of IT to manage job postings (mainly on the Internet) and applications (mainly received by Internet channels such as e-mail or websites). At a level of 85.9 per cent, the majority of vacancies in 2006 were communicated to potential candidates by means of the company's website and 59.0 per cent were published on internet job boards such as monster.com. At a level of 26.6 per cent job postings, printed newspapers or magazines are far behind. Therefore it is not surprising that 64.1 per cent of the hires generated are due to job postings on the internet. Furthermore the increasing usage of IT can be shown in the use of application methods as well. At a level of 51.3 per cent, more than half of the incoming applications are received by electronic channels by the Top-1000 companies in Germany (Eckhardt et al., 2007b). Concerning the value of this increasing IT use, *e-recruiting* is known to lead to significant reductions of time and cost per hire as well as improvements concerning applicant data and applicants' overall quality (Eckhardt et al., 2009). These findings enable the thinking that these companies using e-recruiting perform better in the search for talent.

However, as several researchers have stated, managers who do not pay attention to all issues regarding scarce talent will face serious challenges in engaging and maintaining their workforce (Agarwal & Ferratt, 2002). The open contest for competitors' employees is no longer a rarity but is an accepted business method. Cappelli (2000a) described the central point in the following way: 'To poach is fine, to be poached is not" (Cappelli, 2000a). Not all recruiting is the same; *retention* and *personnel development* should be shifted from broad programs to highly targeted efforts aimed at individuals and groups of key employees (Cappelli, 2000a). However, it is not always the best way for organizations to recruit new staff and offer them important positions, because they do not know the peculiarities of the company and its culture. Organizations could also use other methods to find skilled employees. If they regard the

internal labor market, they have a many people with a high knowledge of the organization. These people could be trained and developed, so that they can carry out both present and future tasks (Hentze & Kammel 2001).

Based on the existence of these three critical issues for organizations the research question of our research paper is as follows: *How can recruiting, retention and, development processes be integrated in holistic talent management system architecture?*

To answer our research question we took a *design science approach* (Hevner et al., 2004). The approach is structured as follows. After the introduction we present the status quo of our method design science in research. In the proximate section 'Research Motivation' we discuss the problem relevance of our topic, especially the issue of a global talent shortage in the engineering and Information Systems field. The underlying literature review about the basic recruiting process, e-recruiting as an e-service as well as retention and development practices and strategies is shown in the section 'Theoretical Background'. The design of our *architecture* is provided after the literature review. In the further course the summarizing section 'Key Findings' offers implications for theory and practice by providing a number of suggestions for further research and about the way responsible managers could benefit by our proposed architecture. Finally we complete our design science approach with a short conclusion of our research contributions. But first of all we introduce design science as a research method in the following section.

DESIGN SCIENCE

Design science is part of the theory of design and action. It is a type of theory which tells the researcher 'how to do something' (Gregor, 2006). The theory is about the justification of theoretical knowledge and the related form, function and methods (Gregor & Jones, 2004; Walls et al., 1992). There are many different types and parts of design theory. Corresponding research can be found as: software engineering in a constructive form of research (Iivari, 1991; Iivari et al, 1998), as prototyping (Baskerville & Wood-Harper, 1998), as systems development (Burstein & Gregor, 1999) and as design science (Hevner et al., 2004; March & Smith, 1995; Peffers et al., 2008). Design Science was introduced into IS research by the work of March and Smith (1995). The core of their work was a framework designed to demonstrate the relationship, activities and outputs of design and natural science research. In total they named four elements of design science research, on one hand the developed constructs and models and on the other hand the methods used and the implementations carried out (March and Smith, 1995). Our design approach is based on the seven guidelines of Hevner et al. (2004) with the exception that we left out the design evaluation of our architecture for further research. We start with our motivation and the need for more holistic research approaches in the fields of e-recruiting, retention and personnel development.

RESAERCH MOTIVATION

Talent shortage is not exactly a new problem for the global economy, but the process of recognizing the problem took a while. But after this cognition process was successfully completed, researchers first tried to define the threat and examine its source. Interestingly, the first approach to analyzing the whole situation of labor market shortage and increasing the importance of recruiting and retaining talent came from practice. The McKinsey consultant Elizabeth Chambers and her colleagues briefly described the state of affairs within their corporate quarterly publication and declared that there was for all corporations a "War for Talent" (Chambers et al., 1998). Management practices were identified as a major source of the

blatant disparity in the sense that driven turnover from the industry results in misplaced recruiting which makes it difficult to accommodate differences in contributions (Cappelli, 2000b). Within the "War for Technical Talent" project Cappelli (2000b) denied a real shortage of talents in IT and engineering but he identified a temporarily imbalance on the entire labor market due to rapidly rising wages and a shortage in the supply of talent. Increasing globalization and industrialization were mentioned by Stokes (2000) as particular reasons for regarding the shortage not just as a national problem but more and more as a worldwide shortage of talent. In 2003 the U.S. Bureau of Labor Statistics prognosticated a labor shortage of 10 million workers in 2008 (U.S. Department of Labor, Bureau of Labor Statistics, 2003). This situation was seen as a reflection of the boom period of the New Economy in the late 90s (Brock, 2003). *Demographic reasons* like the decelerated growth of the labor force due to the retirement of the big baby-boom generation were identified as an important reason for the massive talent shortage in the States (Frank et al., 2004). The percentage of children under the age of 18 years in the U.S. has dropped massively in recent years while the section of the population aged 65 or older is predicted to increase from 12 percent in 2000 to about 20 percent in 2030 (U.S. Census, 2000; Frank et al., 2004; Trauth et al., 2008). Frank et al. (2004) summarized the fact in the following way: '*In summary, the demographic time bomb fueled by aging baby boomers is not a guess it is an actuarial fact.'*

But, as forecast, the talent shortage did not remain a national problem: Its impact is felt globally (Stokes, 2000; Hewitt, 2002). In Europe the talent shortage is also occurring in important markets. For example in France by 2006 more people will leave the working population and retire than young people join the working population and start working. The situation in the neighboring country Germany is even worse. It is expected that in about 20 years 7 out of 10 Germans will be pensioners (Sadin, 2003). Surprisingly even in Asia's boom countries China and India the talent shortage issue has become a serious issue for politicians, managers and researchers. China's '*looming talent shortage*' (Farrell & Grant, 2005) could be traced back to two different causes. Firstly, the birth rate dropped below the rate necessary to maintain the same population size (Kahn, 2004), and as a result the Chinese workforce will begin to scale down in just 10 years (Jackson & Howe, 2004; Frank et al., 2004). Secondly the country suffers from a '*skilled-labor gap*' (Farrell & Grant, 2005). The number of highly-qualified university graduates is far too small to supply the requirements of multinational companies. The need of elementary reforms is obvious against the background of a national young talent pool of engineers which is no larger than the United Kingdom's. Talent shortage threatens China's rapid economic growth as well as its way up the value chain (Farrell & Grant, 2005). The other boom country India faces a different situation. They do not have a demographic problem like declining birth rates or a shrinking workforce. Nevertheless, high turnover rates occur as individual workers sell their skills for incrementally higher payment and for that reason talent shortage is becoming a topic taken more and more into account in India (Frank et al., 2004; Acharya & Mahanty, 2008).

In the following section we will present one possible solution to the talent shortage problem by discussing an IT architecture which aligns recruiting and retention management processes. Therefore we will follow the design science approach by Hevner et al. (2004) and will present the theoretical background of our research first.

THEORETICAL BACKGROUND

To provide the research rigor of our design science approach we based our research artifacts on a comprehensive review of literature about the corporate recruiting and retention processes.

The results of this literature review are provided in the following subsections.

Recruiting Process

As it is one of the critical business processes, the design of the recruiting process is discussed by various researchers in papers which contain valuable approaches to defining the structure and standards of classic staff recruitment. The recruiting approaches differ a lot when comparing large multinationals and small and medium-sized companies as two extremes. In smaller enterprises recruitment is more related to the availability of a known individual than to the process itself. Atkinson and Meager (1994) found evidence of a correlation between business size and the adoption of formal recruiting procedures and confirmed this hypothesis. Within their recruiting process large-scale enterprises also focus on process quality determinants, such as time and costs per hire or the overall quality of the candidates hired (Eckhardt et al., 2007a). Furthermore they are interested to discover if it is useful to use information systems in applicant tracking. Strohmeier (2007) found that applicant management systems turn out to be a good investment if the company receives a mid high number of applications.

Different researchers provide evidence for a systematic procedure for starting a *recruiting process* based on 4 common stages; an assessment if vacancies need to be filled, a definition and broad analysis of the job profile, the production of a job description and a person specification (Carroll et al., 1999). The overall process was divided into three phases; generating applicants, maintaining applicant status and influencing job choice decisions (Barber, 1998). Several activities are identified which have to be fulfilled for these phases. For the generation of applications companies can publish the adverts for vacancies using paper based (such as newspaper) or digital (website, job board) media. Certain recruiting activities supported by information technology may increase the possibility of an applicant's accepting a job offer (Barber, 1998).

Breaugh and Starke (2000) provide a phase-model to portray the recruitment process as a combination of activities, variables and strategic measures to achieve a number of recruitment objectives whose outcomes are compared afterwards. The phase model of the organizational recruitment process outlines the importance to view the entire process from a more holistic HR perspective integrating retention and development aspects as well. So recruitment objectives also include besides the cost and time of filling jobs and applicants' total number aspects as the corporate retention rate or concerning development as an individual's job performance or job satisfaction. After a comprehensive process with several recruitment activities all primary objectives are compared with the actual outcomes (Breaugh & Starke, 2000).

In addition Faerber et al. (2003) suggest a recruiting process integrating different recruitment functions. In their model Faerber et al. (2003) demonstrate the relationship of each recruiting task, its activities and objectives. Starting with the first contact between candidate and potential employer till the signing of the contract Faerber et al. provide a different structure. Based on prior work (Albert, 1998; Schneider, 1995) the process design contained the recruiter's five main tasks; short- and long-term candidate, applicant management, pre-selection as well as the final selection of candidates. Thus the management and tracking of applications in organizations is a main focus as well as the long-term attraction of applicants to build up an employer brand.

Beside these examples of research dealing with the design of the recruiting process and its related tasks little is known about the supporting IT function. An initial valuable approach to structure an e-recruiting process was made by Lee (2005a). He suggests a business process diagram illustrating an intra-organizational information flow and internal process events to simulate the

flow of a recruiting process. The main activities of the recruiting process are the submission of job postings and the management of applications. Alike the process example by Breaugh and Starke (2000) aspects and events outside recruitment as employee development do also affect the recruiting process. These figures illustrate that the use of IT to support recruiting is increasing. Within the process diagram hiring needs initiate the process. In a next step the job requisition will be prepared and send for approval via the system. When the job requisition is approved it will be posted online (e.g. in job boards) or offline (e.g. in newspapers). The job postings remain active till a target number of applications are reached. In the next process step the applications will be evaluated afterwards selected candidates will be invited for a job interview. After a further selection the candidates are pre-screened before employment to gain information regarding their further performance. Following this pre-screening contracts are offered to the successful final candidates.

Based on his prior work Lee (2007) suggested an architecture for a *holistic e-recruiting system* (see Figure 2 for our adapted version). This system was intended to align all the activities and IT tools that support the recruiting process of a company. Lee (2007) provided an idealistic architecture for an e-recruiting system supporting all relevant parts of the recruiting process with IT. For Lee (2007) the central systems of the architecture are systems to manage job requisitions, application tracking, prescreening, job agents, candidate relationship as well as a system to monitor the performance of the recruitment process. All these systems are linked with a workflow management system as well as a database management system to provide central workflow management of the recruiting process and central storage of all relevant data. For example the applicant tracking management subsystem is in charge for collecting job applications, recording candidate resumes or e-portfolios, managing the status of each candidate, providing information for decision makers and for distributing information to other HR systems via interfaces. The job requisition subsystem is to structure and to streamline the management, development and publishing of job requisitions and online postings. The system enables HR managers to monitor current job postings and to close job postings as they are filled. The purpose of the prescreening management system is to assess the matching degree between applicants' qualifications and job requirements. Prescreen supports recruiters as it sorts a pool of resumes in order to rank them and to provide a list of top candidates. The communication with candidates is managed by the candidate relationship management system to establish long-term relationships with potential candidates. Furthermore *"it is the purpose of the system to provide applicants with a feeling they have an ongoing relationship with the company through a virtual human touch"* as pointed out by Lee (2007). This architecture is a holistic approach to summarize all possibilities how IT can support the recruitment process and how this support can be designed. As the figures of the German study illustrate (see introduction) there is an increasing usage of IT in recruiting, and companies have to structure their processes and IT architectures. Furthermore companies try to use innovative IT solutions to gain the competitive edge in the "war for talent".

Based on this previous work it is our aim to align the existing architecture of an e-recruiting process (Lee 2007) with retention process and suggest a way to combine different recruiting and retention management systems.

Personnel Recruiting as E-Service

The currently returning talent shortage in Europe (Thompson, 2007) demands not only new ways to recruit employees and more IT support, but also a new view of staff recruitment. The whole recruiting process needs to be more applicant-focused and task-orientated. Companies need to focus on corporate image and employer branding

to appear in applicants' minds in a much more transparent way (Jaeger, 2007; Eckhardt et al., 2007a). Therefore employers need to restructure not only their staff recruitment but also the whole human resources department. Attracting, recruiting, retaining and developing employees are no longer separate tasks for separate departments with different managers. They all need to be combined in one focused process also known as "talent management" (Frosch & Trost, 2008). A major demand for the holistic talent management approach is an underlying "talent management architecture" (Eckhardt et al., 2008).

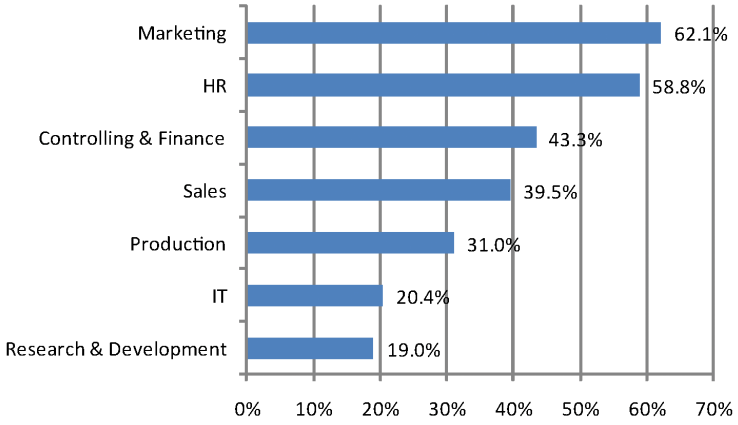
Over the last years more and more of the vacant positions were published online and in addition the number of digital applications via email or a web-based form rose (Malinowski et al., 2005). The internet also brought a new phenomenon to the labor market, "the passive applicant". In this case the candidate does not contact the potential employer with an application: Instead of that the candidate expects the employer to contact him via a recruiting platform (Keim et al., 2005). Platforms for contacting these passive jobseekers are provided by business networking communities such as LinkedIn or internet job portals like Monster. Other newer opportunities to find high-qualified employees are virtual worlds like Second Life. The first approach was made here by IBM who opened a virtual recruitment center in Second Life to contact experienced software developers (Laumer et al., 2008). A further new possibility to attract potential candidates is offered by the combination of e-assessment tools (Buzzetto-More & Alade, 2006) and online gaming (Laumer et al., 2009). Within this self-assessment (George & Smith, 1990) the candidate could discover the potential employer from the point of view of a "virtual employee" (Caligiuri & Phillips, 2003). With the help of this process the companies guide the candidates through their company, increase their transparency and offer the candidates the service how they might fit in the corporate environment (Phillips, 1998). Innovative ways to recruit and attract with the help of diverse e-services are needed as the problem of talent shortage spirals downward.

For example, for the year 2011 Germany's Top-1,000 companies expect a talent shortage for different IT and engineering professionals in R&D (von Stetten et al., 2011), as illustrated by Figure 1. The lowest supply is expected for the group of engineers in the R&D field. Solely 19.0 per cent of the companies questioned expect enough talent for this group on external labor markets. For the group of IT professionals only 20.4% of the companies estimate a sufficient availability. For job profiles in the companies' production 31.0 per cent of the study participants expect enough new workers. Four of ten assume the same availability for sales talent and 43.3 per cent for talent in the controlling and finance field. The highest availability rates are expected for the fields of HR and marketing. 58.8 per cent and 62.1 per cent expect here a sufficient availability of new talent on external labor markets (von Stetten et al., 2011).

As discussed in the introduction companies in Germany are using e-recruiting as a preferred method to search for new employees and to address the talent shortage. For more than two third of the German Top-1,000 companies these e-recruiting systems provide improvements. For example, 89.8 per cent indicates that e-recruiting systems are useful for the company, 87.6 per cent pointed out that the use of e-recruiting systems increase the effectiveness of the recruiting process, 78.4 per cent declared hat e-recruiting simplifies and 77.6 per cent stated that e-recruiting speeds up staff recruitment.

Based on these reported benefits of e-recruiting for staff recruitment the support of retention and personnel development with *e-services* might have benefits as well for companies. Therefore the aim of our paper is to provide an architecture integrating recruiting, retention and development processes based on e-services. The general issues of retention and development are discussed in the next sub-sections.

Figure 1. Expected labor supply for 2011 (Author's diagram adapted by von Stetten et al. 2011)



Personnel Retention

The necessary corollary to the recruiting of new employees is the retention of the existing workforce. Cougar (1984) was one of the first to analyze employees' motivation and wants. It turned out that individual measures and compensations had to be developed and implemented to retain the existing workforce. But Cappelli (2000a) also mentioned that these '*Golden Handcuffs*' are no longer a deterrent: Recruiters are forced to unlock these retaining handcuffs by offering a large signing bonus.

Several research approaches identified environmental and task related factors which influence an individual's turnover intention. For example Igbaria and Siegel (1992) developed a number of recommendations for executives to reduce the turnover intentions of IT employees significantly. The reduction of stress factors like role ambiguity and role conflict was mentioned by Igbaria and Siegel (1992) as a way to make employees stay with the corporation. They also encouraged companies to organize boundary spanning activities and continuous face-to-face meetings with other internal and external firm units. The individual talent should be assigned to more challenging and interesting projects with a high degree of autonomy and creativity. Furthermore, Igbaria and Siegel (1992) advised employers to show their high potentials individual recognition for their achievements and provide dual career paths which offer the opportunity for advancement within their respective field.

Other investigations found that individual career motives could also influence employees' retention. For that reason Agarwal and Ferratt (2000) provided two implications for further research. They took an extreme stand. On one hand they expected classic human resources strategies and practices not to influence an individual employee's decision to stay or leave a company. But they suggested that managers should understand the career motives of their staff as a first step and then build their retention measures around those motives in a second step. The *career motives* could be structured into three different subcategories; the preferred length of employment, the current career stage and career anchors in general. One strategy would be to recruit only those whose career motives fit in with the needs of the company (Agarwal & Ferratt, 2000). This strategy plays a particularly important role in the development of our *integrated IT architecture* in section 3. Agarwal and Ferratt (2000) examined the implementation of this strategy within their studies when one corporation hired only IT talents with an anchor of career development and security.

In a further study, Agarwal and Ferratt (2002) examined existing corporate practices for retaining IT professionals and summarized them in 11 different categories. To measure an IT professional's performance the companies often use an annual performance appraisal or 360 degree performance feedbacks. The factor of payment is implemented within compensation and benefits systems in the form of variable compensation or market anchor compensation (Agarwal & Ferratt, 2002). Another favored measure is the redesign of the individual's work arrangements by putting him in a job rotation process or letting him work in a team environment. Employability training in- or off-house could help to develop a talent's skills and his intention to stay respectively. Long-term career planning improves talent's business and leadership skills and lead to consideration of how they could achieve this career within the company (Agarwal & Ferratt, 2002). Opportunities for advancement or recognition in the form of non-monetary rewards (Laumer, 2009), monetary bonuses or extended vacations are also quite often used to retain a scarce talent as an IT professional within a corporation. Leadership training is often offered for both IT executives and regular employees. This could also be helpful to provide the IT talents with a feeling of belonging and being connected within a larger community. Female IT professionals in particular enjoy the opportunity of flexible work and time arrangements as well as child care services or telecommuting (Agarwal & Ferratt, 2002). Within their survey of key issues for IT executives Luftman et al. (2006) named the top six vehicles for retaining IT staff. They regarded the retention of IT professionals as an issue of top priority in order to avoid IT talent being poached by competitors (Cappelli, 2000). *'Organizations that do not have retention as a high priority will have a tough time'* (Luftman et al., 2006). The SIM members questioned said that open and honest communication is the key to retaining IT staff. An improved communication structure between IT professionals and their supervisors helps to create a 'family-like' working environment (Warner & Zhu, 2000). It was also revealed that a useful measure to retain IT professionals would be to provide them with challenging work experience (Luftman et al, 2006). Trust among colleagues and coworkers were mentioned as an important issue for retention by exactly half of the respondents. Surprisingly, opportunities for advancement identified by Agarwal and Ferratt (2002) as an important retention method four years earlier were only mentioned by a third of all participants. A good balance between work and outside life should be fundamental for retention as well, but came in as less important in this survey (Luftman et al., 2006).

Personnel Development

Nonetheless, recruiting external talent is essential for the further development of the company, turning the viewpoint to the internal resources might also represent an interesting opportunity, as the required personnel can also be acquired internally by selecting members of the company's current staff and preparing them suitably for their new responsibilities (Donahue, 2001). To do this, it is often necessary to introduce training measures which will enable staff to develop their capabilities (Cappelli, 2008; Donahue, 2001). The concept of personnel development is, however, characterized by "great heterogeneity and lack of clarity" (Becker, 2005 p. 2). As a result, we find a large number of definitions of personnel development in the literature. To provide a consistent understanding of the concept of personnel development in the sections that follow, we base ourselves on the definition of (Hentze & Kammel, 2001), who regard personnel development as a function of personnel management, whose aim it must be to provide all members of staff with training and qualifications enabling them to carry out both present and future tasks. In this process, those individual capabilities of the personnel which serve the achievement of the company's goals

should be encouraged. This positive alteration in the qualifications of the staff is understood as a process consisting of a series of several linked activities (Hentze & Kammel, 2001).

Since a company may have several different reasons for developing the *capabilities* of its staff, we have chosen from the literature a personnel development process for our architecture which supports this aim. Such a process is defined by Scholz (2000). In this process the gaps in the capabilities of each employee are deduced from the difference between their 'capability profile' and the profile of requirements defined by the company. This reveals how suited an employee currently is for a given job. Building on this, those employees who are eligible to take part in development activities but have not yet been able to acquire competences that are available are given a deadline for completing the relevant training. Frequently, an employee's entire potential cannot be fully exploited because the company only has limited resources available. After successful completion of a training program the 'capability profile' is updated and checks are carried out to see whether the employee now satisfies the conditions of the required profile and/or whether the training program actually provides the desired competences (Scholz, 2000).

As shown in the last two subsections the retention and development of scarce talent is a significant challenge for management executives. While it is important to understand individual requirements, an integrated strategy could be the key to remain successful within a global talent shortage. In the following subsection we present our aligned architecture based on the work of Lee (2007).

THE TALENT MANAGEMENT ARCHITECTURE

"*Retention is king*" (Frank et al., 2004) and represents together with recruiting and developing the top issues for managing scarce talent as IT professionals (Luftman & Kempaiah, 2008). Several researchers in information systems, human resources and management are discussing different approaches to each of these processes and tasks. Based on this previous work we will in this subsection align the recruiting process with retention and developing activities and provide an IT architecture to align retention, developing and recruiting supported by an information system. For this purpose we will extend the holistic e-recruiting architecture discussed by Lee (2007) by means of important processes and systems which support retention as well as developing and highlight the interface between these three essential HR tasks.

For Lee (2007) the central subsystem of e-recruitment is *a work-flow management subsystem* connected with a database management subsystem managing the communication with the enterprise-wide database. In this database all information and data related to the recruiting process is stored. Therefore the retention and developing parts of an aligned architecture will use the workflow management system, database management system and the enterprise-wide database as well to manage the information flow and storage. For retention we added two important processes and developing employees needs one additional process.

First, the development of retention activities based on key employees, an analysis of their incentives must be conducted. As Brannick (2001) highlights, one of seven strategies for retaining top talent is to "use a great employee profile to drive retention" (p.30). Based on face-to-face interviews, discussion and internet based questionnaires; companies have to collect information on what motivates a top employee to work for, to join and to stay in the company. Brannick (2001) provides a list of questions that must be asked and discussed. Based on these findings companies should develop possible retention actions and provide a collection of incentives and activities

that can be used to retain top talent. All findings must be stored in the enterprise-wide database.

Second, all retention approaches must be approved by top management. Therefore if there is a need for a retention activity an approval process must be started. Based on the findings made when developing retention activities, one must be selected or a new one must be developed based on the first process described. After the identification of retention needs and the suggestion of a retention action, the action must be approved and started. Finally its performance must be measured.

Third, the aim of the recruitment process is to hire the best candidate for a specific vacancy and to integrate them into the company's culture. Based on the findings of what the employee value proposition is (Brannick, 2001) and what the characteristics of retaining employees are, a subprocess must be designed to identify borderline turnover candidates while selecting applications for a vacancy.

Finally, to develop existing personal each position should be described by necessary skills, knowledge and competencies to be able to handle the tasks conscientiously. Moreover, each employee should also specify his strengths and weaknesses and store them in the database. If the organization identifies that one skill is missing particularly, they will be able ask their employees to take an active part in advanced educations to learn this special competency. Such a *skill-oriented advanced education program* could be particularly helpful if these skills are also missing on the external labor market.

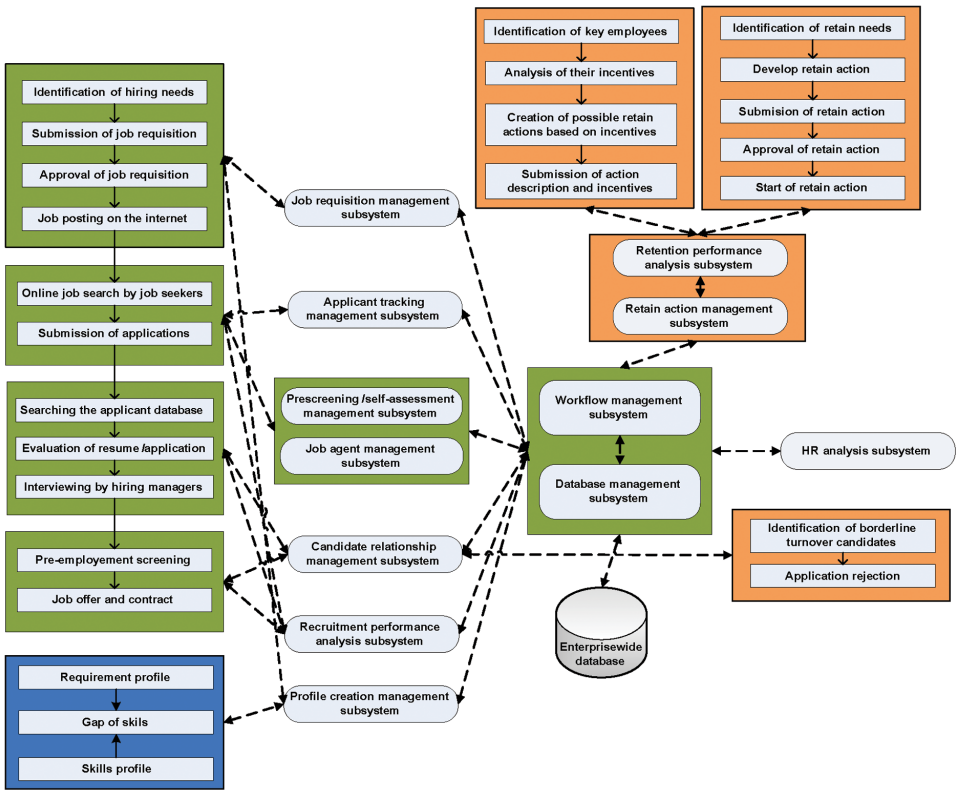
Three explicit artifacts have been designed and developed in our research. Two of them result from retaining processes and one due to the developing one. The first research artifact produced is the developed system architecture for the corporate retention processes based on the research of Agarwal and Ferratt (2000). Our second artifact is the *alignment* of this retention architecture with the holistic e-recruiting system invented by Lee (2007). The third artifact based on prior research on personnel development, enables organizations to train their employees and identifies missing skills. Figure 2 illustrates the *process diagrams* for the processes discussed in this subsection and how subsystems can be used to support them. In the next section the design of the subsystems for supporting the retention process will be discussed.

Systems

The development of retention activities and the approval of a specific action are the two major retention processes. Both are managed using the "retain action management subsystem" and their performance is analyzed with the retention performance analysis subsystem. Both together are responsible for supporting retention processes with IT and manage the linkage to the recruiting process and subsystems. Thus the focus of the system is to streamline the developing of retention activities and to identify key employees as well as the need for retention for specific job profiles or tasks. Users are retention managers, top management and recruiting managers.

As Brannick (2001) highlights, it is important to "count what counts" (p. 30). Brannick (2001) explained that for improving a company's employee retention it is important to understand what the company is compared with what the company wants to be in terms of employee retention. Therefore turnover statistics must be provided by the human resources analysis system and the retention performance measurement system to measure on the one hand the actual retention or turnover rates and on the other how an implemented retention action is influencing these rates. Therefore it is important to break down turnover rates down by department, by job or by geographic region and to measure effectively. Brannick (2001) suggests, for example, measuring the "Major Employee Retention Rates" differentiated by voluntary and involuntary; overall, department and job; hourly and salaried; percentage of great employees who

Figure 2. An IT Architecture for aligning recruiting, developing retention processes (Author's diagram adapted by Lee 2007)



leave and come back. Based on the statistics, the need for retention activities can be monitored and key employees can be identified by the "retention management subsystem". The following paragraphs describe the subsystems in detail.

- ***Retention Action Management Subsystem***: The main objective of the RAMS is to streamline the development of retention activities. Based on the identification of retention needs or the initiation of the retention performance analysis subsystem, the RAMS is the basis for the development and approval of retention activities. It supports communication with all stakeholders and provides the data needed to develop effective activities. The descriptions of the activities developed are stored in the enterprise-wide database and can be accessed via the RAMS. The RAMS is responsible for every activity related to retention.
- ***Retention Performance Analysis Subsystem***: Together with the human resources analysis subsystem the RPAS is responsible for the measurement of the performance of implemented retention activities. The system can identify retention needs and therefore initiates the development of retention activities. Furthermore it can identify key employees of the company. Based on this analysis the system can specify important target groups for retention activities and extract the key characteristics of key employees. These characteristics and the requirements of key

employees can be the basis for the development of effective retention actions.

- ***Candidate Relationship Management Subsystem***: This system offers recruiters the possibility of establishing a long-term relationship with candidates as well as employees. Lee (2007) points out that the CRM-System "is designed to provide applicants [and employees] with a feeling they have an ongoing relationship with the company through a 'virtual human touch'". In Lee's architecture for an e-recruiting system, the CRM-system is designed to increase the chance of job acceptance by candidates. Lee explained the importance of a CRM-system by highlighting that "only companies with a positive long-term relationship with job applicants will gain a competitive edge". For an aligned architecture of recruiting and retention processes the CRM-system is responsible for communication with candidates and employees. However, its main objective is to support the selection of appropriate candidates. Using data analyzed to identify potential turnover candidates, the CRM-system can identify borderline turnover candidates and therefore advise the rejection of an application.
- ***Human resources analysis subsystem***: As Brannick (2001) highlights, it is important to "count what counts". The human resources analysis subsystem is responsible for monitoring the performance of the human resources processes. One aspect is analyzing hired employees and their turnover intention. One possible number is the turnover rate of employees in a company. The HR analysis subsystem is the basis for decisions regarding the rejection of applications, the identification of retention needs or the identification of key employees.
- ***Profile creation management subsystem***: In order to train the employees in their organization in an effective and efficient manner, an organization notes required skills for existing positions and matches these with existing skill profiles of their employees. Based on these analyses the subsystem gives an overview over essential skills which are not available to the necessary degree.

Interfaces

The retention management subsystem is the central system for managing retention activities. However, as outlined, retention cannot be discussed without recruiting. Thus, this section points out the interfaces between the recruiting management system and the retention management system.

First, as already discussed, there must be a sub-process for selecting borderline turnover candidates. If the company is looking for applicants for a job profile identified as critical for retention the "candidate relationship management subsystem" has to involve the additional process in the standard selection process of the recruiting function.

Second, if the company has implemented some retention activities which are major reasons for key employees to stay in the company, the company should use them to attract new employees while filling staff vacancies. Therefore the job requisition management subsystem has to search for implemented retention activities to include them in job ads etc. Thus the main arguments and motivations of key employees for working for the company, can be highlighted in the job ads and can attract candidates who were not sure whether to apply for the job or not.

Third, the recruiting performance analysis subsystem is aligned with the retention performance analysis subsystem to measure if the recruiting process selects candidates with low turnover rates or not, and how the staffing activities are influencing the retention rates of the company.

Fourth, if an employee is leaving the company, the candidate relationship management subsystem (in a long term focus) has to manage communication with the ex-employees in terms of initiating boomerang hires.

KEY FINDINGS

Our paper suggests an alignment of the architecture of a holistic e-recruiting system by Lee (2007) with a system for managing retention and personnel development. We aligned the model by including the concept of retention and modeled retention with two processes: developing retention activities based on incentives of key employees and approving retention actions. Therefore we connected the retention management subsystem and the retention performance analysis subsystem with the workflow management subsystem. In addition, for the need for statistics, and especially for turnover rates we introduced the HR analysis subsystem to measure key HR figures which can be used to identify key employees and the need for retention activities. Moreover, we introduced a deeper selection process to identify borderline turnover candidates and connected the process to the candidate relationship management subsystem. The profile creation management subsystem is responsible for identifying rare skills and to call attention to the need for training the staff to stop this development. The aligned architecture is a basis for developing an individual architecture to support recruiting, personnel development and retention with IT.

Limitations

Like any conceptual research our research is limited as well. We discussed a theory and literature based approach to align retention, developing and recruiting process in an integrated system architecture by reviewing Information Systems, HR and management literature. The concept we recommended must be validated by a case study or empirical research to highlight the benefits. Even so, as Lee (2007) discussed, the holistic e-recruiting system is expensive and complex and a lot of companies have to choose a part of the system to support their needs.

Implications for Research

Future research can benefit from this approach. The combination of different disciplines like human resources, recruiting, information systems, talent management, retention is needed to develop information systems as a discipline which highlights the impact of IS on business and on specific services in particular. Therefore a critical design evaluation of our architecture is needed to find out which subsystem is useful for different companies (like small and medium sized ones compared to large ones), and additionally if it could provide insights for the business value of IT.

Implications for Practice

Apart from our limitations, the suggested architecture could be a basis for the development of an information system supporting the recruiting, development and retention activities of an enterprise. This is indeed a major implication for practitioners. In the following paragraphs we discuss the managerial implications for every added component of the architecture.

- ***Retention Action Management Subsystem***: Although retention activities are used in HR management, they are often not systematically planned and are adopted in an undirected way. To streamline these activities the RAMS serves as kind of a steering tool for an appropriate retention program. The HR management benefits in two different ways from the RAMS, on the one hand by means of the tool for identifying key employees retention activi-

ties could be executed with a high degree of goal-orientation, and on the other hand by means of the alarm system for sudden retention needs the activities could be approved immediately. The identification of key employees and their individual retention needs constitutes an especially important factor for the recruiting process as well. With the help of the aligned recruiting and retention architecture the HR management is able to identify potential turnover candidates as early as the candidate selection phase in staff recruitment as they know which employee is easier to retain and which is not.

- ***Retention Performance Analysis Subsystem***: The RPAS is responsible for the performance measurement of the retention activities implemented. A more focused human resources management based on clearly defined quality criteria in terms of time, cost and process quality is the future for HR. Companies need to be competitive like some who have already managed to effectively reduce their time and costs per hire and to increase the overall quality of their employees as well their employee related data due to standardization (Muenstermann et al., 2010a; Muenstermann et al., 2010b) or long-term employer branding (Gatewood et al., 1993). The RPAS permits the HR management to analyze their retention incentives in terms of time, cost and quality and so to improve the overall process.
- ***Candidate Relationship Management Subsystem***: A shortage of highly qualified employees is not only an effect of demography and a shrinking workforce; it is also an effect of misleading recruiting. In boom periods companies tend to recruit nearly every acceptable candidate instead of analyzing their potential. In difficult economic times companies neglect the staff recruitment altogether. The key to this complex situation is a new form of countercyclical staff recruitment. For a successful form of countercyclical recruitment companies need to take advantage of candidate relationship management (Lee, 2005b). A CRMS allows the HR management to build up a long-term relationship with prospective candidates in difficult economic times in order to recruit them in boom periods (Lee, 2005b). Examples of this relationship between company and candidate are invitations to corporate events, lectures and seminars or birthday and Christmas cards. Empirical research has shown that candidates expect companies to offer a lot more in the recruiting and retention process than they have done so far (Weitzel et al., 2009).
- ***HR analysis subsystem***: As described in detail in the introduction, the future in HR is the combination of different tasks like attracting, staffing, retaining and developing "talents" in one overall function. In order to produce the success of the new "talent management" function (Frosch & Trost, 2008), all processes such as recruiting and retention need to be analyzed and compared in terms of efficiency and value adding to the overall HR. The HRAS supports the HR management by evaluating the quality criteria and producing management ratios for benchmarks with other internal processes or external HR processes in other companies.
- ***Profile creation management subsystem***: In difficult economic situations, if an organization has too many employees, they could train their personal to acquire rare skills and competencies, to be prepared for the economic boom. In booming stages as organizations plan to expand, the PCMS can help to prepare such steps early. Organizations which are willing to

expand to China will benefit in such a situation from Chinese speaking highly skilled employees that are aware of the organizational culture of the parent group. Such a PCMS could be helpful to realize business strategies or to act foresighted. An example for the latter one could be the age distribution of an organization. If the system realizes that special skills are only allocated to elderly people, it will alert the HR department to train people to acquire these.

Our paper was motivated by the global rising shortage of talent and the problem of high turnover rates in the US, Europe and Asia. One can conclude that an aligned architecture for recruiting, retention and development is especially necessary for a competitive environment on the labor market. On the one hand the architecture suggested could protect a company from being poached (because the company knows why employees work for it and the architecture can support these incentives) and on the other hand it can support the poaching of employees for your company (because the company knows the reasons why it is a valuable employer).

CONCLUSION

"To poach is fine, to be poached is not" highlighted Peter Cappelli in 2000(a). Today retention and skilling is already a critical issue for managing scarce groups as IT staff (Luftman & Kempaiah, 2008) and the war for talent still exists. Therefore an integrated strategy of retention and development can prevent a company on the one hand from being poached and on the other hand can help them to develop poaching activities. We support a strategy like this by providing a system architecture based on a design science approach (Hevner et al., 2004).

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Chapter 29
Lotus Workforce Management: Streamlining Human Resource Management

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ABSTRACT

Human Resources departments are often burdened with administrative tasks performed on behalf of employees who lack the tools necessary to complete these tasks themselves. A software approach known as self-service aims to streamline HR processes by providing employees with access and control of their personal information. Different approaches to self-service have been developed, including solutions offered by SAP, Sage Software, and IBM®. This paper examines the approach taken by IBM Lotus® Workforce Management, which is a self-service solution for IBM WebSphere® Portal. Most of the self-service solutions available in the marketplace do provide HR capabilities for an organization's workforce, however, these solutions are usually designed as "out-of-the-box" software that require an organization to adopt a particular approach and a specific set of functionality. Lotus Workforce Management, on the other hand, focuses on providing three key features that allow organizations more choice and control over the implementation of a self-service solution. These features are extensibility, customization, and ease of integration. Extensibility is provided through the WebSphere Portal framework that lets users add or remove components and functionality and determine the structure of communication between portal resources. Integration with IBM WebSphere Portlet Factory gives users the ability to customize and design a solution that is tailored to their needs. Finally, ease of integration with HR resources that reside in a back end system is important as most organizations would be reluctant to change or make complex configurations to that system. For this reason, Lotus Workforce Management uses existing components for SAP ERP systems and provides functional code for rapid and simple integration without extensive configuration.

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1. INTRODUCTION

This paper describes an approach taken to develop a solution that streamlines Human Resource Management tasks with an emphasis on openness and flexibility to focus on the work performed by employees, managers and HR staff.

Interaction with Human Resource departments is not without problems. These issues affect all participants from average employees to managers to customer service representatives. All these users stand to benefit from a solution that streamlines their tasks and processes and removes or reduces pain points. In this paper we share our experiences and insight gained during the design and development of Lotus® Workforce Management, a framework solution built on WebSphere® Portal. This framework provides a foundation to create flexible, extensible, and readily customisable HR self-service applications.

This paper begins with a description of the Human Resources Management space, the major players within this space, and the issues and ideas that led to the creation of the Lotus Workforce Management framework. This paper then describes the main components of the framework and explains how these components collaborate to fulfil the solution requirements. The paper closes with a summary of what we have learned about the technical challenges in the HR self-service domain from our customers as well as some plans for the future.

1.1 Human Resource Management

Human Resource Management (HRM) is the professional practice and academic theory that relates to the structure and management of a workforce. In nearly every major organization today, there exists a Human Resources (HR) department. Regardless or whether public or private, profit or non-profit, organizations rely on HR departments to ensure that they not only attract a talented and competent workforce, but that the individuals who make up that workforce gain a sense of personal fulfilment and are encouraged to improve their skills and professional abilities, thereby assuring the organization's retention of the workforce.

As HR evolved, the level of associated administrative duties increased proportionally. Research suggests that as much as 70% of the time spent by the personnel of many HR departments was performing administrative tasks (Barron, 2002). These tasks were largely manual, paper-based, and focused on maintaining employee records. Information was often difficult to locate and changing it was a time-consuming affair. Data inaccuracy was common. Correcting mistakes diverted even more time and effort away from business-related activities.

However, HR departments have increasingly been able to make use of software systems that streamline these administrative processes. In turn, HR departments have been able to gain back valuable time to focus on strategic goals such as the recruitment and training of employees, the development of specific business practices and policies, and all the other functions that focus on the efficiency and effectiveness of an organization's workforce.

Numerous HRM systems have been developed and implemented, all with varying degrees of success. For the most part, though, currently available HRM systems fail to deliver true value to HR departments. The failures of these software systems stem from a single cause; employees are unable to take control of their own information and must ultimately depend on the HR department to complete common tasks. Whether because their information was spread over multiple systems, requiring multiple passwords, or because they were unable to access their information at the time when they needed to, employees often find HRM systems problematic and end up contacting their HR department to either enter the required information or to verify that the information was entered correctly. This failure has two effects: the first is that employees feel frustrated and dissatisfied; the

second is that HR departments become weighed down in unnecessary administrative work.

A software approach known as self-service has taken shape to deal with the failures of previous HRM systems and not only give HR departments the ability to focus on their strategic objectives, but also to deliver a solution that is truly of benefit to a workforce.

1.2 Self Service

In the context of HRM, self-service is the ability of employees to manage their own HR information easily and at any time. Research has shown that HR departments benefit from self-service solutions, whether ESS (Employee Self-Service) or MSS (Manager Self-Service). Such benefits include gaining back time that would have been spent processing information and reducing data inaccuracy.

In one case study of a public sector organization in Australia, SAP's HR/Payroll module (4.0b), which included the ESS module and SAP's Workflow tool, was used to replace the existing system (Hawking, Stein, & Foster, 2004). In this study, the ESS module was shown to provide a number of benefits to the HR department such as an reduction of time spent processing payroll, an improvement in productivity, and an increase in strategic focus, while overcoming initial resistance from the workforce who were adapted to the previous system. The view taken by Hawking et al. was that the adoption of the ESS solution led to increased satisfaction among the workforce.

However, studies do suggest that the adoption of a self-service solution depends largely upon a positive reception by the workforce. Furthermore that the success of the self-service solution depends upon an intuitive user interface and verification of transactions (Marler & Dulebohn, 2005). Additional research indicates that employee satisfaction with self-service was also influenced by a single authentication mechanism and prompt access to HR information (Rahim, 2006).

Taking into account the conclusions drawn from such research, Web portals can be seen to offer much value to self-service applications as users can access portals through Web browsers, which presents a familiar and comfortable environment for users. Users do not need to learn how to use an entirely new client application and are familiar with entering data through Web forms and views. Additionally, when the Web interface to HR management systems are rendered through a Web portal, value can be added by connecting other Web applications and integrating more closely with the work environment. This integration makes the transition to self-service a much more seamless and cohesive experience for the workforce.

2 LOTUS WORKFORCE MANAGEMENT

IBM® Lotus® Workforce Management is a self-service accelerator for IBM WebSphere® Portal that improves employee productivity and performance by streamlining employee and manager-related activities. Lotus Workforce Management provides employees with personalised, online views into the specific content, self-service transactions, company intranet applications and third-party applications and services they require to operate more efficiently.

Lotus Workforce Management consists of a number of high-level components that collaborate to expose a wealth of Human Resource information and processes that are not traditionally accessible in a user friendly fashion.

The two Lotus Workforce Management components that users interact with most frequently are two portlets known as the checklist framework and the unified task list, UTL. Working together, these two components provide a means of launching and completing profiled events and activities in a uniform way even though individual activities may, and frequently do, occur on disparate back-end systems.

Lotus Workforce Management also provides specific pages and portlets that give managers a dynamic overview of the timesheets, leave requests, and general calendar-related activities for their employees.

The other components that give the checklists and UTL functionality are:

- an innovative approach to SAP data access
- a dynamic and flexible authentication framework
- IBM WebSphere Portlet Factory
- IBM WebSphere Portal and all its various features

The following diagram shows how all the UX and other components collaborate at run-time (Figure 1). The sections that follow the diagram describe the illustrated components in more detail.

2.1 IBM WebSphere Portal

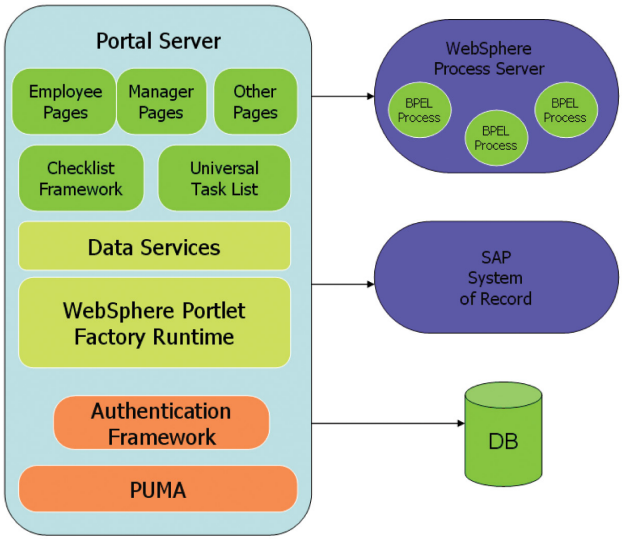
IBM WebSphere Portal provides the runtime environment for the Lotus Workforce Management application. As well as a JSR compliant portlet container there are a number of specific components for both Portal and the underlying IBM WebSphere Application Server, which make the resulting Lotus Workforce Management application more extensible and robust. This section provides a list of the most important of these components along with a brief description of what they do and which parts of Lotus Workforce Management use them.

2.1.1 Application Extension Registry

WebSphere Application Server has enabled the Eclipse™ extension framework that applications can use. Applications are extensible when they contain a defined extension point and provide the extension processing code for the extensible area of the application.

An application can be plugged in to another extensible application by defining an extension that adheres to what the target extension point requires. The extension point can find the newly added extension dynamically and the new function is seamlessly integrated in the existing application. It works on a cross Java™ 2 Platform, Enterprise Edition (J2EE) module basis. The application extension registry uses the Eclipse plug-in descriptor format and application programming interfaces (APIs) as the standard extensibility mechanism for WebSphere applications. Developers can use

Figure 1. Diagram showing how all the UX and other components collaborate at run-time



WebSphere Application Server extensions to implement their functionality to an extensible application, which defines an extension point. This is done through the application extension registry mechanism.

The architecture of extensible J2EE applications follows a modular design to add new functional modules or to replace existing modules, particularly by those outside of the core development team. Each module is a pluggable unit, or plug-in, that is either deployed into the portal or removed from the J2EE application using a deployment tool that is based upon standard J2EE and portal Web module deployment tooling. A plug-in module describes where it is extensible and what capability it provides to other plug-ins in the plugin.xml file.

The Lotus Workforce Management authentication and checklist frameworks both rely on the application extension registry to provide their dynamic extensibility.

2.1.2 PUMA

The Portal User Management Architecture (PUMA) System programming interface (SPI) provides interfaces for accessing the profiles of a portal User or Group. PUMA SPI is used to find, create, modify and delete users and groups. Profile information about the currently logged in user can also be retrieved.

PUMA is used extensively by Lotus Workforce Management, particularly by the authentication framework and in all components which profile content based on the logged in users and the groups to which users are members.

2.1.3 Credential Vault

The Credential Vault is a service that stores credentials and allows portlets to log in to applications on behalf of a user. The Credential Vault manages multiple identities for portlets and users. Using the Credential Vault, a portlet can retrieve a user's authentication identity and pass the information to a backend application.

The Credential Vault is a mature and easily used component which is core to the default authentication implementation that the Lotus Workforce Management authentication framework provides.

2.1.4 Portlet Wires

Portlet Wires are used to direct the information flow between portlets that communicate with one another using portlet events.

A wire connects a publishing event to a processing event of another portlet. When the source portlet fires an event source event has outgoing wires, the information is propagated to the target portlet(s). At the same time the corresponding handler code is invoked. Conversely, if an event is produced that is not wired to any targets, the event is simply discarded.

Creating wires is a part of page administration and requires appropriate access permissions. It is separated from the portlet development or deployment process, so that the portlet developer does not need to know the actual structure of inter-portlet communication. Communicating portlets can be developed independent of each other, as long as they agree on the same data type and semantics for data exchange.

Wiring is used wherever Lotus Workforce Management requires portlets to communicate with one another. Wiring not only provides the means of this communication but also enhances the ability of users to customise the solution by allowing for the wiring to be changed after deployment without any need to redevelop the core application.

2.2 IBM WebSphere Portlet Factory

WebSphere Portlet Factory is an Integrated Development Environment (IDE) and run-time environment for developing Java Web applications and portlets. While WebSphere Portlet

Factory has many different capabilities and can run on various platforms, we used WebSphere Portlet Factory to create solutions hosted on IBM WebSphere Portal. Most of the components of the Lotus Workforce Management solution are developed on WebSphere Portlet Factory as it provides foundational artefacts that deliver the functionality that Lotus Workforce Management required much faster.

WebSphere Portlet Factory has a design time component and a run-time component. The WebSphere Portlet Factory designer is an Eclipse plug-in that provides the IDE for developing with WebSphere Portlet Factory. To develop applications in WebSphere Portlet Factory, developers assemble builders into models and then build portlets from the models. Models are XML documents that define the order in which builders are called and what parameters are passed to the builders. Builders themselves are snippets of Java code that can do many things from generating a simple piece of HTML to retrieving data from a remote service. The builders assembled into a model are used to generate the contents of a Web application and a model is usually either consumed by other models or deployed as a portlet. Taken all together the models and builders in a WebSphere Portlet Factory project within the designer result in a web application for deployment on a portal server.

At run-time time the automation engine (a servlet) handles incoming requests and in conjunction with the WebSphere Portlet Factory profiling functionality provides dynamically profiled content.

2.3 SAP

SAP is a leading European software provider that is based in Germany. SAP products primarily focus on Enterprise Resource Planning (ERP). The company's main product is called SAP ERP. The current version is SAP ERP 6.0, which forms part of the SAP Business Suite. The previous version was R/3 and is still in widespread use.

SAP ERP is one of five enterprise applications in SAP's Business Suite. The other four applications are:

- Customer Relationship Management (CRM)
  - Helps companies acquire and retain customers as well as gain marketing and customer insight
- Product Lifecycle Management (PLM)
  - Helps manufacturers with product-related information
- Supply Chain Management (SCM)
  - Helps companies with the process of resourcing manufacturing and service processes
- Supplier Relationship Management (SRM)
  - Enables companies to procure from suppliers

2.3.1 SAP in HRM

SAP HRM or HCM (Human Capital Management) is also a part of SAP ERP and it is the part in which we are most interested as SAP is one of the leading providers of HCM solutions. Given SAP's dominance in the marketplace, engaged customers, and pre-existing software artefacts, SAP was chosen as the first system of record that Lotus Workforce Management would support.

The other driving force behind the decision to support SAP initially was the general dissatisfaction amongst customers with the user experience when interacting with SAP. This is especially true with regard to the older versions. To move to a more modern interface was not a simple upgrade when staying within the SAP product suite, which remains to be true today. The Lotus Workforce Management solution offers an attractive, non-proprietary, and complementary route to enhanced data interaction as well as the potential for integration with multiple other systems by leveraging the underlying capabilities of the WebSphere Portal and Application Server products.

2.3.2 SAP Integration

As discussed in the preceding section, SAP provides Enterprise Resource Planning software. Lotus Workforce Management leverages SAP's HR component as a system of record for its Employee and Manager Self Service functionality. Integration with SAP from Lotus Workforce Management is achieved by the use of SAP's Java Connector library. This Java Connector library, the SAP JCo, allows applications developed using the Java programming language access to SAP data via Remote Function Calls (RFCs). These RFCs are essentially remote enabled applications running on a deployed SAP system. SAP provides a suite of RFCs that can be called to perform a variety of operations. These RFCs provided by SAP are known as BAPIs. Lotus Workforce Management interacts with these BAPIs but also provides a set of additional RFCs that are deployed on an SAP system. These Lotus Workforce Management RFCs allow for a greater degree of access to information stored on SAP's HR component.

Data in SAP's HR component is structured as a set of infotypes. Infotypes are logical representations of data as this data exists inside the SAP HR component. The data to which we refer here is essentially employee related information. For example, you'd expect a HR management system to capture data about an employee's address, pay details, emergency contact information and so on. Each of these examples are stored on SAP's HR component as infotypes. Each infotype in turn can have a number of subtypes. As a generic infotype becomes specialised, this specialised infotype is referred to as a subtype. Again, an example may help with the understanding here. Take the address infotype, this address can be of varying types, for example a permanent address, a temporary address, a holiday address and so on. Each of these specialised types of address is considered a subtype of the address infotype.

SAP's BAPIs, the remote enabled applications we introduced above, provide access to these infotypes and subtypes, but do so in a defined and somewhat restrictive manner. Calling a BAPI to read an instance of an infotype, requires that a defined set of parameters be passed when making the remote call and in turn a defined set of return values are made available. The return values made available when calling a BAPI on SAP do not reflect the entire Infotype data structure. Rather, a limited set of fields are returned, which may not meet the requirement of the calling application. Let us use an example to help illustrate. Let us say for example, we wanted to read an employee's permanent address from an SAP system. When reading a permanent address using a BAPI, we have access to only a subset of the infotype information on SAP. So where a permanent address infotype on SAP may include 50 fields, we have access to only 10 for example.

For this reason, the Lotus Workforce Management application delivers an implementation of an approach to retrieving all infotype data via remote function call. The implementation is delivered as ABAP code (the SAP specific programming language) by Lotus Workforce Management and is a fully functional RFC. By deploying this ABAP code on an SAP system, access is provided to all infotypes and subtypes available on the SAP HR component. This ABAP once deployed and configured as an RFC, can be called by a remote Java application using the SAP JCo connector. In this manner any application developed using the Java programming language has access to all SAP infotypes.

Lotus Workforce Management provides a tight approach to integration with this RFC by delivering a specially designed WebSphere Portlet Factory builder. This builder, called the SAP Infotype builder, leverages the existing SAP builders delivered by WebSphere Portlet Factory to connect with SAP via the SAP JCo Connector library. Having established a connection, the SAP Infotype builder interacts directly with the custom RFC delivered with the Lotus Workforce Management solution, providing services to create, retrieve, update and delete infotypes on SAP.

Using this and other builders as it's foundation, Lotus Workforce Management provides a means of interacting with the SAP system of record that is not possible using the traditional BAPI approach.

2.4 Custom Components

The following components are those we developed specifically to resolve issues in streamlining the HRM interaction action experience. These components leverage underlying application features as mentioned in previous sections.

2.4.1 Checklist Framework

When we need to do tasks that comprise a number of steps we work from a checklist. We do this in everyday day life when we work from a recipe or use a grocery list. In the content of human resource interaction these lists are for tasks such as hiring a new employee or changing of one's marital status. As we progress through these lists we check off completed items. So put simply a checklist is a list of activities to be carried out to accomplish a particular task. Within Lotus Workforce Management this task, or event, can be anything and comprises a list of activities which can involve interaction with people and applications. An oft used example of a checklist is that of the change address event.

To extend flexibility there are many attributes which activities possess:

- They can be organised into related groups
- They can be mandatory or optional
- They can have a required completion order
- They can integrate with various external systems
- They can exist on various backend repositories

Moreover the containing checklist can:

- Be unique or multiply occurring for the owning user
- Restricted in access particular groups
- Have its status changed based on its age

Both checklist templates and in-flight checklists are represented as xml documents the storage of which is provided and abstracted by a persistence layer. This representation allows for simple manipulation of the checklists as well as enhanced readability of the checklist contents outside of the Lotus Workforce Management application.

2.4.1.1 Presentation

Checklists are presented to the user by one of three portlets.

The My Resources Portlet

The My Resources portlet (Figure 2) provides a profiled and categorised list of checklists to the logged in user. This profiling provides for targeting of function so that a manager can for example exploit resource management events such as promotion which would not be presented to an employee.

The UTL Task List Portlet

The task list portlet of the UTL displays in-flight checklists that are owned by the current logged in user. This is the users' primary means of accessing active checklist instances.

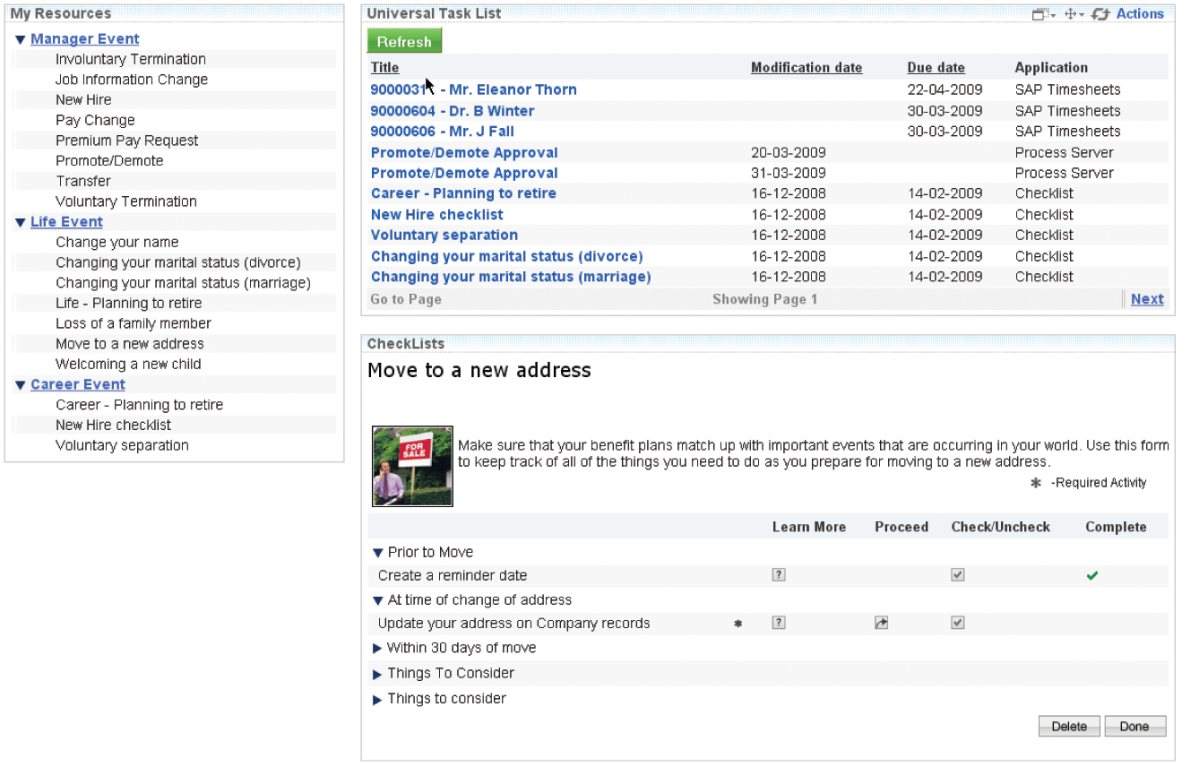
The Checklist Portlet

The checklist portlet is responsible for rendering checklists and presenting the activities to the user. Most of the heavy lifting here is performed by the checklist builder, a custom built WebSphere Portlet Factory artefact.

2.4.1.2 Operation

New events are initiated by the user via the My Resources portlet. A user simply selects one of the categorised events and typically a new checklist instance is created and displayed in the checklist portlet. If however the selected event is unique and pre-existing it is the pre-existing instance of the checklist which is presented to the user. An

Figure 2. The My Resources portlet



example of one such event is the change marital status event which is unique per user at any given time.

With the checklist available in the checklist portlet the user can proceed with completing the listed activities. Unsequenced activities can be completed in any order and non-mandatory activities can marked complete by the user or simply ignored. At any stage the user may save the state of the checklist and proceed to do other things.

To return to an in-flight checklist the user typically uses the UTL task list portlet. On the selection of the required task from this portlet the checklist portlet restores the previous state of the checklist and work can proceed.

Each individual activity in a checklist delegates its function to an activity handler. Activity handlers can be as simple as URL handlers handling redirection to another portal page or as complex as a handler to interact with a workflow engine.

Lotus Workforce Management ships with a number of pre-built handlers including those for interacting with WebSphere Portlet Factory models and portal page redirects. Additional handlers can easily and dynamically be added via the implementation of an extension class or statically added with the creation of a new WebSphere Portlet Factory model.

As in real life as time passes the status of incomplete checklist instances changes, the checklist sub-component of the checklist framework runs on a configurable schedule and visits each in-flight checklist in turn. For each instance it compares the current time with the creation time of the checklist and based on a set of customer configurable values it changes the status of the checklist and/or sends email alerts to specified parties.

2.4.2 Unified Task List

The UTL task list portlet aggregates tasks and activities from multiple systems into a single user interface. WebSphere Portal users access the unified task list portlet to complete these tasks and activities in order to advance workflows.

2.4.2.1 Presentation

The UTL presents a simple and easily understood interface to the business user as well as a comprehensive range of configuration options to an administrative level user. As with all the major components used in Lotus Workforce Management the UTL is also flexible and dynamically extensible. Some of its capabilities are listed in the following table by user role (Table 1).

The tasks presented to the user are those the individual task providers decide the user is eligible to see (Figure 3). This may mean simply that the user is the owner of the task as in the case of a checklist task or that the user is one of the potential owners of a WebSphere Process Server hosted process task.

2.4.2.2 Operation

When the task list portlet is loaded it determines the logged in users attributes via PUMA, the Portal User Management Architecture, SPI. The central task dispatcher then passes this information to each of the listed task providers. It is then the individual task provider's responsibility to return a list of relevant tasks to sort and display. In the current version there are task providers for Checklist tasks, IBM WebSphere Process Server tasks, and SAP workflow tasks.

The user can now select any task from the list. Each task type is handled by a task details portlet the launching of which is user configurable. We have already seen that the checklist portlet provides the task details UI for checklist tasks and whilst a generic UI is provided for the out of the box task types the pattern of usage would be that the details portlets would very much be task specific and need to be developed by the customer of a case by case basis.

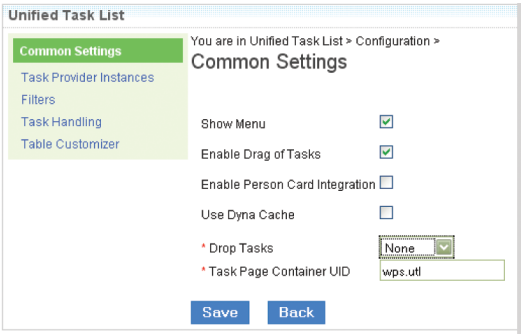
2.4.3 Authentication

The Lotus Workforce Management authentication solution was designed to provide a dynamic and extensible framework for single sign-on between the portal resident Lotus Workforce Management application and the HR repository of choice at the backend. It has a generic approach to authentication which allows for the dynamic alteration of authentication mechanism with no observable impact on the end user. The framework comprises largely WebSphere Portal server artefacts with companion WebSphere Portlet Factory client artefacts to allow for its use in portlet factory base applications.

Table 1. UTL capabilities

Role	Task
All	add task list providers at runtime via the portlet configuration view
All	enable the filtering and sorting of the aggregated task list
Administrator	enable or disable caching
Administrator	configure how task pages should be launched

Figure 3. Unified task list



The framework leverages WebSphere Application Server's implementation of the Eclipse extension framework and it is this which allows for the flexibility and extensibility of the solution. Additional authentication mechanisms can be added to the application server and these are automatically detected by the Lotus Workforce Management authentication administration portlet. This portlet then allows the administrator to chose a new authentication mechanism and configure its settings all without any code change to the pre-existing deployment.

An authentication broker, implemented as WebSphere Portal service, is the single point of contact between the Lotus Workforce Management application and the pluggable authentication mechanisms. This allows applications to be developed without being tied to a particular authentication mechanism.

2.4.3.1 Identities

There are three main artefacts when it comes to authentication and identification between the Lotus Workforce Management application and the HR backend. These are the credentials used to authenticate with the portal system, the credentials used to authenticate with that backend, and the employee's identifier in the HR backend.

The following sections describe each of these artefacts in turn and explain how they interoperate to surface information to the Lotus Workforce Management user.

2.4.3.2 Portal Authentication

By default WebSphere Portal uses the Custom Form-based Authentication mechanism of IBM WebSphere Application Server to prompt users for identity. Users type their user ID and password in the login portlet or the login screen of the portal. It has support for many other types including SSL, custom forms, and third party authentication with Tivoli® Access Manager for example.

2.4.3.3 SAP Personnel Number

In SAP employees are identified but their personnel number, a system wide unique string which is used in most interactions with the SAP backend system. The personnel number supplied to the backend ensures that the employee information specific to that personnel number is returned to the requestor. For example a call to get an address will only return address information for the personnel number passed to the get address call. There are temporal and other standard parameters that also affect the information returned but for the purposes of this section we are only interested in the personnel number.

2.4.3.4 Backend Authentication

Obviously before one can retrieve information from the HR system the request must be authenticated. As our solution is Java based we use the SAP Java Connector to connect to the SAP backend. The connection methods of the java connector require credentials to authenticate requests and subsequently return information. The Java Connector supports SSO with username and password credentials and logon tickets. It also supports x509 certificates. Whilst the Lotus Workforce Management authentication framework is flexible enough to accommodate all there, and more, the out of the box authentication implementation uses the common username and password credential combination. The username has no relation to the personnel number. It is used purely to authenticate with the backend and determine authorisation rights. Depending on the rights of the username, information on more than one personnel number may be retrieved or altered.

2.4.3.5 Interoperation

WebSphere Portal stores information about it's users in a user registry and access to this registry is provided programmatically via PUMA, the Portal User Management Architecture, SPI. Our solution leverages the WebSphere Portal user registry and

its credential vault component to provide a single sign-on mechanism between the Lotus Workforce Management application and the HR backend.

We map the SAP personnel number to an attribute in the Portal user registry. This provides the linkage between the user's identity in Portal and their identity in SAP. Independently if this link we store the SAP logon credentials in Portal's credential vault. The credentials stored are determined by the mapping type chosen by the portal administrator. The default mapping is n-1 where multiple portal users logon to SAP with the same shared credential. The other mapping supported by the username and password authentication mechanism is a 1-1 mapping where each portal user has their own SAP credential in the vault.

These mappings provide two distinct runtime paths on initial logon to the Lotus Workforce Management application:

- n-1 mapping
  - There is no credential challenge as only the administrator can set the password. If the password is set and valid the user notices nothing. If the password is invalid (unset or expired for example) the user is presented with a customisable error message.
- 1-1 mapping
  - If a valid credential exists in the vault for the user they seamlessly go to the Lotus Workforce Management application. If the password is invalid the user is presented with a challenge. On successful completion of the challenge the new valid credential is persisted to the vault and the user continues to the Lotus Workforce Management application.

The challenge is determined by the authentication mechanism in use and in the case of the default username and password implementation the challenge is the familiar dual text entry field for username and password. The framework allows for any type of challenge as long as the accompanying authentication mechanism can handle the returned credential.

2.4.4 Builders

A set of WebSphere Portlet Factory builders we developed and released with the Lotus Workforce Management solution. These builders were designed to provide rapid application development capabilities for the Portlet Factory developer creating HR portlets in particular. The builders themselves are broken into three broad categories:

1. Base builders
2. SAP builders
3. Checklist builders

The Checklist builders form part of the previously discussed checklist framework and provide a solution for lightweight workflow type applications running on WebSphere Portal. SAP builders and Base builders are designed specifically to build HR portlets using data from SAP. The sections that follow discuss each category in more detail.

2.4.4.1 Base Builders

The Base builders delivered with Lotus Workforce Management provide essentially two core services for the SAP builders. Firstly the Base builders operate as a point of integration with the Authentication Framework. Tightly coupled with services provided by the Authentication Framework, the Lotus Workforce Management Credential builder will determine whether a user has already supplied valid credentials to access SAP. If no valid credentials are present, the user will be asked to enter a user name and password for SAP. Once these credentials are verified, the builder will then store these values in WebSphere Portal's credential vault. Secondly, the Lotus Workforce Management Base builder will provide

access to a range a valuable data from SAP to a Portlet Factory model developed using the Lotus Workforce Management SAP builders. This data is core information about the logged in user that may be required numerous times in the life of the application. This Lotus Workforce Management Base builder will retrieve relevant information via a one time call to SAP, store the information in local variables and make this information available via a set of public methods that can be called by other builders in the model.

2.4.4.2 SAP Builders

The SAP builders delivered with Lotus Workforce Management aim to abstract away from the complexity of calling Remote Function Calls on SAP. Five builders are included in this category of builders with specialised functions to

- Read table data on SAP
- Perform create, retrieve, update and delete (CRUD) operations on HR data on SAP
- Provide a presentation layer for the data access functions listed above

The SAP Infotype builder is one of the foundational builders in this category. Responsible for performing the CRUD operations on HR data mentioned above, this builder is designed for use by the business analyst that has no specific knowledge of working with SAP APIs known as BAPIs. Creating a web application or portlet that interacts with SAP as a HRM system would typically require expert knowledge of SAP's BAPIs. Clever logic inside the SAP Infotype builder removes this onus from the developer, empowering the business analyst to develop SAP HR portlets in just minutes.

This category of SAP builder should not be confused with the SAP builders delivered with the WebSphere Portlet Factory product itself. WebSphere Portlet Factory's SAP builders are raw data access builders that require the user be skilled in working with SAP's BAPIs when developing a web application. These builders certainly have a place in the SAP web application development space but the Lotus Workforce Management SAP builders are of particular value when leveraging SAP as a Human Resources Management System. Technically, the Lotus Workforce Management SAP builders have a dependency on the WebSphere Portlet Factory SAP builder and in fact leverage the SAP Function Call builder delivered with WebSphere Portlet Factory. This dependency is of course by design, leveraging the connection pooling already implemented by Portlet Factory.

3 CONCLUSION

In this paper we described the motivations behind the development of the Lotus Workforce Management solution; the desire for a customisable solution, the need for ease of integration, and the requirement for extensibility. We showed how each of these goals were met and what technologies and assets were used to create Lotus Workforce Management. During the course of the project we strove to reuse as much as possible of the underlying stack components. Both WebSphere Portal and WebSphere Portlet Factory provided us with a significant amount of functionality out of the box, for example, the user management feature of Portal and the SAP feature set in Portlet Factory. WebSphere Portal and WebSphere Portlet Factory also provided the ability to customise and extend Lotus Workforce Management. The Eclipse extension framework in Portal and the builder/model architecture in Portlet Factory are perhaps the most pertinent examples of the capacity for customising and extending Lotus Workforce Management.

The following sections enumerate some of the experiences of the team during this project and provide a view on the future direction of work on Lotus Workforce Management.

3.1 Lessons Learned

The development of the Lotus Workforce Management solution involved a relatively large team of developers, some with experience of Java, some with SAP, and some more with Portal. During the course of the project we encountered the usual issues development teams hit as well as some more specific ones. This section aims to share a synopsis of those issues.

3.1.1 Knowledge Acquisition

Throughout this project we had SAP domain experience in two key areas of SAP; the functional area of human resources within SAP and the development of Advanced Business Application Programming, ABAP, the COBOL like language used to develop on SAP.

These skills enabled us to develop the SAP resident functionality we required and administer the SAP systems we used for test. However, even with such expertise onboard there was still much effort involved in determining the information we required to interact with SAP at the level we wanted to. The experience of our SAP resources allowed us the mine this information more quickly but knowledge acquisition was still something that took longer than originally anticipated.

3.1.2 User Experience

The main purpose of this project was to streamline access to HR data. The presentation of such data to the end user, as well as the paths to access this data, is one of the most important means of achieving this streamlining. With the use of the Universal Task List, the My Resources portlet and its companion the checklist framework, as well as the themed portal pages we feel we successfully achieved this user experience goal.

As always some things slip through however and in our case the most obvious of these is the need for a user to specifically save a checklist to persist state. It would be better if activities could be auto-saved on completion. So doing would prevent users losing state if they were to forget to manually save a checklist before moving on.

The lesson here is that experienced UX resource involvement at all stages of the project and most especially at the beginning and end is invaluable.

3.1.3 Testing

As we have shown the Lotus Workforce Management solution comprises a number of collaborating components used at both design time and run-time. Both of these types of components presented their own challenges from a test point of view.

The design time builders had to be tested for integration with the rest of the WebSphere Portlet Factory artefacts and also for integration with the WebSphere Portlet Factory builders on which some of them are built.

The run-time components, both those produced via WebSphere Portlet Factory and the authentication framework, naturally had to be system and performance tested as a whole. The development of a test harness and the allocation of unearthed defects proved to be the most troublesome aspects here due to the number of moving parts.

When going through a similar project in future planning and implementation effort will be expended to system and performance the larger components in isolation before the whole solution is subjected to these tests.

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Chapter 30
Applicability Assessment of Semantic Web Technologies in Human Resources Domain

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ABSTRACT

To meet the challenges of today's Internet economy and be competitive in a global market, enterprises are constantly adapting their business processes and adjusting their information systems. In this article, the authors analyze the applicability and benefits of using semantic technologies in contemporary information systems. By using an illustrative case study of deployment of Semantic Web technologies in Human Resources sector at the Mihajlo Pupin Institute, this paper shows how the latest semantic technologies could be used with existing Enterprise Information Systems and Enterprise Content Management systems to ensure meaningful search and retrieval of expertise for in-house users as well as for integration in the European research space and beyond.

INTRODUCTION

In order to meet the challenges of today's information economy and be competitive in the global market, enterprises are constantly adapting their business processes and adjusting their information systems. Whereas in the 1990s the companies concentrated on implementing systems with re-automated functions to provide specific benefits in-house, today's market demands new applications and better integration within and between the organizations. Nowadays, the modern enterprise information systems represent an interconnection of heterogeneous systems like frameworks, knowledge management systems, enterprise resource planning, databases, data ware-

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houses, etc. Resources are more often distributed over multiple sites, thus requiring utilization of different technologies and approaches for data/ document access and retrieval.

Semantic technologies provide standards and structures that allow information to be described in a way that captures what it is, what it means and what it's related to, all in a machine-readable form. This enables machines as well as people to understand, share and reason with them at the execution time. Semantic Web (SW) technologies are designed to extend the capabilities of the information on the Web and to enable enterprise systems to be networked in meaningful ways. This opens new perspectives that are far beyond the traditional approaches to information management.

In the present article we shall first more closely define the semantic technologies and the Semantic Web, and then, using an illustrative case study of deploying Semantic Web technologies at the Mihajlo Pupin Institute (Belgrade, Serbia), we will discuss the transition from the older models of information management to new ways of data integration and leveraging the diversity of resources using Semantic Web technologies. In order to locate the types of problems semantic technologies can solve, we will analyze the W3C collection of Case Studies and Use Cases and discuss the extent of adoption of Semantic Web technologies in practice.

RESEARCH FRAMEWORK

Semantic Web is one of the fastest developing fields within the ICT sector and, as such, under constant examination by scientists and IT professionals. Most of the academic work, up to now, has focused on the global public gains of adopting SW technologies (Alani et al., 2008), and to a significant degree has neglected the industry development and migration needs to meet the SW challenges.

Having in mind this situation, the present work will focus on:

- Presenting a brief account of the key application areas of Semantic Web technologies and a summary of the achieved benefits from them (based on the analysis of the W3C collection of Case Studies and Use Cases), that will give a picture of the present status of the SW technology implementation and needs thereof in industry development sector, and
- Presenting the results of a case study of the use of semantic technologies for integration and meaningful search and retrieval of expertise data, as an example of the new approaches to data integration and information management.

Semantic Web Background

The Semantic Web was envisioned by Tim Berners-Lee, inventor of the World Wide Web (Web), and is now being further refined by researchers and visionaries within the World Wide Web Consortium (W3C), which Berners-Lee directs. In (Berners-Lee, Hendler, & Lassila, 2001), Semantic Web is defined as '…an extension of the current Web in which information is given the well-defined meaning, better enabling computers and people to work in cooperation'. The main standardization body the W3C was created in October 1994, to "lead the World Wide Web to its full potential by developing common protocols that promote its evolution and ensure its interoperability."

Semantic Web is an extension of the conventional Web based on the HyperText Markup Language (HTML) and the Extensible Markup Language (XML). A markup language is a set of markup tags used to describe the web pages. A HTML Web document contains HTML tags and plain text. XML is a generic markup language for describing the structure of data. Unlike in the HTML, neither the tag set nor the semantics of

XML are fixed. XML can thus be used to derive markup languages by specifying tags and structural relationships. Semantic Web languages, indeed, use XML syntax. Since the Semantic Web was conceived, numerous web technologies have been accepted as standards or recommendations by the W3C's Semantic Web Activity (Ayers, 2009). In an attempt to structure and relate these technologies, Berners-Lee presented several versions of the Semantic Web architecture where these technologies were layered into a so-called stack of increasingly expressive languages for meta-data specification (Gerber, van der Merwe, & Barnard, 2008). In short, W3C recommends implementing the Semantic Web in the layers of Web technologies and standards where the Application layer should be developed on top of the Ontology layer, which in turn is developed on top of the Resource Description Framework (RDF) layer. RDF is a general-purpose language for representing information on the Web. It defines a framework in which independent communities can develop vocabularies that suit their specific needs and share vocabularies with other communities. In order to share vocabularies, the meaning of terms must be specified in detail. The descriptions of these vocabulary sets are called RDF Schemas. A schema defines the meaning, characteristics, and relationships of a set of properties, and this may include constraints on potential values and the inheritance of properties from other schemas. The RDF language allows each document containing metadata to clarify which vocabulary is being used by assigning each vocabulary a Web address. RDF Schema uses Uniform Resource Identifier (URI) references for naming. URI reference is a string that represents a URI, i.e., name or address of an abstract or physical resource on the Web. Ontology Web Language (OWL) facilitates greater machine interpretability of Web content than that supported by RDF and RDF Schema by providing an additional vocabulary along with formal semantics.

W3C does not prescribe ways of implementation semantic applications, and the Semantic Web layer cake (see W3C, http://www.w3.org/2007/03/layerCake.png) is not a technology stack in the engineering sense. After the standardization of the RDF and the Ontology layer, main efforts of the Semantic Web research community during last several years have been (and still are) devoted to: standardization of technologies (WSDL - Web Services Description Language and SAWSDL - Semantic Annotations for WSDL and XML Schema, recommended in 2007) for development Semantic Web Services and provision of tools that enhance interoperability; development of rule languages (SWRL - Semantic Web Rule Language, RuleML), development of Rule Interchange Format (RIF) and provision of engines (ontology reasoning and rule) that enhance reasoning; improvement of OWL and invention of new knowledge representation formalisms.

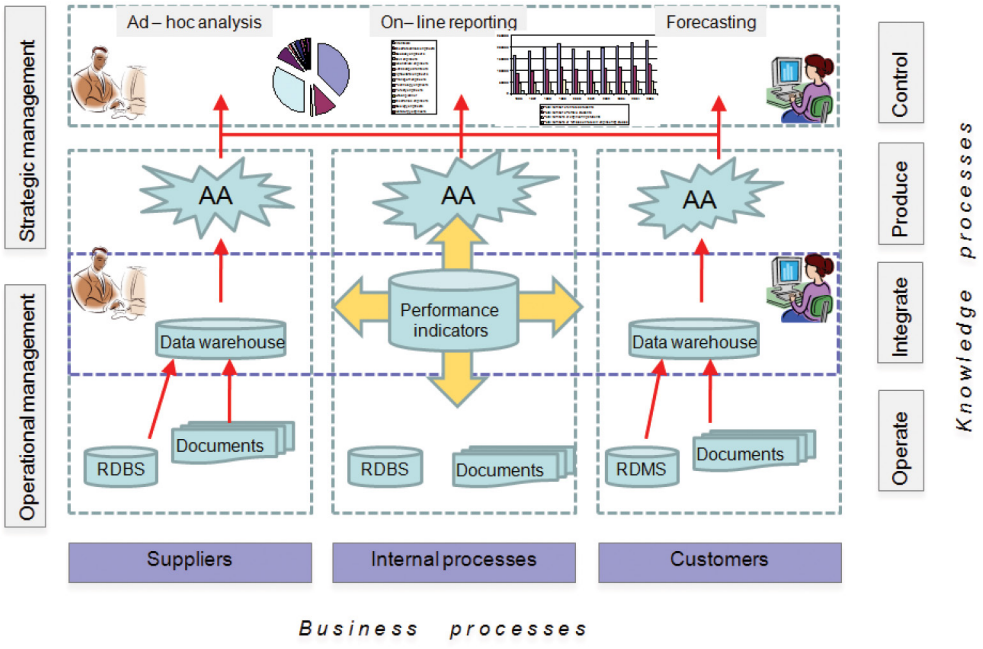
Knowledge Technologies and Processes in Traditional EIS

An enterprise is an independent legal economic entity, established with the aim to carry out particular business activities with a positive outcome. Depending on the type of primary economic activities, we distinguish manufacturing enterprises, retail enterprises, service enterprises, public enterprise, etc. The primary economic activities of an enterprise define also the structure of its enterprise business processes. For instance, the business processes of a research and development organization (R&D) will slightly differ from the enterprise business processes of a retail company. Roughly speaking, enterprise information flows could be divided into external and internal flows. External flows are directed towards clients, suppliers, partners and other legal entities. Internal flows are results of information exchange and business interactions between employees inside the enterprise. Both types of processes together form the enterprise business processes, such as:

marketing, sales, purchase, customer support, research and development, manufacturing and management.

As shown in Figure 1 (Janev & Vraneš, 2005), enterprise management processes vertically can be divided into operational business processes and strategic business processes. Operational business processes that are aimed at carrying out the daily activities in an effective and an efficient way are based on transactional databases (DB). On the lowest level (Layer 1 in Figure 1), enterprise resource management (ERP) systems integrate and automate all aspects of operational business activities from manufacturing and warehousing to sales and finance. Built around a centralized or distributed database, ERP systems are often preserved as back office systems for managing the internal information flows. The ERP systems' integrated functionalities ensure prompt connection of the employees with the customers, suppliers or partners. Information technologies that have an integrative role on the enterprise level are (Layer 2 in Figure 1): data warehousing technologies, collaboration solutions, portals, document management, workflow solutions and other ontology based and SOA oriented solutions. While managers on the operational level are concerned with the optimization of workflows, reduction of costs, and utilization of resources, the strategic managers (Layers 3 and 4 in Figure 1) are concerned with establishment of good position on the market, improving the customer satisfaction, meeting the business objectives and creating profit, protection and development of intellectual capital, etc. On upper levels specialized executive information systems that support strategic activities, such as goal setting, planning and forecasting and tracking performance, are used. Executive information systems, also called Business Intelligence (BI) systems, include decision support applications, operational research techniques, knowledge production technologies and enterprise performance measurement systems (Colomo-Palacios, Hernández-López, García-Crespo, & Paniagua-Martín, 2009).

Figure 1. Relating information and knowledge technologies to business processes in traditional EIS



Driving Forces for EIS Development

In order to increase the efficiency of business processes, organizations outsource business processes to service providers or use information technologies to shift the front-end process completely to the customer self-service and automatic retail of digital goods without any human interference at the provider side. New organizational models such as a "virtual organization" (Cruz-Cunha & Putnik, 2009), whose members link their individual core competencies (Lahti, 1999) through cost-sharing and risk-sharing agreements so that the virtually integrated organization can act as a larger, single entity, invoke challenges such as inter-enterprise cooperation, interoperability and integration, migration and heterogeneity management. From here we can see the growing importance of inter-organizational (cross-organizational) applications of enterprise information systems, in particular in the e-business context (Nayak, Bhaskaran, & Das, 2001). This includes dynamical aspects in external links, e.g. with respect to offered functionality and/or with respect to collaborating parties. To provide integrated solutions, new approaches, technologies and architectures have emerged during the last decade (Gu, Xia & You, 2006) that include ontologies, Web services and Components technology, Workflow technology, Service-oriented architecture, Model driven architecture, the Grid Computing, etc. The Semantic Web technologies are the subject of investigation in this paper, especially their role in the contemporary software engineering and the ways researchers and practitioners are using them in practice.

APPLICABILITY ASSESSMENT OF SEMANTIC WEB TECHNOLOGIES

New technologies are usually subjected to experimentation, refinement, and increasingly realistic and exhaustive testing. This kind of information gathering, which looks beyond the immediately obvious and attempts to analyze a given technology's ramifications in as wide-ranging and far-sighted a manner as possible, is known as *technology assessment* (Braun, 1998). It is usually based on different forecasting methods, such as extrapolation, expert opinion (the Delphi method) and modeling, cost-benefit analysis, and cross-impact analysis. Prior to incorporating a specific technology into a system or subsystem, many of the world's larger companies and government agencies use a measure called *the technology readiness level*. At the lowest level, researchers begin to translate scientific data into applied research and development. At the middle level, they test the prototype system (or technology) in a real environment, and at the highest level, they integrate the new technology into an existing system.

Aiming at providing an updated picture of the applicability and adoption of Semantic Web technologies in practice, we have analyzed the collection of W3C Semantic Web Case Studies and Use Cases (www.w3.org/2001/sw/sweo/public/UseCases/). The W3C, the main standardization body for the Semantic Web, established a collection of Semantic Web case studies and use cases in 2007, based on an enterprise survey conducted by the SW Education and Outreach Interest (SWEO; www.w3.org/2001/sw/sweo/) Group. The "case studies" include descriptions of systems that have been deployed within an organization and are now being used in a production environment. The "use cases" include examples of built prototype systems that have not yet been used in practices. As of this writing, the database stores 40 entries, in which 27 are case studies.

For better understanding the usability of SW technologies in real applications, we have used the cross-tabulation analysis to find relationships between variables such as the enterprise *Activity area of*, the *Application area of SW technologies*, the *SW technologies used*, and the *Benefits of SW technologies*. Researchers typically use cross-tabulation analysis, also known as contingency table analysis, to analyze categorical (nominal

Table 1. Semantic Web technologies' application domains

Status	Definition
Data integration	Data integration is a process of retrieving, merging and storing of data originated in heterogeneous, expanding set of corporate/public data sources using ontologies and web services.
Semantic Search	Semantic search is based on methods (i.e. faceted-based) that aim to augment and improve traditional search results by using not just words, but concepts and logical relationships.
Content discovery	Semantic content discovery is based on using taxonomies and ontologies for describing different types of content and for dynamic linking between content items.
Semantic annotation	Semantic annotation is a process of assigning unambiguous meaning to resources (e.g. assigning types to single terms or semantic relations to pairs of terms) in order to enable a more efficient discovery mechanism.
Social networks	W3C standards, natural-language processing, statistical analysis, graph analysis capabilities and other technologies are used to help people track, discover, and share content around topics they are interested in, thus forming social networks.
Natural language interfaces	W3C standards, natural-language processing, machine learning methods are used to provide natural, human-like interaction with the computer.
Service integration	Adding semantics to Web services with the aims to augment service integration i.e. discovery, composition, ranking, selection and mediation of services.

measurement scale) data. A cross-tabulation is a two- (or more) dimensional table that records the frequency of respondents with the specific characteristics described in the table's cells. Our primary objective was to identify the W3C SW technologies applied in a particular application domain (see Table 1) and the benefits gained. The results are summarized in Table 2.

Looking at the *Activity area* of early adopters registered in the W3C collection of Semantic Web Case Studies and Use Cases, we found that 37.5% of the companies are public institutions. Further on, 17% of applications are e-government applications, 12.5% are applications for the health sector, while only 7% are life science applications. Looking at the technical problems solved by using semantic technologies and comparing them by frequency of occurrence, we have obtained the following list (see also Table 2): data integration (65%), search (42%), portal (40%), content dis-

Table 2. Relating Benefits of SW to SW technologies used

	23 - DSR	**22 - IS**	**10 - ECR**	**6 - INR**	**4 - P**	**4 - RRC**	**2 - RTM**
34-RDF(S)	18	20	10	6	4	2	1
25- in-house voc.	13	13	8	3	2	2	
18- public voc.	11	11	4	3	3	2	1
20- OWL		11	5	2	1	2	
14- SPARQL	11	7	4	4	2	2	1
6- Rules	3	2	2		1	1	
4- SKOS	2	2	1		1	1	1
3- RDFa	3		1		1	1	1
2- GRRDL	1	1			1		
1- WSMO	1						1

Legend: DSR – Data share and re-use data; IS - Improved search; ECR - Explicit content relation; INR - Ident. new relation; P – Personalization; RRC - Rapid response to change; RTM - Reduced time to market.

covery (25%), semantic annotation (25%), social networks (10%), content management (7.5%), customization (7.5%), domain modeling (7.5%), natural language (5%) interfaces, and service integration (5%). Semantic technologies are by far most often used for data integration and to improve search. However, according to these statistics, they have the potential for dynamic customization /composition of services and, hence, for building flexible architectures.

Our analysis has also indicated some of the *Benefits* that end-user organizations gain by utilizing the SW technologies, including data share and re-use (57.5%), improved search (55.5%), incremental modeling (27.5%), explicit content relation (25%), identifying new relationships (15%), dynamic content generation (10%), personalization (10%), open model (12.5%), rapid response to change (10%), reduced time to market (5%), and automation (5%). From the results presented in Table 2, it is obvious that SW technologies are very suitable for data sharing and reusing, as well as knowledge search. Using the faceted navigation technique, knowledge bases could be full-text searched, as well as filtered and sorted using semantic relations. Analyzing the SW technologies that have been applied, this analysis has shown that in comparison with RDF(S), that is used in almost all data integration applications, the OWL is used in less than half. It is interesting to notice that SPARQL Protocol and RDF Query Language (SPARQL), which is a standard query language for RDF, is more exploited for data integration i.e. syntactic matching of different knowledge schemas, than for querying and retrieval. The search and content discovery function rely both on public and in-house vocabularies. It is encouraging that, besides the mature SW technologies (RDF and OWL), technologies such as OWL-S and Web Service Modeling Ontology (WSMO) that are still in the process of standardization are considered to be used for service integration.

One of the benefits reported is that "semantic technologies make the content relationships explicit and hence machine processable". Semantic Web is an extension of the conventional Web, and therefore existing contents should be available on Semantic Web as well. For this purpose, W3C recommended several technologies including Gleaning Resource Descriptions from Dialects of Languages (GRRDL) mechanism, RDFa, and microformats. In addition, both the research community and the commercial sector offer various semantic annotation and ontology learning tools for online conversion of the existing unstructured contents on the web into a format understandable by computers. However, this process is not trivial and generally not an easy solvable task.

DEPLOYING SEMANTIC WEB TECHNOLOGIES: A CASE STUDY OF THE MIHAJLO PUPIN INSTITUTE

The business process of a modern organization (such as the Mihajlo Pupin Institute - MPI) in the information and communication technologies – ICT sector, is a very complex one and is driven, on one hand, by market "pool" factors and relations with the industry (public and private sectors) and, on the other hand, by science "push" factors, societal needs and expectations (public sector). Since MPI performs applied research in the ICT sector, with outcomes directly applicable in the industry, it takes advantage of it and successfully performs technology transfer from academia to industry. As the most precious asset, apart from knowledge artifacts and standardized business processes, the MPI knowledge resources include the creative human resources and their explicit and tacit knowledge and experience. Since R&D organizations' innovation charter demands a focus different from that of other types of organizations, specifically, to nurture open access to human resources' extensive knowledge and experience, explicit and tacit, significant adjustment of standard information management solutions and practices are necessary to suit their needs.

In this Section, we shall discuss to what extend the semantic technologies can address these specific needs.

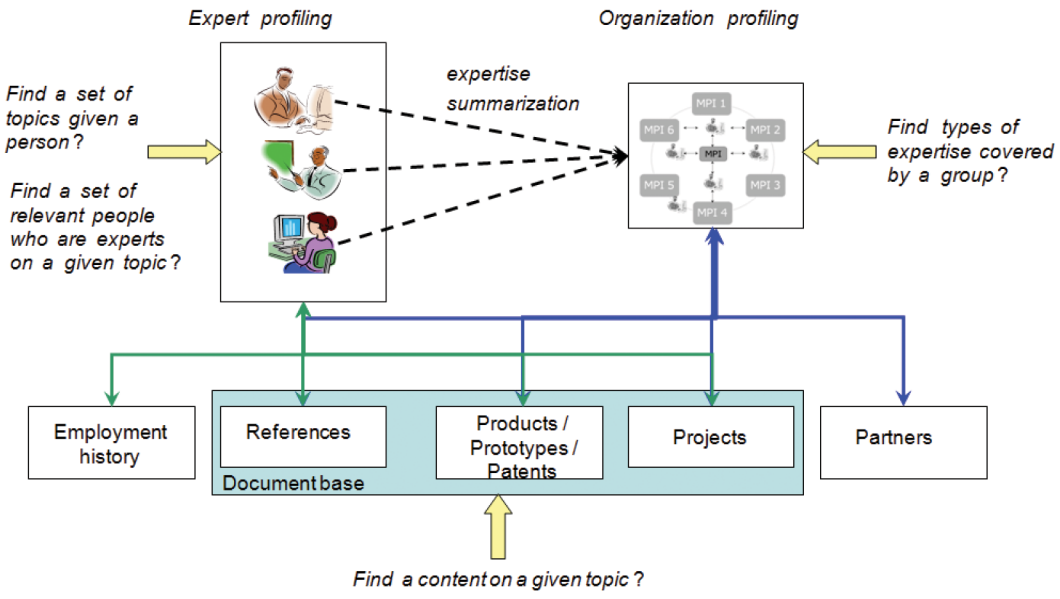
Knowledge Management in HR Sector

Knowledge management systems (KMS) support all aspects of knowledge processing and sharing, including knowledge extraction, representation and retrieval. KMS in HR domain should respond to challenges such as management of entities in the HR domain (organizational units, people, jobs, competences) by continually recording the experts' knowledge, expertise profiling and by building community oriented competency repositories, expertise gap analysis, expertise planning and development, etc. They should answer questions such as those presented in Figure 2.

In 2008, MPI introduced the *SAP® Enterprise Resource Planning* (ERP) system and thus has integrated in-house processes related to material management, sales and distribution, financial and management accounting, human management, project management, etc. The *SAP® Human Capital Management* (SAP HCM; www.sap.com), that is part of SAP ERP, supports core HR processes including employee administration, organizational management, time management, benefits, payroll, and legal reporting. SAP HCM covers the whole life-circle of an employee from her/his recruitment, training, development, deployment to retirement and thus enables tracking of employee movements and adequate tracking of changes in organizational structure. It supports skill management and gives managers and HR professionals reporting and analysis options that provide a real-time insight into employee qualifications.

During its introduction (Janev, Đokić, Minić & Vraneš, 2008), it was concluded that considerable modifications have to be made in the standard SAP HCM solution in order to meet the specific MPI requirements and the adopted ISO 9001 Quality Assurance standards (Mihajlo Pupin Institute, 2004). Modifications concern, firstly, the specifics of the MPI organizational structure and, secondly, the specifics of human resources data

Figure 2. Expert profiling vs. organization profiling



in the research sector. Taking into consideration the recommendations of the Serbian Ministry of Science for compilation of the Researchers files (Serbian National Scientific Council, 2008), the SAP employee master data was supplemented by data specific for scientific research environments including: scientific and professional skills and expertise, information about engagements in projects with details about roles and competences, scientific achievements (patents, technical solutions, scientific articles / books), other achievements / awards, etc. Presently, this system stores the information for about 450 current MPI employees and the complete employment history of 900 past MPI employees from 1960 until now. The established knowledge pool of employees' professional and scientific results and achievements is used by HR department staff on everyday basis for different reporting purposes.

With regards to expertise management, the disadvantage of this approach is that the resulted personal profiles rely on the self declared expertise. This approach is error-prone since the experts are typically subjective/biased and reluctant to update their files regularly. Also, manually created key qualification lists cannot be an exhaustive description of the person's expertise areas. Further on, the data centric approach in SAP HCM does not offer integration of whole documents, e.g. scientific papers or other publications that document the employee's expertise. Finally, the exported personal profiles documents are in a form of PDF document without possibilities for assigning explicit meaning to the document contents.

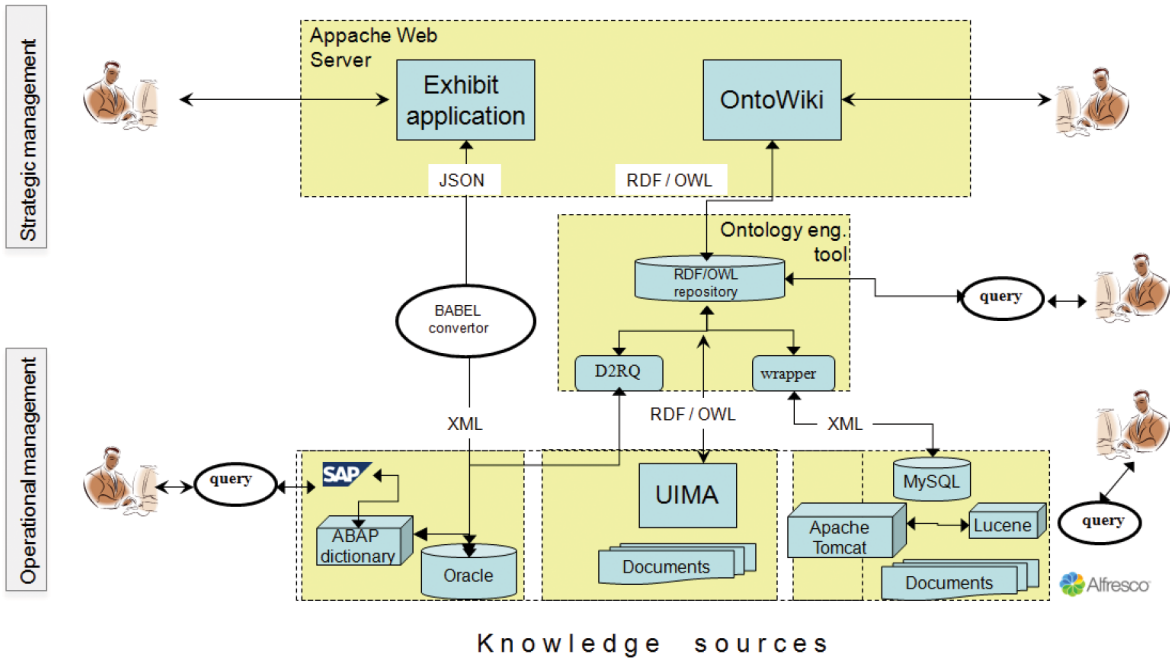
Semantic Web Based Approach to Expertise Profiling and Retrieval

Semantic Web technologies (i.e., ontologies and semantic web services) offer new possibilities for employees' expertise data integration and competency management (Schmidt, & Kunzmann, 2006; Müller-Riedlhuber, 2009; Bizer, Heese, Mochol, Oldakowski, Tolksdorf, & Eckstein, 2005). Roughly, ontologies correspond to generalized database schemes made up of concepts, and the relations between them, that are relevant for a specific domain of knowledge. However, an ontology not only provides a database scheme for storing metadata but also facilitates semantic content annotation, i.e, assigning semantics to a set of knowledge sources (documents), and definition of rules that are both tractable by machines and understandable for humans. Therefore ontologies, as was shown in the above analysis, are nowadays very often used for building integrated inter- and intra-organization business services, and to make the search and retrieval both efficient and meaningful.

Figure 3 depicts the components (building blocks) of the proposed holistic MPI knowledge infrastructure for the HR domain. Instead of proposing a data warehouse for data/knowledge integration (as it was practice 10-15 years ago), we are suggesting ontologies because they are explicit knowledge representation forms and made the instance data locked in legacy systems interoperable with similar applications at other sites. Using inference services, the explicit data could be checked for consistency and new knowledge could also be generated.

The holistic MPI knowledge infrastructure is based on three disparate knowledge sources: the SAP® HCM, Alfresco open-source Enterprise Content Management (ECM) software (www.alfresco.com) and UIMA (Unstructured Information Management Architecture, incubator.apache.org/uima/) framework. The Alfresco document base serves to integrate knowledge items such as published research papers, products' documentation, marketing materials, etc. Alfresco ECM is based on a set of document management (to import, classify, store, search, access and control content) and collaboration services. The Alfresco workflow engine enables organization and automation of the process activities. In addition, Alfresco integrates WebDAV server and Apache Lucene full text indexing and searching service. Using Lucene

Figure 3. The MPI human capital management solution



one can explore the document contents as well as the automatically extracted and user defined metadata. The new social software functionalities (e-mail, forum and blog support) enable capturing the additional valuable information about the users' expertise. In March 2009, OASIS, the international open standards consortium (see Organization for the Advancement of Structured Information Standards, http://www.oasis-open.org/) approved UIMA (Unstructured Information Management Architecture, http://incubator.apache.org/uima/) as standard technology for creating text-analysis components. This was a reason for exploring the functionalities of the UIMA architecture for analysis of unstructured content in the HR domain and introducing user-defined text-analysis components in the latest version of MPI HR knowledge infrastructure.

On top of SAP® HCM and Alfresco ECM we can use an engineering tool for establishing and managing an ontological knowledge base. Tools such as the *TopBraid Composer*™ (www.topquadrant.com), that is one of the most comprehensive commercially available semantic modeling and development environments, or the open source *Protégé Ontology Editor and Knowledge Acquisition System* (protege.stanford.edu) can integrate and further process the personal profile documents exported from SAP® HCM knowledge pool and metadata extracted from documents stored in the Alfresco document base. This approach allows enhancing the personal profiles with information automatically extracted from the user business activities.

The MPI ontological knowledge base was established using common ontologies such as FOAF, SIOC, DOAC, Dublin Core, and others. On the top of this knowledge base, the OntoWiki Portal was mounted that allows searching the ontological base and exporting the data in format recognizable for the broader Semantic Web community.

Table 3. Common public vocabularies/ ontologies applicable in the human resources domain

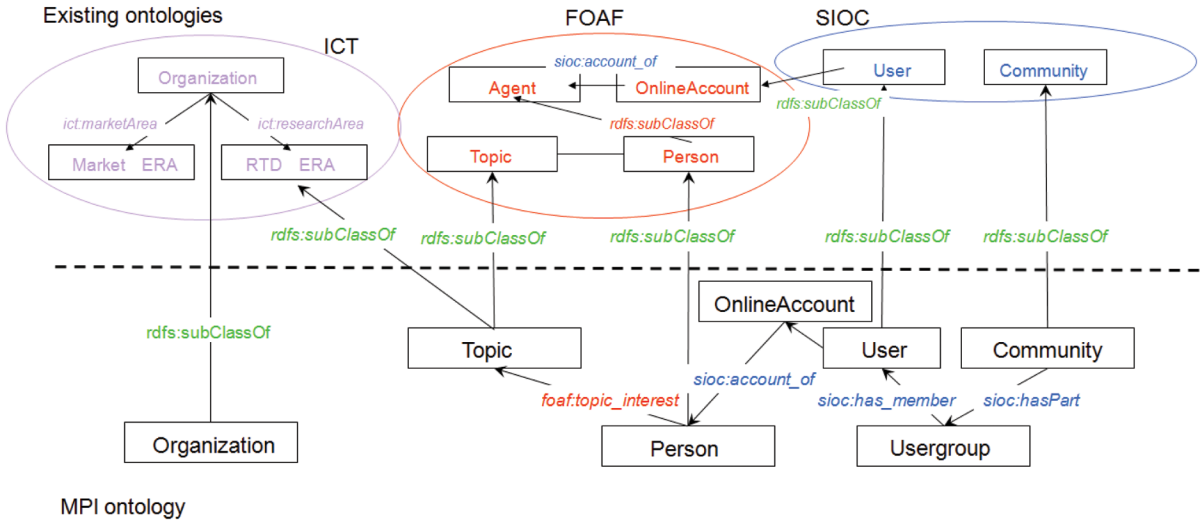
Vocabulary / Ontology	Definition
FOAF	Friend of a friend, a vocabulary for expressing personal profile and social networking information. It defines machine readable information/metadata for people, groups, organizations and other related concepts. Further information at: http://xmlns.com/foaf/0.1/.
DOAC	Description of a Career, a vocabulary for describing professional capabilities of workers gleaned, for example, from CVs or resumes. DOAC has been designed to be compatible with the European CV. Further information at: http://ramonantonio.net/doac/0.1/.
SIOC	Semantically-Interlinked Online Communities, an ontology for expressing information contained within online community sites (weblogs, message boards, wikis, etc.). Further information at: http://rdfs.org/sioc/.
bibTeX	A vocabulary for describing bibliographic data. Further information at: http://zeitkunst.org/bibtex/0.1/.
ICT	ICT taxonomy for describing the ICT research areas. Further information at: http://ec.europa.eu/research/era/index_en.html.

Building the MPI Ontological Knowledge Base

Prior to importing source data/documents into an ontological knowledge base, we have to model the ontological knowledge base in a way that it is optimized for semantic expertise search and retrieval. Common public ontologies relevant for building an expertise finding system in ICT domain are given in Table 3.

Figure 4 illustrates the interoperability between the MPI ontology and the public vocabularies/ ontologies. The main "components" of the MPI ontology are defined as subclasses of the public concepts (*foaf:Person*, *foaf:Organisation*, *foaf:Document*, *foaf:PersonalProfileDocument*, *doac:Education*, *doac:Skill*, *doac:Experience*), while links/relations between the components are defined as sub-properties of *foaf:interest*, *foaf:made/maker*, *foaf:topic*, *foaf:primaryTopic*, *foaf:homepage*, etc. Additional classes and prop-

Figure 4. Reusing existing ontologies



erties specific to the MPI are defined manually with elements from the RDF Schema (www.w3.org/TR/rdf-schema/) or defined automatically via the mapping facilities of the engineering environment during the data import from the relational database. As a result, the ontological database is a set of interlinking public ontologies and in-house ontologies in RDF/OWL format as is shown with the following code:

```
  <owl:Ontology rdf:about="">
  <owl:imports rdf:resource="http://
www.imp.com/publications.owl"/>
  <owl:imports rdf:resource="http://
www.institutepupin.com/projects.
owl"/>
  <owl:imports rdf:resource="http://
www.imp.com/ict.owl"/>
  <owl:imports rdf:resource="http://
www.wiwiss.fu-berlin.de/suhl/bizer/
D2RQ/0.1"/>
  <owl:imports rdf:resource="http://
purl.org/dc/elements/1.1/"/>
  <owl:imports rdf:resource="http://
purl.org/dc/terms/"/>
  <owl:imports
rdf:resource="file:/C:/TopBraidCom-
poser/WorkSpace/DOAC/doac01.rdf"/>
  <owl:imports rdf:resource="http://
www.w3.org/2004/02/skos/core"/>
  <owl:imports rdf:resource="http://
xmlns.com/foaf/0.1/"/>
  <owl:imports rdf:resource="http://
www.institutepupin.com/Researchers.
owl"/>
  <owl:versionInfo
rdf:datatype="http://www.w3.org/2001/
XMLSchema#string"
  >Created with TopBraid Composer</
owl:versionInfo>
  </owl:Ontology>
```

In order to profile the MPI activities with the topics relevant for MPI ICT fields we have initiated the MPI Business Topic Hierarchy with the following topics: Information and Computer Science, Automation and Control, Sensors and Measurements, Telecommunications, Traffic Management, and Robotics. The subtopics of the Information and Computer Science topic are: Business Information Systems, Communications, Databases, Document Management, DSS and Artificial Intelligence, Groupware and Collaboration, Semantic Web, System Architectures, etc.

Extracting Expertise Data from Unstructured Sources

Applying procedural programming, the UIMA ConceptMapper Annotator can be used to extract information from unstructured documents (e.g. published papers, project reports) and convert them into RDF instances. In order to extract topics of interest of experts from their working documents (publications and project reports), we used the CISTRANA ICT European Research Area taxonomy. The new properties *ict:topic_interest_project* and *ict:topic_interest_reference* were defined as subproperties of *foaf:topic_interest*. In addition, we included in the UIMA dictionary model a domain specific taxonomy that classified the computer skills of the experts with respect to ability of using tools/technologies. The new properties such as *ict:useModellingTool*, *ict:useDBMS*, *ict:useOperatingSystem*, *ict:useSoftwareSolution*, etc. were defined as subproperties of *doac:skill*. The exported output from the user-defined text-analysis component looks as follows:

```
  <ict:Person rdf:ID="ID_1526">
  <Global_ID rdf:datatype="http://
www.w3.org/2001/
XMLSchema#integer">1526</Global_ID>
  <ict:topic_interest_project
rdf:resource="http://www.institute-
pupin.com/ict.owl#Semantic_Technolo-
gies"/>
  <ict:topic_interest_reference
```

```
  rdf:resource="http://www.institute-
pupin.com/ict.owl#Imaging_Image_Pro-
cessing_Pattern_Recognition"/>
  …
  <ict:useOperatingSystem
rdf:resource="http://www.institutepu-
pin.com/skills.owl#Windows"/>
  <ict:useDBMS rdf:resource="http://
www.institutepupin.com/skills.owl#MS_
SQL_Server"/>
  <ict:useSoftwareSolution
rdf:resource="http://www.institutepu-
pin.com/skills.owl#SAP_ERP"/>
  …
  </ict:Person>
```

Searching the MPI Ontological Knowledge Base

Expertise profiling is a technique for identifying and classifying knowledge and expertise of individuals. Assuming that information sources described previously could provide plenty of data about an employee's expertise, we have introduced

- *imp:PersonalProfileDocument*, based on *foaf:PersonalProfileDocument* class that aims to integrate all expertise data for an employee, and
- *imp:RnDProfile* that serves to infer the R&D profile of an organization.

Using semantic relations such as *foaf:topic_interest*, *foaf:primaryTopic*, *doac:organization* links can be established between the classes *imp:Person*, *imp:Organization*, *imp:PersonalProfileDocument*, *ict:RTD_ERA* and questions can be answered such as the ones presented in Figure 2 using the SPARQL Query Language for RDF.

Figure 5 gives an example of a search for experts with "System Analysis" qualifications in "Semantic Technologies" area when SPARQL query is run interactively via the SPARQL query editor in TopBraid Composer.

A far more comfortable way for querying the ontological base is, however, to use free of charge open-source tools, such as the OntoWiki (ontowiki.net), in order to improve the expertise search, analysis and retrieval. OntoWiki (Auer, 2008) uses SPARQL to access the underlying databases. Using the OntoWiki tool (see Figure 6), the RDF/OWL expertise data can be full-text searched (see the "Search" panel in the upper left corner), browsed using semantic relations (see the "Classes" panel in the lower left corner) and searched using faceted navigation method (see the "Filter" panel in the right most side).

CONCLUSION

The study presented in this article analyses the current status and trends in the Semantic Web and discusses the adoption the Semantic Web

Figure 5. SPARQL sample query against the ontological knowledge base

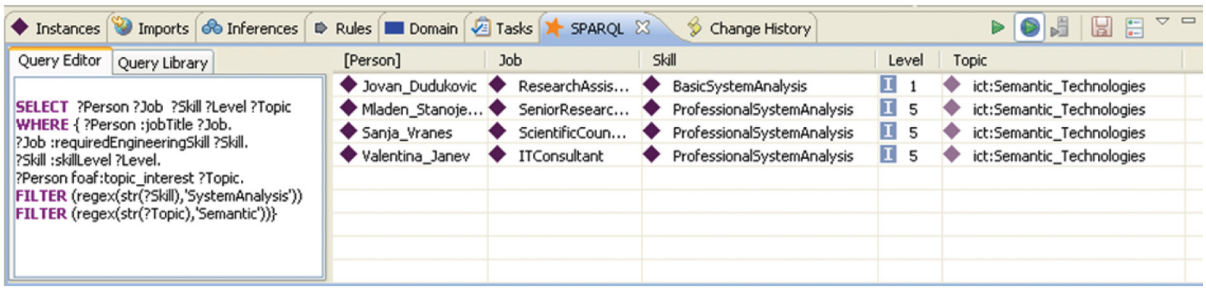
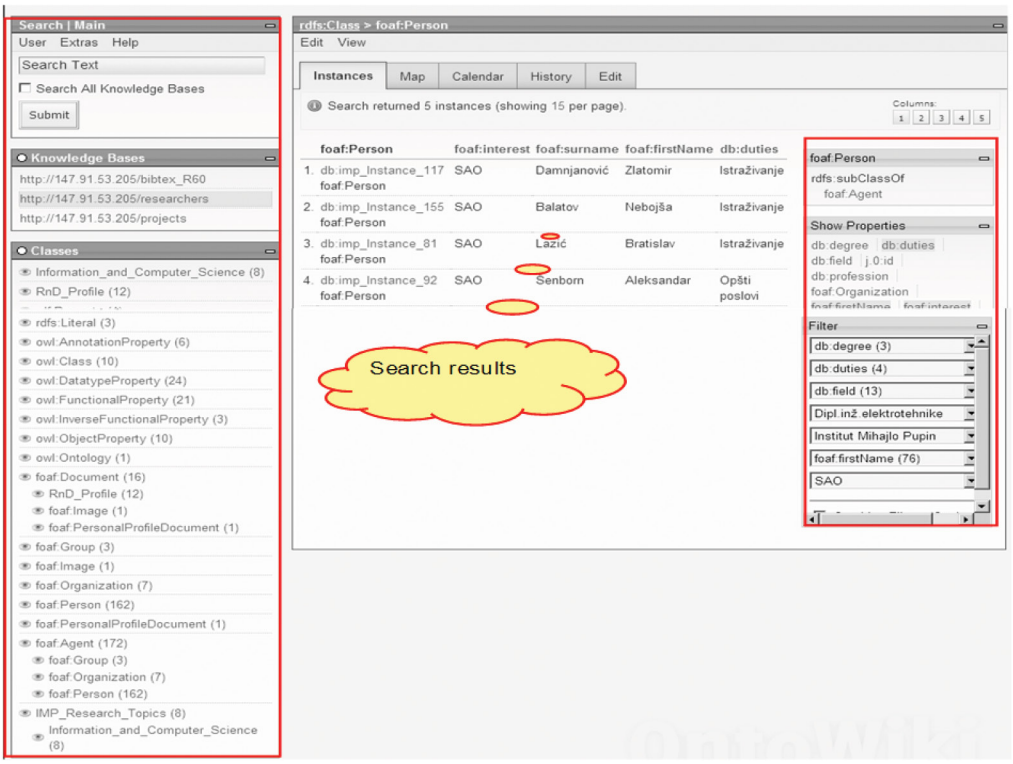


Figure 6. Expertise search with OntoWiki



technologies in practice. The results of the analysis have shown that semantic-based technologies have been increasing their relevance in both the research and business worlds in recent years. W3C, together with universities and IT research organizations, and in cooperation with the major software companies and government agencies, has already accepted many specifications, guidelines, protocols, software, and tools that are the basis for realization of the Semantic Web vision. Innovative enterprises (the Mihajlo Pupin Institute, for instance) interested in catching new opportunities from the Semantic Web and also developing new business models are already introducing semantic technologies that facilitate data integration and interoperability, as well as improve search and content discovery. Considering the benefits from introducing SW applications, the analyzed early adopters from the W3C collection of Case Studies and Use Cases report that SW technologies are useful for sharing and reuse of data, to improve search and to establish explicit content relations.

From the presented Mihajlo Pupin Institute case study and the overall analysis, we may conclude that the Semantic Web technologies are finding their ways to applications, and that rather than being another research issue, the Semantic Web technologies have emerged as solutions for the new requirements and challenges of future enterprise information systems.

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Chapter 31
Human Talent Forecasting using Data Mining Classification Techniques

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ABSTRACT

Talent management is a very crucial task and demands close attention from human resource (HR) professionals. Recently, among the challenges for HR professionals is how to manage organization's talents, particularly to ensure the right job for the right person at the right time. Some employee's talent patterns can be identified through existing knowledge in HR databases, which data mining can be applied to handle this issue. The hidden and useful knowledge that exists in databases can be discovered through classification task and has been widely used in many fields. However, this approach has not successfully attracted people in HR especially in talent management. In this regard, the authors attempt to present an overview of talent management problems that can be solved by using this approach. This paper uses that approach for one of the talent management tasks, i.e., predicting potential talent using previous existing knowledge. Future employee's performances can be predicted based on past experience knowledge discovered from existing databases by using classification techniques. Finally, this study proposes a framework for talent forecasting using the potential Data Mining classification techniques.

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INTRODUCTION

Human capital is a definitely critical issue and it demands close attention from the top management and Human Resource (HR) professionals in any organization. Human Resource Management (HRM) that deals with human capital aims to facilitate organizational competitiveness; enhances productivity and quality; promotes individual growth and development; and complies with legal and social obligation (DeNisi & Griffin, 2005). Besides that, an organization needs to struggle effectively in term of cost, quality, service and innovation in order to achieve organization's target. All these depend on having enough right people, with the right skills, employed in the appropriate locations at appropriate points in time. Recently, among the challenges for HR professionals is managing talent, especially to ensure the right person for the right job at the right time. These tasks involve a lot of managerial decisions, which are sometimes very ambiguous, uncertain and difficult. On the other hand, HR decision practices depend on various factors such as human experience, knowledge, preference and judgment. These factors cause inconsistence, inaccuracy, inequality and unforeseen decisions. Consequently, in promoting individual growth and development, this situation can often make people sense injustice and this can also influence the productivity of an organization. In talent management, to identify the existing talent for the right job is the topmost challenge for HR professional (A TP Track Research Report, 2005); and at present, most of the determination processes use human experience knowledge that is supported with evidence to justify the potential talent.

The advancement of technology has proposed some new approaches that can be used to solve some decision making problems. Data mining (DM) and also known as Knowledge Discovery in Database (KDD) approach is a computer technology that can be used to handle some talent management issues. DM is one of the Artificial Intelligent (AI) technologies that have been developed for exploration and analysis in large quantities of data to discover meaningful patterns and rules. In HRM, HR data can provide a plenty of resource for knowledge discovery and decision support tools. Therefore, the application using DM approach has not attracted much attention in HRM field (Ranjan, 2008) compared to other fields such as in marketing, financial, manufacturing, medical and many others. DM approach has several tasks such as classification and prediction; concept description; association; cluster analysis; outlier analysis; trend and evaluation analysis; statistical analysis and others. Over the years, data mining has evolved various techniques to perform tasks including database oriented techniques, statistic, machine learning, pattern recognition, neural network, rough set and etc. Classification and prediction technique is among the popular task in DM. For that reason, in this article we attempt to use DM classification techniques for managing talent tasks especially to identify existing talent by predicting the performance using past experience knowledge. Finally, this study aims to suggest the framework for talent forecasting using selected DM classification techniques.

This paper is organized by describing related work on HR decision system that uses Artificial Intelligent technology. Next, some issues in talent management are discussed while reviewing HR researches that use the DM approach. Then DM classification techniques are discussed followed by an explanation on how talent management tasks use the DM approach in their problems solving and suggests framework for talent forecasting using DM classification techniques. Finally, the paper ends with the concluding remarks and future research directions are also identified.

HR DECISION APPLICATION

Nowadays, HR has been linked to improve productivity, good customer service, greater profit-

ability and on the whole organizational survival. Successively to reach such link, management must not only face contemporary issues of human resource but also deal with future challenges to HRM effectively (Stavrou-Costea, 2005). HRM tasks involve a lot of managerial decisions and professionals that are highly needed to focus the goal for each of HR activities such as: staffing task is to locate and secure competent employees; training and development task to adapt competent workers to the organization and help them obtain up-to date skill, knowledge and abilities; motivation task to provide competent and adapt employees who have up-to date skill, knowledge and abilities with an environment that encourage them to exert high energy level; and maintenance task is to help competence and adapt employees who have up-to date skill, knowledge and abilities and exert high level energy level to maintain their commitment and loyalty to the organization (DeCenZo & Robbins, 2005).

Among the challenges for HRM professionals are issues regarding health, managing talent, employee rewards, retention, training and development, technology innovation, tribalism, nepotism and corruption. However, among the major potential prospects for HRM is technology's innovation, selection and implementation (Okpara & Wynn, 2008). In addition, the benefits of technology applications and innovation in HRM are to easily deliver information from the top to bottom workers in an organization, easily to communicate with employees and it is easier for HR professionals to formulate managerial decisions. Nowadays, HR decision application can be widely used in any type of decision making tasks as contribution to the achievement of HR goals. The potentials of HR decision applications are to increase the productivity, consistent in performance and the institutionalized expertise where the system capabilities are embedded into the specific programs (Hooper, Galvin, Kilmer, & Liebowitz, 1998).

The technology's innovation in HRM can help HR manages and makes decision in some decision making process especially for decisions which involved human judgment. Artificial Intelligent technology is a current and useful technology that can be embedded with any HR decision making tool towards producing more precise decision in decision making process. In fact, there are many techniques or approaches in Artificial Intelligent that can be used in a development of the advance decision making tools. Besides that, this technology was adopted in many fields such as in manufacturing, management, development, planning, finance, medical and many others (Jantan, Hamdan, & Othman, 2008b). Most studies in the HR decision application that use Artificial Intelligent techniques focus only on the specific HRM domains such as in personnel selection, training, scheduling and job performance (Table 1). Besides that, the advance computer technologies used for most of the HR decision applications are expert system or Knowledge-based system (KBS), and focuses especially on HR personnel selection and training tasks. The commercial emergence of KBS information technology applications represents a tremendous opportunity to improve the practice of HRM (Martinsons, 1995). The KBS benefits are more permanent, easier to duplicate, less expensive and automatically documented. On the other hand, the limitations of KBS systems are difficult to capture informal knowledge; knowledge has not been documented and difficult to verbalize. The techniques used to verify and validate the conventional systems are considered to be insufficient and KBS-specific methods are still immature. Due to these reasons, currently, the new HR decision application researches use other computer technology approaches especially that are related to Artificial Intelligent technologies. In this case, for personnel selection, they use Data Mining (Chien & Chen, 2008; Tai & Hsu, 2005) and Neural Network approaches (Liang Chih Huang, Huang, Huang, & Jaw, 2004; Huang, Wu, Kuo, & Huang, 2001) (Table 1).

Table 1. HR decision applications using AI technology

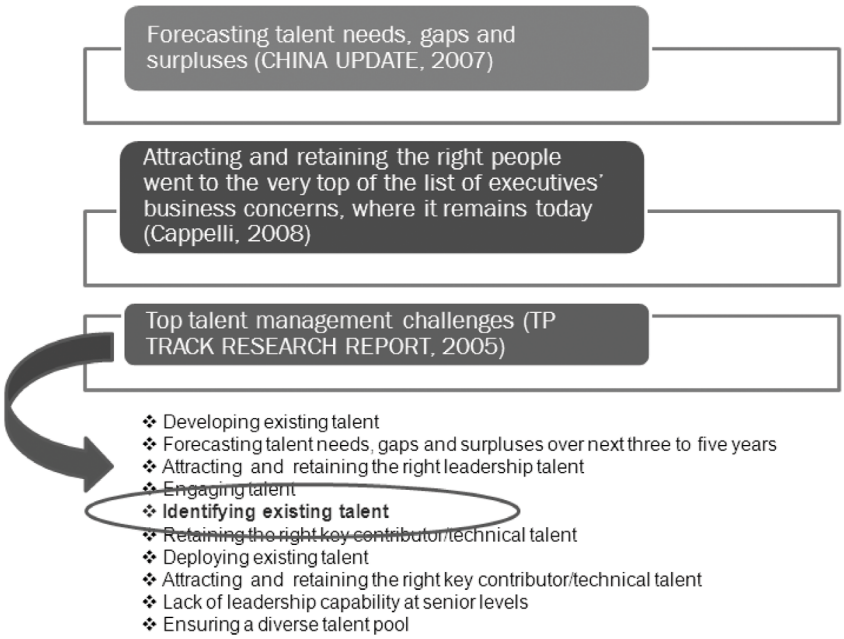
Category	***Techniques used***
Staffing Personnel Selection	*Expert system/* *Knowledge-based system (Hooper et al., 1998) and (Mehrabad & Brojeny, 2007)* *Data Mining (Huang, Tsou, & Lee, 2006) and (Chien & Chen, 2008)* *Artificial Neural Network (Liang Chih Huang et al., 2004)and (Huang et al., 2006)*
Training and Development Training Development	 *Knowledge-based system (Liao, 2007)* *Expert System (Chen, Chen, Wu, & Lee, 2007)* *Rough Set Theory (Chien & Chen, 2007)*
Motivation Job Attitudes Performance appraisal	 *Artificial Neural Network (Tung, Huang, Chen, & Shih, 2005)* *Fuzzy logic (Ruskova, 2002)*
Administration Meeting scheduling	 *Software agent (Glenzer, 2003)*

However, in this study, there are very few researches that use Artificial Intelligent techniques and do research in HR decision application field. Besides that, the focus domains are also limited to the specific problem such as in personnel selection and training activities. Recently, in information technology era, advance HR decision applications that are supported by Artificial Intelligent techniques can be used as a tool to help human resource managers in their decision making problems.

TALENT MANAGEMENT

In any organization, talent management has become an increasingly crucial method of approaching HR functions (American Management Association, 2009; Hart, 2006; Hiltrop, 1999; Personneltoday, 2008; PricewaterhouseCoopers, 2008; SuccessFactors, 2007; Wilkins, 2008). Talent management involves human resource planning that regards processes for managing people in organization especially to develop existing talent and forecasting talent needs (A TP Track Research Report, 2005; Taleo Research, 2009). In other studies, talent management can be defined as an outcome to ensure the right person for the right job; process to ensure leadership continuity in key positions and encourage individual advancement; and decision to manage supply, demand and flow of talent through human capital engine (Cubbingham, 2007). Failures in talent management are an ongoing source of pain for executives in modern organization and it will cause surpluses to shortfalls of talent (Cappelli, 2008). Talent is considered as any individual who has the capability to make a significant difference to the current and future performance of the organization (Lynne, 2005). However, talent can also be categorized as valuable, rare and difficult to-imitate but the specific prescription regarding talent are not always clear. Besides that, talent is critical because it is the role of a strong HR function to manage everyone for high performance and business trends now place talent in general more valuable (Lewis & Heckman, 2006). In HRM, talent management is very important and needs full attentions from HR professionals since this task deals with organization's valuable asset. Nowadays, most organizations concentrate on how they can attract and retain talent to achieve organization target. Figure 1 shows some issues related to talent management; and the top talent management challenges (A TP Track Research Report, 2005), and one of them is to identify the

Figure 1. Talent management challenges

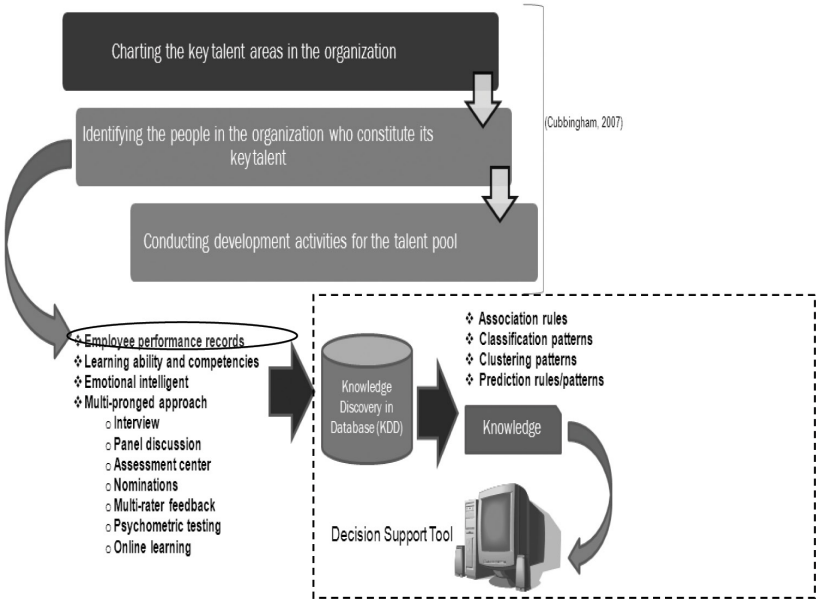


existing talent which is closely related to talent forecasting (Jantan, Hamdan, & Othman, 2008a).

Recently, in modern organization, a new way to think about talent management is by looking at manufacturing sector. In that case, we can say how forecasting product demand is very important in manufacturing, which is comparable to forecasting talent needs in an organization. In talent management, talent is an organization product, which is how employee advance through development jobs and experiences are remarkably similar to how products move through a supply chain; reducing bottlenecks the block advancement, speeding up processing time, improving forecast to avoid mismatches (Cappelli, 2008). For those reasons, we can apply the same approach to identify existing talent in an organization by using forecasting idea. Figure 2 shows processes involved to identify the people in the organization who constitute the key talents using some common evaluation approaches (Cubbingham, 2007; Taleo Research, 2009). Besides that, it also demonstrates how Knowledge Discovery in Database (KDD) approach can be used to solve some talent management problems.

Furthermore, forecasting future talent for an organization is similar to forecasting product demand in business field. In other words, we can apply any suitable prediction approaches to predict future talent. In the literature study, prediction approaches can be categorized into two approaches; the first approach is statistical approach and the second one is intelligent approach which is concerned with Artificial Intelligent technology. There are many intelligent approaches are used in prediction application such as KDD, Artificial Neural Network, Artificial Immune System (AIS), Support Vector Machine (SVM) and many others (Jantan et al., 2008b). Due to that reason, this study attempts to apply KDD approach for talent identification which is regarding the key talent in an organization. The employee performance and talent records that are stored in databases will be used to discover talent patterns and prediction model for selected category of employee in an organization. The talents

Figure 2. Talent management and KDD approach



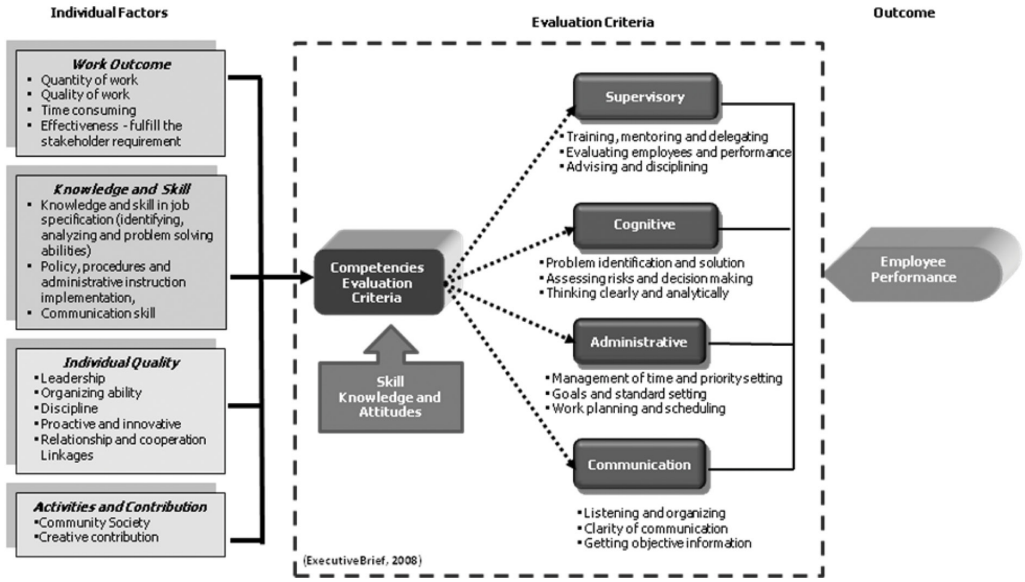
of employee in general are according to the evaluation criteria that involved in evaluation process. However, different employee has different criteria of evaluation and the most significant factor involved in evaluating employee's performance is individual factor. In that factor, the work outcome; knowledge and skill; individual quality; and activities and contribution area are among the main criteria especially for management talent (Adobor, 2004). Besides that, in management and professional performance evaluation, the competency-based criteria are used and it involves skill, knowledge and attitude factors. The competency-based evaluation criteria can be categorized into four main components; supervisory, cognitive; administrative; and communication (Executive-Brief, 2008). Each of the components contains performance criteria that should be considered in the evaluation process, as stated in Figure 3.

In many organizations, information regarding employee's performance can be gathered through affiliated sections in HR department, such as personnel, training, employee development and others. HR databases contain rich, meaningful and hidden knowledge that can be used for future planning. In the advancement of technology, we can get all information especially related to employee's performance through the respective HR databases. The selected data that are used for prediction is associated to the factors involved in prediction. In Data mining process, all evaluation criteria for each factor will be represented as attribute. The attribute contains information regarding data that we have. KDD or Data mining approach can be used to discover the hidden and meaningful knowledge for the existing data and that will be discussed in the next section.

DATA MINING IN HRM

DM and Knowledge Discovery in Database (KDD) are used interchangeable in this article. DM is a step to KDD and currently receives great attention and is recognized as a newly emerging analysis tool (Tso & Yau, 2007). Recently, DM has given a great deal of concern and attention in the information industry and in society as a whole. This is due to the wide accessibility of enormous amounts of data and the important need for turning

Figure 3. Talent factors in evaluation process



such data into useful information and knowledge (Han & Kamber, 2006). Data mining is a machine learning approach, which has several tasks such as classification and prediction; concept description; association; cluster analysis; outlier analysis; trend and evaluation analysis; statistical analysis and others. Computer application interfaces with DM tool can help executives to make more informative and objective decisions. Besides that, it can help managers to retrieve, summarize and analyze decision related data to make wiser and more informed decisions. Over the years, DM has involved various techniques including statistics, neural network, decision tree, genetic algorithm, and visualization techniques. Moreover, DM has been applied in many fields such as finance, marketing, manufacturing, health care, customer relationship and etc. Nevertheless, its application in HRM is rare (Chien & Chen, 2008) (Table 2).

Nowadays, there are some interests on solving HRM problems using DM approach (Ranjan, 2008); and Table 2 lists some of the HR tasks that use DM techniques as a tool to solve some HR problems. There are very few studies related to prediction application in HR that uses this approach. However this approach is quite popular in HR personnel selection problems. From the literature study, prediction applications in HRM

Table 2. Human resource researches that use data mining techniques

Activity in HRM	***Data Mining Techniques***
Project Assignment (Huang et al., 2006)	*Fuzzy Data Mining and Fuzzy Artificial Neural Network*
Personnel selection (Chien & Chen, 2008), Job attitudes classification (Tung et al., 2005) Performance Evaluation (Xin, 2008)	*Decision tree*
Training (Chen et al., 2007)	*Association rule mining*
Personnel Selection – Recruit and Retain Talents (Chien & Chen, 2007)	*Rough Set Theory*
Personnel Selection (Tai & Hsu, 2005)	*Fuzzy Data Mining*

are infrequent, there are some examples such as to predict the length of service, sales premiums, to persistence indices of insurance agents and analyze mis-operation behaviors of operators (Chien & Chen, 2008). In Data mining researches, classification and prediction techniques are among the popular task. The classification techniques are known as supervised learning, where the class level or classification target is already identified. In that case, we can classify the new data with classification target as our prediction result. Due to these reasons, in this study, we attempt to use DM approach for talent management as a method to predict the potential talent in an organization by using Data mining classification techniques.

CLASSIFICATION IN DATA MINING

DM tasks are generally categorized as clustering, association, classification and prediction(Chien & Chen, 2008; Ranjan, 2008). DM has involved various techniques to perform tasks including database oriented techniques, statistic, machine learning, pattern recognition, neural network, rough set and etc. Databases or data warehouse are rich with hidden information that can be used to provide intelligent decision making. Intelligent decision refers to the ability to make automated decision that is quite similar to human decision. In other words, prediction and classification techniques are among the methods that can be used to produce intelligent decision. Prediction and classification in Data mining are two forms of data analysis that can be used to extract models describing important data classes or to predict future data trends (Han & Kamber, 2006). Besides that, classification process has two phases; the first phase is learning process where the training data are analyzed by classification algorithm (Figure 4). The learned model or classifier is presented in the form of classification rules or patterns. The second phase is the use of model for classification and, test data are used to estimate the accuracy of classification rules. If the accuracy is considered acceptable, the rules can be applied to the classification of new data or for unseen data. Nowadays, many classification methods have been proposed by researchers in machine learning, pattern recognition, and statistics. Some of the techniques that are used for classification in Data mining are decision tree, Bayesian methods, Bayesian networks, rule-based algorithms, neural network, support vector machine, association rule mining, k-nearest-neighbor, case-based reasoning, genetic algorithms, rough sets and fuzzy logic. Thus, decision tree and neural network are found useful in developing predictive models in many fields (Tso & Yau, 2007). Some of the techniques that are used for data classification are decision tree, Bayesian methods, Bayesian network, rule-based algorithms, neural network, support vector machine, association rule mining, k-nearest-neighbor, case-based reasoning, genetic algorithms, rough sets, fuzzy logic. In this study, our discussion focuses on three classification techniques, i.e., decision tree, neural network and Nearest-neighbor that shown in Table 3.

Decision tree and neural network are found useful in developing predictive models in many fields (Tso & Yau, 2007). The advantage of decision tree technique is that, it does not require any domain knowledge or parameter setting, and is appropriate for exploratory knowledge discovery. The second technique is neural-network which has high tolerance of noisy data as well as the ability to classify pattern on which they have not been trained. It can be used when we have little knowledge of the relationship between attributes and classes. The Nearest-neighbor technique is an instance-based learning that uses distance metric to measure the similarity of instances. All these three classification techniques have their own advantages and disadvantages and depend on the type of data used. Due to this reason, we attempt to explore selected techniques from three main classification techniques in the next experiment.

Figure 4. Classification in data mining process

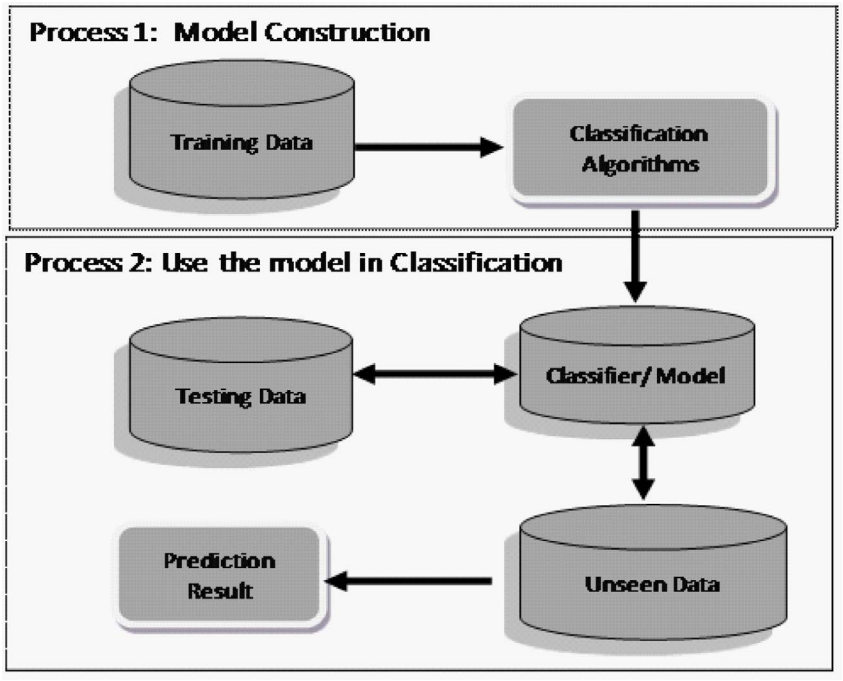


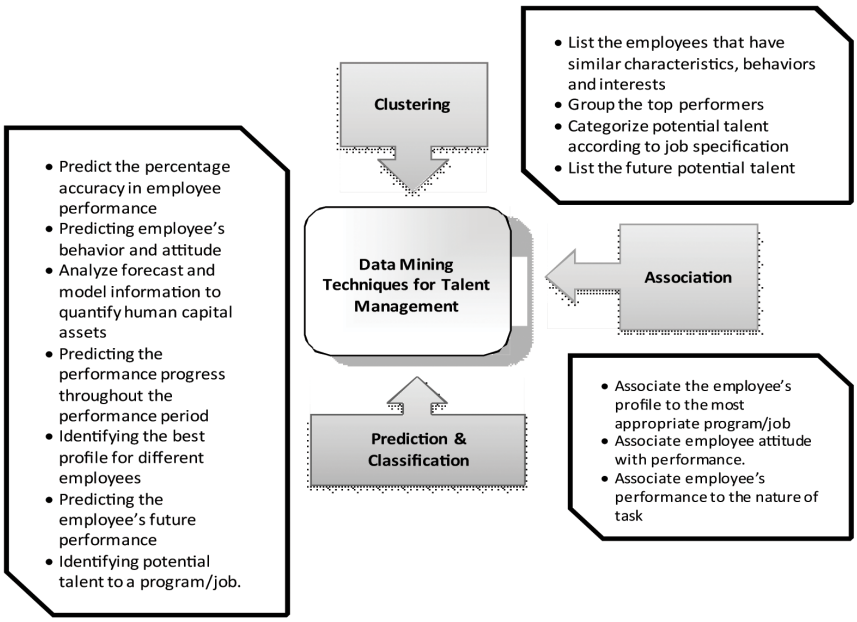
Table 3. Potential data mining classification techniques

Data Mining Techniques	***Classification Algorithm***
Decision Tree	***C4.5*** *(Decision tree induction – the target is nominal and the inputs may be nominal or interval. Sometimes the size of the induced trees is significantly reduced when a different pruning strategy is adopted).* ***Random forest*** *(Choose a test based on a given number of random features at each node, performing no pruning. Random forest constructs random forest by bagging ensembles of random trees).*
Neural Network	***Multi Layer Perceptron*** *(An accurate predictor for underlying classification problem. Given a fixed network structure, we must determine appropriate weights for the connections in the network).* ***Radial Basic Function Network*** *(Another popular type of feed forward network, which has two layers, not counting the input layer, and differs from a multilayer perceptron in the way that the hidden units perform computations).*
Nearest Neighbor	***K*Star (****An instance-based learning using distance metric to measure the similarity of instances and generalized distance function based on transformation*

TALENT MANAGEMENT USING DATA MINING

In the literature studies, most of the DM researches in HR problems focus on personnel selection and very few discussions in other activities such as planning, training, talent management and etc (Table 1). Recently, with the new demand and increased visibility of HR management, therefore, HRM seeks a strategic role by turning to DM methods (Ranjan, 2008). This can be done by identifying generated patterns from the existing data in HR databases to useful knowledge. In this article, we focus on identifying the patterns related to talent. The patterns can be generated by using some major DM techniques and it is shown in Figure 5.

Figure 5. Data mining for talent management



The matching of Data mining problems and talent management needs are very important, in a way to determine the suitable Data mining techniques. In this study, we propose talent forecasting framework using KDD approach and we attempt to hybrid the suitable Data mining classification technique and knowledge-based system (KBS) approaches in system development for HR application. This integration between KBS and Data mining approaches can allow users to interact with the system and get the forecasting results and explanations about the decision made by the knowledge discovered from the database shown in Figure 6. The proposed talent forecasting framework contains three main modules as follows:

Knowledge Discovery in Database

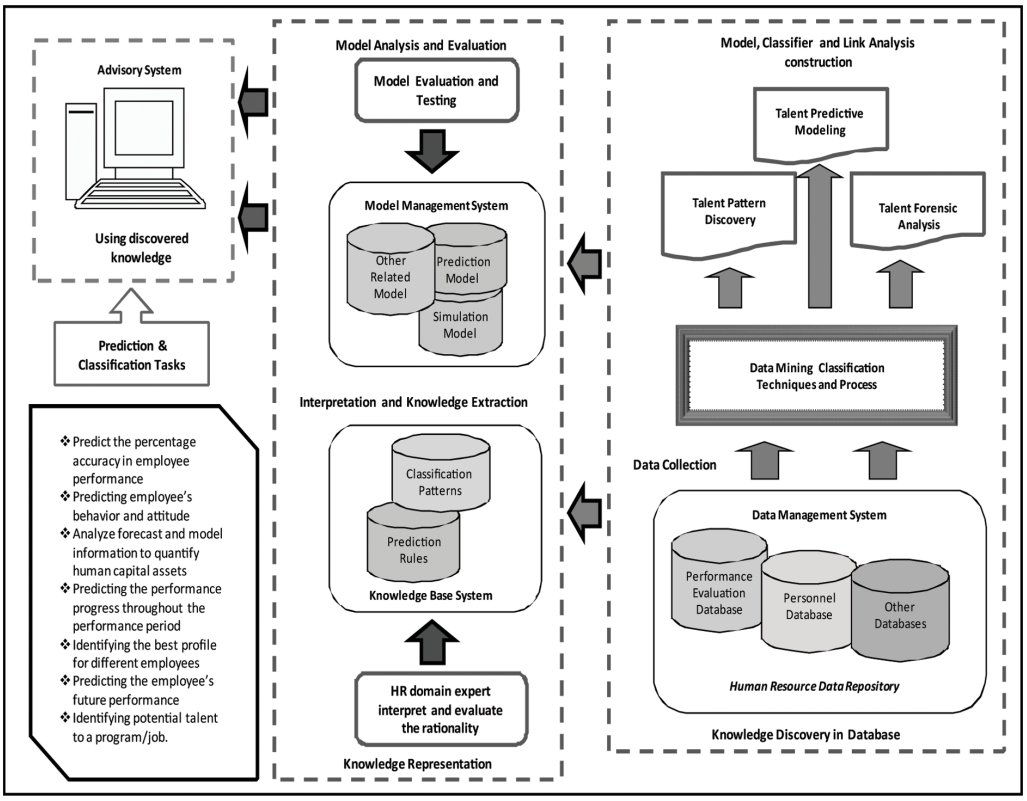
This module uses Data mining approach to develop predictive model by using machine learning approach. The meaningful talent pattern and rules are discovered from existing HR database system. In this case, we will use HR databases that are related to talent performance such as data from personnel, training, administrative, performance evaluation data and other related databases. The selected databases need to be evaluated through data preprocessing process. This process is a major task in Data mining. Data preprocessing have data cleaning, data integration, data transformation and data reduction processes.

Besides that, all these processes involved tasks such as dataset selection, dealing with missing values, reducing data dimension and complexity; and data enrichment. The relevant data will be transformed into useful knowledge as predictive model through talent predictive modeling, generated rules by talent pattern discovery and extracted patterns to find unusual data elements by forensic analysis. All these hidden and meaningful knowledge are very useful for talent management tasks.

Model and Knowledge Based System

The model based system is used to store constructed model, existing simulation model and any related models that can be used in decision

Figure 6. Suggested framework for talent forecasting



making process especially related to talent forecasting. In fact, before we can embed the talent performance predictive model in this application, the model must be evaluated and tested through model analysis and evaluation phase that involves the domain experts. The knowledge based system is known as interpretation and knowledge extraction phase. This component contains a set of facts and rules regarding decision making elements. In the suggested framework, KBS will store information about talent patterns, association rules, forensic analysis results which is related to the talent forecasting. The potential talent in future will be recognized by using facts and rules in this component. The rules and pattern will be evaluated and interpreted by the HR domain experts.

Advisory System

This module will react as inference engine in this application. This component supervises the interactions among the various parts of application such as knowledge-base and model based components. Basically, the component will respond as interface between user and the system itself, especially to display the prediction results, justify and explain the decision and sometimes if needed it can instruct KBS to update the existing knowledge. In this study, the advisory system will display the potential talent with some reasons and advises, and in advance can suggest the possible tasks for them.

In this article, the suggested framework concentrates on talent management purposes which are used to identify the potential talent that is suitable with the talent management needs. On the

other hand, this framework can also be applied to other DM tasks such as association, and clustering to solve some talent management problems.

CONCLUSION

This article has described the significance of the study and discussed issues in talent management and Data mining approach in HR application. As a result, we propose a HR application framework using Data mining classification technique for talent forecasting to identify potential talent in an organization. From the literature study, most researchers have discussed HR applications using Data mining from different approaches. However, there should be more HR applications and Data mining techniques applied to different problem domains in HRM field to broaden our horizon of academic and practice work on HR applications using Data mining classification approach. Some experiments to identify the most suitable Data mining classification will be conducted and the predictive model will be generated through the selected technique. The generated model will be embedded to the system as decision support tool in decision making process through system development phase. Finally, the ability to continuously change and obtain new understanding is the power of HR application, and this can be one of the HR application future works.

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Chapter 32
An Introduction to Structural Equation Modeling (SEM) and the Partial Least Squares (PLS) Methodology

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ABSTRACT

Over the past 15 years, the use of Partial Least Squares (PLS) in academic research has enjoyed increasing popularity in many social sciences including Information Systems, marketing, and organizational behavior. PLS can be considered an alternative to covariance-based SEM and has greater flexibility in handling various modeling problems in situations where it is difficult to meet the hard assumptions of more traditional multivariate statistics. This chapter focuses on PLS for beginners. Several topics are covered and include foundational concepts in SEM, the statistical assumptions of PLS, a LISREL-PLS comparison and reflective and formative measurement.

MAIN FOCUS

What is Structural Equation Modeling?

Structural equation Modeling (SEM), also referred to as 'causal Modeling', has become a popular tool in the methodological arsenal of social science researchers (Bagozzi & Baumgartner, 1994; Chau, 1997). SEM is a method for representing, estimating, and testing a theoretical network of (mostly) linear relations between variables, where those variables may be either observable or directly unobservable (Hair, Black, Babin, Anderson, & Tatham, 2006). The multivariate technique combines aspects of multiple regression (examining dependence relationships) and factor analysis (representing unmeasured concepts or factors with multiple variables) to estimate a series of interrelated dependence relationships simultaneously.

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The issue of simultaneity is especially important since the measures often derive their meaning from the conceptual network within they are embedded. SEM is grounded in three main premises. First, from the field of psychology comes the belief that the measurement of a valid construct cannot rely on a single measure. Second, from the field of economics comes the conviction that strong theoretical specification is necessary for the estimation of parameters. Third, from the field of sociology comes the notion of ordering theoretical variables and decomposing types of effects. Taken as a whole, these ideas have emerged into what is called latent variable structural equation modeling (Falk & Miller, 1992).

The two common approaches for SEM are the covariance-based approach used in LISREL (Linear Structural Relations), AMOS (Analysis of Moment Structures), and EQS (Anderson & Gerbing, 1988; Bentler, 1995; Bollen, 1989; Bollen & Long, 1993; Byrne, 1994; Jöreskog & Sörbom, 1982 1988), and the variance-based approach used in PLS-PC, PLS-Graph, Smart-PLS and XLSTAT-PLS (Chin, 1995 1998; Esposito Vinzi, Chin, Hensler, & Wang, 2010; Fornell & Cha, 1994; Hansmann & Ringle, 2004; Wold, 1985). Both approaches belong to the family of techniques that Fornell (1987) and Lohmoller (1989) call "*the second generation of multivariate data analysis techniques*". Unlike first generation techniques such as multiple regression, principal components and cluster analysis, canonical analysis, discriminant analysis and others, second generation models are able to bring together psychometric and econometric analysis in such a way that the best features of both are exploited (Fornell & Larcker, 1981; Fornell, 1987). SEM can therefore be viewed as an extension of several first generation multivariate techniques (Hair et al. 2006) because they incorporate the psychometrician's notion of unobserved latent variables (constructs) and measurement error in the same estimation procedure. In social sciences research theoretical constructs are typically difficult to operationalize in terms of a single measure, and measurement error is often unavoidable. Therefore, given an appropriate statistical testing method, structural equation models are recognized as indispensable for theory evaluation in this type of research.

Traditional first generation techniques have a number of limitations. First, the statistical tests of the regression coefficients (and the use of procedures like stepwise regression) make assumptions of the data that may not hold, such as sufficient sample size and multivariate normal distribution. Second, the two-step process of aggregating variables to form variate scores and then testing the relationships among these variates presumes that the relative importance of items in each composite is portable across theoretical contexts, an assumption that may not be valid (Fornell, 1982). In traditional multiple regression and path analysis, scales of the latent variables are created by either averaging, summing, or according to some kind of factor analysis of observed variables, the results are then imported into a regression (or path) model. The assumption is that such scores are portable, an assumption that Fornell (1987) argued is not tenable. This two-stage analysis can potentially result in invalid estimates, since it assumes that the relationship among the measures of a construct is independent of the theoretical context within which the measures are embedded (Fornell, 1982; Fornell & Yi, 1992; Hirschheim, 1985). Third, all measurement is made with error, and though error may be estimated using methods such as factor analysis, these error estimates do not explicitly figure in regression analysis, nor are they estimated within the context of the theory being tested (Fornell, 1982). Fourth, each first generation technique can examine only a single relationship at a time i.e., a single relationship between a dependent variable and an independent variable (Hair et al. 2006). In contrast SEM can

estimate many equations at once, and they can be interrelated, meaning that the dependent variable in one equation can be an independent variable in other equations.

Both covariance-based and variance-based approaches such as LISREL and PLS allow for causal interpretations of the relations between the latent variable and the indicators, as well as the relations among the latent variables. Both techniques also allow constructs to be measured with multiple indicators, thus minimizing biases imposed by measurement error (Herting, 1985; Kenny, 1979). SEM also has the added benefit of being able to model both direct and indirect relationships among constructs (or latent variables) to determine the relative importance of antecedent constructs, making it possible to test complex theoretical models. This is an advantage over traditional path analysis where the indirect effects need to be calculated by hand (Barclay, Higgins, & Thompson, 1995). Three types of effects may be distinguished with SEM: direct, indirect and total effects. The direct effect is that influence of one variable on another that is unmediated by any other variable in a path model. The indirect effects of a variable are mediated by at least one intervening variable. The sum of the direct and indirect effects is the total effects, in other words, one variable's total effect on another is the sum of its direct effect and indirect effects (Bollen, 1989).

SEM also provides the means to resolve thorny problem of multicollinearity (Rigdon, 1998). By using multiple items in a questionnaire, the items are modeled as measures of the same common factor, and only the factor is used as a (single) structural variable. The principal component i.e., the factor explaining the most variance is used as the most reliable and valid observable indicator reflecting each of the unobservable research constructs (latent variables). Thus, all of the multiple measures are included in the model, but only one variable enters the prediction equation. High correlations among the multiple items actually improve the stability of the factor analytic measurement model.

Structural Equation Modeling Using Partial Least Squares

Partial Least Squares (PLS), a relatively new, powerful multivariate analysis technique with roots in path analysis (Wold, 1985), is ideal for testing structural models involving multiple constructs with multiple latent variables (Fornell, 1982 1987; Lohmoller, 1989; Wold, 1982 1985). The PLS estimation approach is discussed in detail in many books and articles that deal with the theoretical and application issues in SEM (Barclay et al. 1995; Bollen, 1989; Chin, 1998; Esposito Vinzi et al. 2010; Fornell & Larcker, 1981; Fornell, 1982 1987; Fornell & Bookstein, 1982; Fornell & Cha, 1994; Hayduk, 1987 1996). PLS has gained interest and use in various disciplines in recent years including information systems (Chin & Gopal, 1995; Compeau & Higgins, 1995; Rivard & Huff, 1988; Thompson, Higgins, & Howell, 1994), marketing (Ashill & Jobber, 2009; Hulland, 1996; Hulland & Kleinmuntz, 1994; Johnson & Fornell, 1987), and organizational behaviour (Howell & Higgins, 1990; Lee, 2007).

SEM with PLS is a conceptual approach to data analysis involving the interplay of theoretical thinking and empirical data. This approach to inquiry embraces abstract and empirical variables simultaneously and recognizes the interplay of these two dimensions of theory development. Empirical data need not achieve high-level precision but simply represent realistic attempts to observe the world around us. Falk and Miller (1992, p.92-93) comment:

"The more sophisticated the theory and precise the observations, the more our work approaches the scientific goal of understanding causal mecha-

nisms. Before we reach that point however, we need a research tool that allows us to examine the immense complexity that exists in the social and behavioral sciences. Professor Wold had this in mind when he developed soft modeling".

The term "Soft Modeling" indicates that model building applies when theoretical knowledge is scarce and stringent distribution assumptions are not applicable. Soft modeling provides a system for expressing theoretical ideas about a sequence of events (Falk & Miller, 1992; Lohmoller, 1989; Wold, 1980) and can be viewed as a method of estimating the likelihood of an event given information about other events. It is not intended to be a system for the assessment of causation, but is particularly applicable when the conditions of a closed system i.e., a set of theoretical, measurement and distributional conditions, are not met. That is, with soft modeling, the theoretical component simply accounts for as much of the variance in the measured variables as possible. Using this procedure, the highest percentage of common variance among the measured variables is extracted. As a result, the component maximally predicts the variance of the individual manifest variables. As one moves away from the powerful conditions required for a closed system, the concept of causation must be abandoned and be replaced by the concept of predictability (Wold, 1980 1985).

Within the context of multivariate statistics, PLS, unlike LISREL, is a least squares estimation procedure that makes few assumptions about the nature of the data. In PLS optimal linear relationships are computed between latent variables and are interpreted as the best set of predictions available for a given study considering all the limitations. PLS thus has a philosophical as well as statistical/mathematical position. Wold (1980 1982) contends that the work of science is an interplay between ideas about the world and our observations. Such a position is consistent with the modern philosophy of science, which views science as the union of theory and empirical observations (Ackermann, 1985). Some sciences are endowed with both strong theory and precise empirical observations. Under these conditions there are well known data analysis procedures available. In the social sciences however, soft theory and soft empirical observations are the rule where there are conditions of low information. Although PLS has a rigorous mathematics base, the mathematical model is soft in that it makes no measurement, distributional or sample size assumptions. Lohmoller (1989, p.64) states that "*it is not the concepts nor the models nor the estimation techniques which are 'soft', only the distributional assumptions*".

A Comparison of LISREL and PLS

The fundamental differences between LISREL and PLS are reflected in the PLS and LISREL algorithms and their optimum properties. The purpose of LISREL is to model the covariance structure of the manifest variables (Wold, 1985). This technique is based on maximum likelihood or generalised least squares and is used where prior theory is strong and further testing is the objective of the research (Jöreskog and Sörbom, 1984; Pedhauzur, 1982). LISREL is a model for theory testing and a general method for covariance structure analysis in which a theoretical model is specified in terms of covariances and tested against empirical data (Fornell & Bookstein, 1982). The aim of LISREL is therefore to estimate causal model parameters (e.g., loadings and paths) such that the discrepancies between the initial empirical covariance data matrix, and the covariance matrix deduced from the model structure and the parameter estimates, are minimized. It is concerned with the entire covariance matrix. The focus is of LISREL is thus on fitting the data to

the structural model proposed and generating the path coefficients that have the greatest likelihood of being from this sample's population data set. Accordingly, it is concerned with regenerating covariance structures in the data and not explaining variance in the dependent measures. The emphasis is on overall model fit, i.e., testing a strong theory as a whole (Barclay et al. 1995). Indicators are also reflective of constructs. Data are assumed to be multivariate normal, and sample sizes must be relatively large (Wold, 1985).

In contrast, PLS is not a model in the same sense. The objective in PLS is to estimate the model parameters based on the ability to minimize the residual variances of dependent variables (both latent and observed) (Chin, 1998). Instead of covariance structure analysis, it belongs to the same class of models as canonical correlation, principal components, and regression analysis. The conceptual core of PLS is an iterative combination of principal components analysis relating measures to constructs, and path analysis permitting the construction of a system of constructs. Being a components-based structural equations modeling technique, PLS simultaneously models the structural paths (i.e., theoretical relationships among latent variables) and measurement paths (i.e., relationships between a latent variable and its indicators). The path coefficients obtained from a PLS analysis are standardized regression coefficients, while the loadings of items on individual constructs are factor loadings (Hulland, 1999). Factor scores created using these loadings are equivalent to weighted composite indices. Thus, PLS results can be easily interpreted by considering them in the context of regression and factor analysis.

PLS provides an advantage over regression for two reasons: (1) it considers all path coefficients simultaneously to allow the analysis of direct, indirect and spurious relationships, and (2) it estimates the individual item weightings in the context of the theoretical model rather than in isolation. Rather than assume equal weights for all the indicators of a scale, the PLS algorithm allows each indicator to vary in how much it contributes to the composite score of the latent variable. Thus indicators with weaker relationships to related indicators and the latent construct are given lower weightings. Chin (1998) states that PLS is preferable to techniques such as regression, which assume error free measurement (Lohmoller, 1989; Wold, 1982, 1985). This makes LISREL '*closer to the model, more confirmatory and more model analytic'*, and PLS '*closer to the data, more explorative and more data analytic*' (Lohmoller, 1989, p. 213). The objective of the researcher therefore, and the stage of development of the theory under consideration, become key criteria in methodology selection (Barclay et al. 1995).

There are other features of LISREL which are more theoretically compelling but may not apply in a given research situation. For example, LISREL is more elegant with respect to the types of models that can be proposed. It handles non-recursive relationships, permits the comparison of the fit of a model between groups, and allows the modeling of correlated error terms. PLS does not allow for these specifications and assumes uncorrelated errors as in regression. In addition, LISREL offers a number of measures of overall model 'fit' such as χ^2 goodness-of-fit. PLS does not yet have these overall measures, relying instead on variance explained (i.e., *R*-square) as an indicator of how well PLS has met its objective (Cohen, Cohen, Teresi, Marchi, & Velez, 1990).

The philosophical distinction between these two approaches is whether to use SEM for theory testing and development or for predictive purposes (Anderson & Gerbing, 1988; Chin, 1998). Barclay et al. (1995) recommend PLS for predictive research models in the initial exploratory stages of theory development, when the conceptual model and the measures are not well developed,

whereas covariance based estimation methods such as LISREL, AMOS and EQS are more suited for testing, in a confirmatory sense, how well a theoretical model fits observed data, generally requiring much stronger theory than PLS (Fornell & Bookstein, 1982; Jöreskog & Wold, 1982). With covariance based approaches to SEM, a complete description of the theory is represented in a structural model and a theoretical rationale is offered for each proposed causal relationship. These two assumptions require a well-developed and stable theory in order for the proposed causal relationships to represent real-world phenomena. In contrast, in soft modeling such as PLS, a set of relationships may be formulated derived from embryonic theory, or previous research findings, or the problem at hand (Wold, 1985).

Chin (1998) also states that compared to the better known factor-based covariance fitting approach for latent structural modeling (e.g., LISREL), the component-based PLS avoids two serious problems: inadmissible solutions and factor indeterminacy (Fornell & Bookstein, 1982). PLS incorporates defined constructs, as in principal components analysis, which means the constructs are estimated as weighted linear aggregates of their indicators are therefore completely defined by their indicators, and component scores are readily available. Constructs in LISREL are indeterminate of factors in the factor analytic tradition, which means the constructs contain surplus, untapped meaning. This results in an inability to develop factor scores. Due to this indeterminacy of factor score estimates, there exists a loss of predictive accuracy. However, the PLS approach estimates the latent variables as exact linear combinations of the observed measures, thus avoiding the indeterminacy problem and providing an exact definition of component scores (Chin, 1998). This makes PLS much more predictive in a traditional regression sense and can enhance 'knowledge' without making causal claims (Fornell & Bookstein, 1982; Blili, Raymond, & Rivard, 1998). Jöreskog and Wold (1982, p. 270) state:

"Maximum Likelihood is theory-orientated, and emphasizes the transition from exploratory to confirmatory analysis. PLS is primarily intended for causal-predictive analysis in situations of high complexity but low theoretical information."

PLS is also considered better suited for explaining complex relationships than LISREL (Fornell & Bookstein, 1982; Fornell, Lorange, & Roos, 1990) since it readily accommodates complex theoretical and measurement models (Barclay et al. 1995). As stated by Wold (1985, p. 589),

"PLS comes into the fore in larger models, when the importance shifts from individual variables and parameters to packages of variables and aggregate parameters". Wold (1985) states later (pp. 589-590), "In large, complex models with latent variables PLS is virtually without competition."

A large variable model in PLS can be estimated because a) least squares algorithms are highly efficient and, b) in PLS, the analysis is segmented or partitioned.

Wold (1982) states that LISREL comes to the fore in problem areas where the models are relatively simple, namely where the stringent assumptions behind its optimality aspirations are realistic, and when the LISREL technique is not bogged down by too many parameters to estimate. When the problems under analysis become more complex, the stringent frequency assumptions of LISREL become less tenable, and the optimality aspirations become more or less illusory. The complexity of a model, in terms of the number of latent constructs and manifest variables, often makes identification, convergence, and goodness of fit difficult to achieve with the LISREL algorithm, and results in improper solutions (e.g.,

negative variances, correlations > 1). PLS does not encounter these situations. Soft modeling comes to the fore with the PLS estimates technique that aims at consistency in the statistical inference rather than optimality, and which provides "instant estimation" even for large models with a large number of parameters to estimate" (Wold, 1982). For example, Noonan (1979) examined 16 constructs measured with 59 manifest variables with over 1100 cases and claim that the LISREL algorithm would find this too difficult.

PLS also have the advantage of being able to provide a robust estimation procedure with respect to various potential deficiencies in the model specification, such as multicollinearity and skew response distributions (Cassel, Hackl, & Westlund, 2000; Wold, 1980). No specific distributions are required with PLS and there are no assumptions about the independence of observations. PLS is thus distribution-free allowing non-multivariate normal and non-interval scaled data. This is not the case with the maximum likelihood estimation method used in LISREL, which assumes a multivariate or normal distribution. Data from non-normal or unknown distributions violates one of the major assumptions for hard modeling procedures. A calculation requirement of maximum-likelihood is that the probability distribution be known and used. If the data do not conform to the distribution, then all estimates are biased. PLS on the other hand does not require a normal or known distribution. Rather, given any distribution, PLS produces the best set of predictive weights. Because the procedure is based on the least squares method, it provides unbiased with minimum variances around the estimates (Falk & Miller, 1992; Wold, 1985). When the average of many estimates of a particular value is close to the true parameter value, the estimate is said to be unbiased. Thus, if a parameter is estimated many times by a least squares method, the mean of the estimates will be close to the actual parameter and therefore unbiased. The size of the variance of the estimates i.e., the variance of the random sampling distribution of parameter estimates, will be smallest when least squares methods are used; and they always will provide the best linear approximation to the true parameter value (Falk & Miller, 1992).

PLS is also the approach of choice with smaller sample sizes. A problem with LISREL is its strong assumptions of large sample sizes, whereas PLS can handle small sample sizes (Fornell, Tellis, & Zinkhan, 1982). PLS can deal with small sample sizes because the iterative algorithm behind PLS estimates parameters in only small subsets of a model during any given iteration. Once specified, the measurement and structural parameters of a PLS causal model are estimated in an iterative fashion using traditional ordinary least squares simple and multiple regressions. The PLS algorithm takes segments of complex models and applies the same process until the entire model converges. At any given time, the iterative procedure is working with one construct and a subset of measures related to that construct, or to adjacent constructs in the model. It is this segmenting of complex models that allows PLS to work with small sample sizes (Wold, 1985). This data reduction procedure in PLS is fundamentally no different than adding the answers to several questions to create a scale score and then using the scale scores in subsequent analysis (Hulland, 1996). It is very similar to obtaining factor scores through principal component analysis and using the factor scores in future analysis.

The subset estimation process consists of simple and multiple regressions so that the sample required for statistical analysis is that which would support the most complex multiple regression encountered in the model. In general, the most complex regression will involve: (1) the indicators from the most complex formative construct, or (2) the largest number of predictors leading to

an endogenous construct, as predictors in an OLS regression. Sample size requirements, using the general rule of thumb of 10 times per predictor, become 10 times the number of predictors from (1) or (2) whichever is greater (Barclay et al. 1995; Wold, 1985)[1]. A weak rule of thumb, similar to the heuristic for multiple regression (Tabachnik & Fidell, 1989) would be to use a multiplier of 5 instead of 10 for the preceding formulae. An extreme example is given by Wold (1989) who analyzed 27 variables using two latent constructs with a data set consisting of 10 data cases. Lohmoller (1982) also presents an example of a model with 96 indicators and 26 constructs estimated with 100 cases. Using the general rule of thumb, 200 usage responses would be sufficient for statistical analysis using PLS if there are no more than 20 items for the most complex formative construct and if no construct has more than 20 incoming or out-going paths (endogenous construct). Smith and Barclay (1997) for example, examined 16 variables to test a model of selling partner relationship effectiveness. Each construct had between 2 and 9 items and there were no more than 4 in-coming or out-going paths. Statistical analysis using PLS was performed using 135 usable responses. In this case, the minimum sample size required to meet PLS criteria would have been 90 responses (the number of items on the most complex formative construct is 9 and this is greater than the number of incoming or out-going paths).

Finally, PLS can model both formative (cause) and reflective (effect) indicators (Fornell & Bookstein, 1982; Fornell & Cha, 1994). A key decision for the researcher is whether formative or reflective indicators should be used in the data analysis. An underlying assumption for hard-modeling approaches such as LISREL, EQS and AMOS is that the items or indicators used to measure a latent variable are reflective in nature to be consistent with the statistical algorithm. In LISREL, formative indicators can be used indirectly by summing the weighted formative indicator scores to create a single-item measure. The weights may be unity or estimated using factor analysis outside the LISREL procedure. The single-item measure is then used to measure the emergent latent construct during model estimation in LISREL. On the other hand, PLS is better suited to handle formative indicators since it can estimate the formative indicator weights and loadings along with the structural model estimation. That is, in PLS, the measurement model for both the reflective and formative indicators is optimized in conjunction with the structural model. As a result, the formative indicators in PLS explain the highest amount of variance for the emergent construct as well as for the criterion construct of the predictor emergent construct. Since one of the strengths of structural equation modeling (SEM) lies in simultaneously estimating the measurement and structural models, using externally estimated construct scores diminishes this advantage of SEM when using LISREL with formative indicators (Bagozzi & Baumgartner, 1994; Diamantopoulos & Winklhofer, 2001; Fornell & Bookstein, 1982).

Reflective vs. Formative Indicators

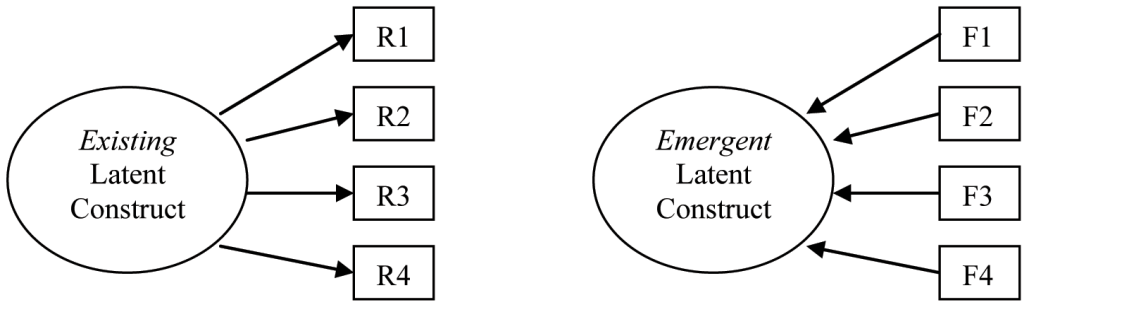
SEMs incorporating both exogenous and endogenous constructs[2] can be modeled with formative or reflective indicators as dictated by theory. In the questionnaire design phase of the study, the researcher confronted the decision to model indicators as reflective or formative. A reflective variate or construct is one where the variables are expressed as a function of the variate (the observed variables are assumed to be caused by the latent variable). As the name suggests, *reflective* measures reflect an *existing* latent, unobservable construct. These measures are also called *effect* indicators since they are the effect of the latent construct (Bollen, 1989; Bollen & Lennox, 1991; Chin & Todd, 1995; Chin, 1998; Cohen et al. 1990;

Fornell & Larcker, 1981; Fornell & Bookstein, 1982). Most social science researchers routinely use reflective indicators in their models, which means that observed variables (and their variances and covariances) are regarded as manifestations of underlying constructs. Reflective indicators are more consistent with how researchers typically view relationships between constructs and measures. In IT research for example, the perceived ease of use of an information system is typically specified as a reflective construct i.e., the ease of use of an information system is reflected in answers to a series of ease of use questions (Adams, Nelson, & Todd, 1992; Davis, Bagozzi, & Warshaw, 1989; Hendrickson, Massey, & Cronan, 1993).

An alternative and, in the information systems literature, practically ignored measurement perspective is based on the use of formative (cause) indicators, and involves the construction of an index rather than a scale (Bollen & Lennox, 1991; Chin & Todd, 1995; Diamantopoulos & Winklhofer, 2001). If the latent construct is a categorization and measurement device for a complex phenomenon, the indicators can be specified as formative. An example is personal computer utilization i.e., utilization of a personal computer can be formed by length of use, frequency of use, number of different software packages used, and the variety of tasks performed (Chin, 1998). As the name suggests, a formative variate or construct is one where the observed variables are assumed to cause a latent variable (the variate is expressed as a function of the observed variables). *Formative* measures are termed *cause* indicators since they cause or form the *emergent* latent unobservable construct (Bollen & Lennox, 1991; Chin & Todd, 1995; Chin, 1998; Edwards, 2001). Unlike reflective indicators, whereby "*the latent variable causes the observed variables*" (Bollen, 1989, p. 65), formative indicators can be viewed "*as causing rather than being caused by the latent variable measured by the indicators*" (MacCallum & Browne, 1993, p. 533).

As shown in Figure 1, in the case of reflective indicators (R1, R2, R3, R4), the arrows point from the existing latent construct to the observed indicators, whereas in the case of formative indicators (F1, F2, F3, F4), the arrows point in the opposite direction, from the observed indicators to the emergent latent construct[3]. Since the direction of measure-construct relationship for reflective indicators is opposite to that for formative indicators, the decision to model indicators as either reflective or formative is an important one when using Structural Equation Modeling (SEM). The decision is even more critical when using the

Figure 1. Reflective vs. formative indicators



SEM-based partial least squares (PLS) methodology. This is because in PLS, the measurement for reflective as well as formative indicators can be estimated along with the structural model.

The designation of reflective or formative rests on the theoretical underpinnings of a construct. One cannot simply arbitrarily link sets of items to constructs. According to Bollen (1989) and Chin (1998) the decision to model indicators as reflective or formative is based on two important considerations. First, the choice between using formative or reflective indicators for a particular construct should always come back to what makes sense theoretically, that is the causal priority between the indicator and the latent variable (Bollen, 1989; Cohen et al. 1990). In other words, the researcher must establish whether the measures define the construct (formative), or whether the construct gives rise to the measures (reflective). Fornell et al. (1990) suggest that the researcher must provide a clear argument for choosing one form of epistemic relationship over the other for each construct. In doing so, it is necessary to employ strong theory and multiple measures to ensure acceptable content validity. Similarly, Hulland (1999) suggests that the researcher needs to think carefully about whether it is more correct to think of the underlying construct as 'causing' the observed measures i.e., a reflective relationship, or of the measures as 'causing; (or defining) the construct i.e., a formative relationship. "*When researchers use formative or reflective relationships in their models, their choice of a particular form of epistemic relationship should be both justified clearly and applied consistently*" (Hulland, 1995, p. 11).

Second, for a decision to model indicators as reflective, the measures should be highly (and positively) correlated – both theoretically and empirically. Reflective indicators are created under the perspective that they all measure the same underlying phenomenon. With reflective measurement there should be no resistance to replacing one indicator with another indicator as long as the latter's correlation with the first indicator is of a similar magnitude (Chin, 1998). In other words, a change in the latent construct or one of the measures of the latent construct should result in a reasonably large change in the same direction for all the other measures of the latent construct. A change in the latent variable will be reflected in a change in all indicators, since the "*latent variable determines its indicators*" (Bollen & Lennox, 1991, p. 306). If replacing indicators with equally reliable indicators causes any unease or skepticism, this probably signals that a reflective model may not be appropriate (Diamantopoulos, 1999). This is because "*with effect indicators of a unidimensional construct... equally reliable indicators are essentially interchangeable*" (Bollen & Lennox, 1991, p. 308). Being interchangeable is a key principle of reflective measures (Churchill, 1999; Diamantopoulos, 1999; Nunnally & Bernstein, 1994).

Chin (1998) states that if indicators are not interchangeable, they should be modeled as formative. With formative measurement, the latent variable is formed by its indicators, which means that a change in the latent variable is not necessarily accompanied by a change in all of its indicators. For example, the latent variable socio-economic status with the indicators of income, occupational prestige, and education, can be thought of as a summary index of observed variables (Fornell & Larcker, 1981; Fornell & Bookstein, 1982). If an individual loses his job, then socio-economic status would be negatively affected. But to say that a negative change has occurred in an individual's socio-economic status does not imply that there was a job loss. Furthermore a change in an indicator such as income does not necessarily imply a similar directional change for the other indicators i.e., education and occupational prestige. Unlike reflective indicators, formative indicators can

have positive, negative or no correlation with one another (Bollen & Lennox, 1991). Other examples of formative indicators would be the amount of beer, wine and hard liquor consumed as indicators of mental inebriation. Reflective indicators would be blood alcohol level, driving ability, MRI brain scan, and performance on mental calculations. If truly reflective, then an improvement in the blood alcohol level measure for an individual would also imply an improvement in the MRI activity and other measures since they are all meant to tap into the same concept or phenomenon. Whereas for the formative measures, an increase in beer consumption does not imply similar increases in wine or hard liquor consumption. Therefore, formative indicators need not be correlated.

Existing measure development guidelines (Spector, 1992) focus almost exclusively on scale development, whereby items (i.e., observed variables) composing a scale are perceived as reflective (effect) indicators of an underlying construct (i.e., latent variable). Diamantopoulos and Winklhofer (2001) state that unlike scale development, for which detailed step-by-step guides exist (Churchill, 1999; Spector, 1992), guidelines for constructing indexes based on formative indicators are much harder to find. They suggest that four issues are essential to successful index construction: a) content specification, b) indicator specification, c) indicator collinearity, and d) external validity. With formative indicators, since the observed indicators are conceptualized as a mix of variables that in combination lead to (cause) the formation of the latent variable, examination of correlation or internal consistency is considered to be inappropriate and illogical (Bagozzi, 1994; Bollen, 1984; Chin, 1998). The very nature of formative measurement renders internal consistency inappropriate for assessing the suitability of indicators. "*The best we can do... is to examine how well the index relates to measures of other variables*" (Bagozzi, 1994, p. 333). Since reliability measures such as Cronbach's alpha, internal consistency and average variance extracted cannot be used for measuring the reliability of formative indicators (Chin, 1998), it is important to measure the emergent construct with a large number of indicators to adequately tap into the multidimensional and multifaceted domain of the construct (Bollen & Lennox, 1991). Nunnally and Bernstein (1994) state that 'breadth' of definition of a construct is extremely important to causal indicators because failure to consider all facets of the construct will lead to an exclusion of relevant indicators and thus exclude part of the construct itself.

Given that correlation between the item scores and the true score of the latent variable is not presumed with formative measurement, the researcher needs to consider whether a set of indicators are the critical antecedent variables in the formation of the latent variable. To say that a construct combines into a broad factor is neither compelling nor complete. All constructs that form a construct should be included (a census of indicators rather than a sample) which means that a construct cannot be defined independently of its measures (Bollen & Lennox, 1991; Hulland, 1995). More specifically, the items used as indicators must cover the entire scope of the latent variable as described under the content specification. Hulland (1995) further notes that if the epistemic relationship is formative, additional measures of the construct are not possible and the researcher can never remove any of the measures regardless of how well or poorly they may load on the construct. However, Diamantopoulos and Winklhofer (2001) argue that the literature is unclear as to how to assess the suitability of formative indicators and virtually silent on the circumstances calling for the removal of invalid indicators from the index. From a theoretical perspective, elimination of indicators carries the risk of changing the construct itself and should always be approached with caution (Diamantopoulos & Winklhofer, 2001).

Another issue particular to formative indicators is that of multicollinearity. This is because the formative measurement model is based on a multiple regression and therefore the stability of the indicator coefficients is affected by the sample size and the strength of the indicator intercorrelations. Excessive collinearity among indicators thus makes it difficult to separate the distinct influence of the individual manifest variables on the latent variable. Chin (1998) warns that if the indicators are modelled as formative, it is important that the '*indicators are relatively independent of one another, that is, there are no multicollinearity problems, and the sample size is large enough*' (Chin, 1998, p. 307). Also, the formative modeling option may be moot if the estimates are not stable, and the lack of multicollinearity is important if the researcher is concerned with understanding the formation process of the latent variable. Multicollinearity occurs when any single independent variable is highly correlated with a set of other independent variables (Churchill, 1999; Hair et al. 2006). The simplest and most obvious means of identifying collinearity is an examination of the correlation matrix for the independent variables. The presence of high correlations (generally.90 and above) is the first indication of substantial collinearity. However, the lack of high correlation values does not ensure a lack of collinearity and its existence may be due to the combined effect of two or more other independent variables. The two most common measures for assessing multicollinearity are tolerance and its inverse, the variance inflation factor (see Hair et al. 2006 for an overview of how these are calculated).

In summary, the decision to model indicators as reflective is based on two important considerations. First, it should be possible to conceptually argue that the measures are the effects of the latent construct; second the measures should be highly (and positively) correlated – both theoretically and empirically. If both conditions are not fulfilled, it may be more appropriate to model the indicators as reflective. Where items are developed to reflect a single latent construct, the latent variable is regarded as the cause of each of the item scores. As a result there is a presumed correlation between the item scores and the true score of the latent variable (DeVellis, 1991). With formative indicators, correlation between the item scores and the true score of the latent variable is not presumed.

Structural Equation Modeling Components and Data Analysis using PLS

The first step in studies involving structural equation models (SEM's) is to explicitly specify both the structural (path) model and the construct-to-measures relationships in the measurement model. The standard notation for specifying SEM models is: an exogenous construct (an independent variable) is specified as ξ and is shown as predicting or 'causing' an endogenous construct (a dependent variable) and is specified as η. Exogenous constructs are labelled $\xi 1, \xi 2, \xi 3$ etc while endogenous constructs are labelled $\eta 1$, $\eta 2$, etc. In the first stage, the researcher needs to ensure that the items used as measures of the underlying constructs are both reliable and valid. The measurement model consists of the relationships between the observed variables (items) and the constructs, which they measure. With traditional first generation techniques, Cronbach's alpha coefficients and/or factor analysis are used. In PLS, the loadings of the measures on their corresponding construct are examined. The characteristics of the measurement model demonstrate the construct validity of the research instruments i.e., the extent to which the operationalization of a construct actually measures what it purports to measure (Peter, 1981). Two important dimensions of construct validity are (a) convergent validity, including reliability, and (b) discriminant validity.

Once convinced of the adequacy of the measurement model, the researcher can then proceed

to interpret the resulting model coefficients. The structural equations represent the paths among the constructs, and measurement equations represent the relationships between the indicators and the constructs that they measure. To assess the structural model, PLS produces standardized regression coefficients using ordinary least squares to minimize the residual variance. This evaluation consists of an assessment of the explanatory power of the independent variables, and an examination of the size and significance of the path coefficients, which represent hypotheses to be tested. Together the measurement and structural models form a network of measures and constructs (Fornell, 1982 1987; Fornell and Bookstein, 1982). The item weights and loadings indicate the strength of measures while the estimated path coefficients indicate the strength and sign of the theoretical relationships.

Since PLS makes no distributional assumptions in its parameter estimation procedure, traditional parameter-based techniques for significance testing and model evaluation are considered to be inappropriate (Chin, 1998). The evaluation of PLS models is therefore based on prediction-orientated measures that are non-parametric (Chin, 1998). The PLS measurement (outer) model for reflective measures is evaluated by examining the convergent and discriminant validity of the indicators, and the composite reliability of a block of indicators. On the other hand, the formative measures are evaluated on the basis of their substantive content, by comparing the relative size of their estimated weights, and by examining the statistical significance of the measure weights (Chin, 1998). Wold (1982) argued that rather than based on covariance fit, evaluation of PLS models should apply prediction-oriented measures that are also nonparametric. Consistent with the distribution free, predictive approach of PLS (Wold, 1980 1982), the structural (inner) model is evaluated by assessing the percentage variance explained, that is, the R-square for the dependent latent constructs, by using the Stone-Geisser Q-square test for predictive relevance (Geisser, 1975; Stone, 1974), and by examining the size of the structural path coefficients. The stability of the estimates is examined by using the t-statistics obtained from the bootstrap resampling procedure (100 resamples) in the PLS software (Efron & Gong, 1983; Wold, 1982). These statistical techniques are now briefly discussed.

LISREL and other covariance structure analysis modeling approaches involve parameter estimation procedures, which seek to reproduce as closely as possible the observed covariance matrix. In contrast, PLS has its primary objective the minimization of error (or, equivalently, the maximization of variance explained) in all endogenous constructs. One consequence of this difference in objectives between LISREL and PLS is that no summary statistic or overall goodness-of-fit measures such as the likelihood ratio chi-square statistic exist for models using the latter. Instead, the variance explained (the *R*-square value) and the sign and significance of path coefficients are used to assess nomological validity i.e., how well each of the endogenous constructs is predicted (Cohen et al. 1990). *R*-square indicates the predictive power of the model and the values are interpreted in the same manner as *R*-square in a regression analysis. Moreover, the number of iterations required to converge on a solution provides an indication of how well the model fits the data (Hulland, 1999).

In PLS, the structural (inner) model is also evaluated by using the Stone-Geisser Q-square test for predictive relevance (Geisser, 1975; Stone, 1974). The Q-square statistic represents a measure of how well the observed values are reconstructed by the model and its parameter estimates (Chin, 1998). The PLS adaption of the predictive sample reuse technique as developed by Stone (1974) and Geisser (1975) follows a blindfolding proce-

dure that omits a part of the data for a particular block of indicators during parameter estimations and then attempts to estimate the omitted part using the estimated parameters. This procedure is repeated until every data point has been omitted and estimated. As a result of this procedure, a generalized cross-validation measure can be obtained (Chin, 1998).

Finally, to assess the statistical significance of the estimated path coefficients using PLS, researchers can use a jackknife or bootstrap analysis to determine t-values for each path (Fornell & Barclay, 1993). With jackknifing, the researcher does not have to assume that the underlying data are multivariate normal. Jackknifing is a nonparametric technique that is robust in the sense that it is not as affected by violations of the usual assumptions of normality associated with regression analysis (Fornell and Barclay, 1983). The jacknifing procedure creates a series of subsamples, removing one or more cases from the total data set in each case (Lohmoller, 1984). PLS is then run using each of the subsamples to arrive at separate path estimates. The distribution of estimates is then examined, yielding both a standard error and a corresponding t-value.

The bootstrap also represents a nonparametric approach for estimating the precision of the PLS estimates. *N* samples are created in order to obtain *N* estimates for each parameter in the PLS model. Each sample is obtained by sampling with replacement from the original data set (Chin, 1998). The bootstrapping approach treats a random sample of data as a substitute for the population and resamples from it a specified number of times to generate sample bootstrap estimates and standard errors. These sample bootstrap estimates and standard errors are averaged and used to obtain a confidence interval around the average of the bootstrap estimates (Schumacker & Lomax, 1996). This confidence interval is used to determine how stable or good the sample statistic is as an estimate of the population parameter. Obviously, if the random sample initially drawn from the population is not representative, then the sample statistic and corresponding bootstrap estimator obtained from resampling will yield misleading results. The Bootstrap approach is used in research situations where replication (in which additional samples are obtained) and cross validation (in which the sample is split) are not practical (Barclay et al. 1995). The jacknife estimation tends to take less time for standard error estimation under the joint assumption that the bootstrap procedure utilizes a confidence estimation procedure other than the normal approximation and the number of resamples are larger than those of the Jackknife. Conversely, the jackknife is viewed as less efficient that the bootstrap (Efron & Tibshirani, 1993).

Summary of the PLS Methodology

As a SEM technique, PLS offers greater flexibility in testing theoretical models with empirical data, since it allows researchers to handle latent constructs, model relationships among several latent predictor constructs, and incorporate errors in measurement. Because of this flexibility, PLS provides a powerful way to understand the interaction between theory and data. The technique thus provides a better platform than traditional multivariate techniques from which to construct and verify theory.

PLS is more appropriate than LISREL when models are complex, the goal of the research is explaining variance, where measures are not well established, and where any data distributions are appropriate. PLS is also ideally suited to the early stages of theory building and testing, and can be used to suggest where relationships might or might not exist and to suggest propositions for later testing. PLS is particularly applicable in research areas where theory is not as well developed as that demanded by covariance based

approaches such as LISREL. Other strengths that make PLS appropriate for this study include its ability to handle formative constructs and its small sample requirements. At its core, PLS combines principal components analysis and path analysis to simultaneously estimate the parameters of a causal model. Because the analysis is partitioned, sample size is less important in the overall model. The only requirement is that the sample size be larger than the number of manifest variables in the largest block.

Covariance based approaches such as LISREL requires large sample sizes (e.g., 200 to 400 respondents), multinormal data, and a strong theoretical base for consistent estimators. The main problem lies with the theoretical basis and the use of formative indicators in the measurement model. PLS users do not have to contend with improper or inadmissible solutions and problems with assessing model fit sometimes encountered with LISREL.

The following appendix illustrates the step-by-step procedures for using PLS-Graph version 3 (developed by Wynne W. Chin and Tim Frye). It is strongly recommended that the reader first consult the PLS-Graph User's Guide which details the process of model creation, and generating measurement and structural model statistical output. The user guide can be found at: http://www.pubinfo.vcu.edu/carma/Documents/OCT1405/PLSGRAPH3.0Manual.hubona.pdf.

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SEM SOFTWARE

AMOS - http://www.spss.com/amos/

1Covariance-based approaches

EQS - http://www.mvsoft.com/

LISREL - http://www.ssicentral.com/lisrel/

PLS-Graph - http://www.plsgraph.com/

SmartP. LS - http://www.smartpls.de/forum/

2Variance-based approaches

XLSTAT-PLS - http://www.xlstat.com/en/products/xlstat-pls/

KEY TERMS AND DEFINITIONS

Boostrap and Jacknife: Approaches to validating a theoretical model by drawing a large number of subsamples and estimating models for each subsample.

Covariance-Based SEM: Techniques estimate path coefficients and loadings by minimizing the difference between observed and predicted variance-covariance matrices.

Formative Indicators: A formative construct is one where the observed variables are assumed to cause a latent variable (the construct is expressed as a function of the observed variables).

Multicollinearity: Multicollinearity reflects the extent to a single independent variable is highly correlated with a set of other independent variables. As multicollinearity increases it becomes more problematic to parcel out the effect of any single construct owing to their interrelationships.

Partial Least Squares (PLS): A powerful multivariate analysis technique with roots in path analysis.

Reflective Indicators: A reflective construct is one where the variables are expressed as a function of the construct (the observed variables are assumed to be caused by the latent variable).

Soft Modeling: Applies when theoretical knowledge is scarce and stringent distribution assumptions are not applicable. Soft modeling can be viewed as a method of estimating the likelihood of an event given information about other events.

Structural Equation Modeling (SEM): A method for representing, estimating and testing a theoretical network of (mostly) linear relations between variables.

ENDNOTES

1 LISREL requires the use of large sample sizes to ensure correct estimates of the unknown parameters and their standard errors. Although there is no widely cited minimum, numerous authors refer to a minimum requirement of 200 cases (Haydul, 1987; Jöreskog & Sörbom, 1996).

2 An exogenous construct is an independent variable and is shown as predicting or 'caus-

ing' an endogenous construct, an dependent variable (Hair et al. 2006).

[3] When pointing the arrows from the circle to the squares, the block becomes outwardly directed. This means that the circle is estimated in a fashion similar to that of a first principal component i.e., factor loadings are identified that represent the predictable, common variance among the manifest variables. When the arrows are pointed from the squares to the circle, the block is inner-directed. In this case the circle is estimated as a regressed variate and factor weights are identified.

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Section 4
Utilization and Application

This section discusses a variety of applications and opportunities available that can be considered by practitioners in developing viable and effective Human Resources Management programs and processes. This section includes 10 chapters that review topics from best practices in Asia to ongoing research in the United States. Further chapters discuss Human Resources Management in a variety of settings (business process modeling, succession planning, outsourcing, etc.). Contributions included in this section provide excellent coverage of today's IT community and how research into Human Resources Management is impacting the social fabric of our present-day global village.

Chapter 33
Budding Researchers in the Humanities:
An Intercultural Online Project

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EXECUTIVE SUMMARY

This chapter aims at describing the networks within the Research and Development in Empirical Studies (REDES) Project, an intercultural enterprise aimed at promoting empirical studies of culture. Probably the first and only international project in the Humanities which prepares new researchers through on-line communication, the experience is believed to be scalable to other areas as it enables students to acquire the methodological techniques needed to undertake and carry out research in an environment totally different from the traditional university classroom. The chapter traces the history of the project from its foundation in 2002, explains in detail how it was set up, and evaluates the contributions of this joint effort. The problems met along the way are also pointed out. The chapter concludes with the challenges still to be faced. This case report stands as a proof of the impact of technology in preparing human resources for the Humanities.

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INTRODUCTION

Perhaps one of the most distinguishing aspects of human beings, one which has never changed and has enabled us to survive as a species, is our need to communicate and live in social groups. What has actually changed, however, is the way in which communication has been carried out. As we enter the 21st century, a new group of human beings, also known as the "Net Generation" (Baron & Maier, 2005), is on the make. These youngsters, born in many parts of the world after 1980s, have grown up with technology, which they have used for communication. Baron & Maier (2005, p. 57) describe them as "digitally literate; connected; social; prefer to working in groups; achievement oriented; require structure and guidelines; crave interactivity; have short attention spans; are experiential, visual, kinaesthetic learners; and prefer working on things that matter". They also state that the Net Generation is representative of the population in all the universities around the world. Still, they are a large group, who, to some extent, are trying to show us that a new way of learning must find its way into the curriculum. Indeed, if one of the major goals of the university is to produce new knowledge, working online in a research community which goes beyond geographical boundaries is one of the most effective ways to prepare students to become budding researchers and thus effectively participate in the scientific knowledge production. It may be argued that the idea of research communities is not new and hence presents no innovation. However, roughly until the turn of this century, research groups depended on the physical presence of their members and were generally affiliated to a single university or to those within a similar geographical area. Nowadays, technology has opened the access to exchange which hardly knows space or time limitations. The Internet has made some aspects of research quicker, more economic and more accessible to all, especially to students. As Geer (2001) rightly notes, there are still limitations but they may be of a cultural nature. She writes that:

Although as human beings, we communicate with others in many ways and across many mediums, communication is not always easy, even when we feel we know the other person. Cultural influences are often at the root of the communication challenge where misunderstandings and misinterpretations occur. Interaction and collaboration become much harder when communicating with total strangers in the online environment (p. 557).

It must be stressed, however, that before the Net Generation was born, scholars were already discussing the implementation of projects aimed at providing researchers in the Humanities with personal computers (Andersen, 1984) so as to facilitate communication among research groups. Fortunately, the world has moved beyond this stage. According to De Smedt (1999), "[t]he fact that students and staff have a computer on their desks instead of a pile of books is one visible change affecting the learning and teaching situation, even if it is a superficial one" (p. 2). Still, the way computers and their distance-learning advantages influence the process of producing and disseminating knowledge could be much different – from simply helping literature searches and storing information to full-scale research collaboration crossing the boundaries of classrooms, laboratories, libraries, universities, and countries.

This chapter aims at presenting a case study showing how to prepare new researchers in the Humanities through online communication. Relying on the Internet for about seven years, it has been possible to create a research group that works simultaneously in four different countries. Additionally, it has allowed the development of cross-cultural studies that would be impossible to carry out if students had to travel to all of the countries involved (Fisher & McGeveran, 2006). The present chapter indicates in a sense that the

New Generation may be growing in several different places around the world.

BACKGROUND

The project to be focused in this chapter is the Research and Development in Empirical Studies[1] ('REDES'), which was founded on September 10, 2002. At the moment this chapter is being written, the group is active in four different countries, as illustrated in Figure 1.

The major concept within REDES is to bring together both senior and junior researchers[2] in order to promote the development of empirical studies in the area of the Humanities. Members are appreciated for the kind of work they do in spite of the titles they may hold. This practice entails that B.A., M.A. and Ph.D. students equally participate in the group provided that they want to do so. In other words, the same opportunities are offered to all those who meet the minimum requirements to be a member.

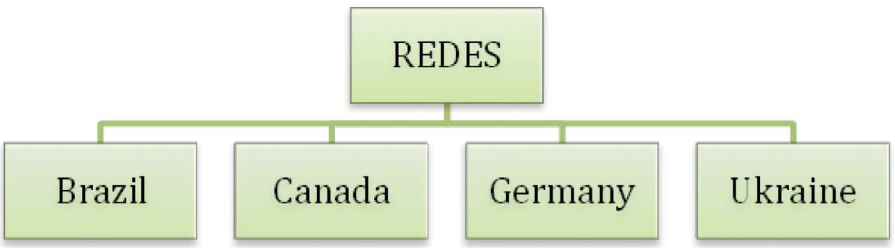
One of the most important aims of REDES is to engage students in carrying out research as soon as possible in their career. It is believed that they will profit the most from it if they are immersed in the culture of inquiry (Brew, 2006; Bender, 2006) at the earlier stages of their studies. According to Freire (1970/1987, p. 58), traditional forms of education tend to see teaching as making 'deposits' of knowledge into learners' minds. Within REDES, however, the idea that knowledge should be produced by junior researchers during (and also after) their academic lives is crucial to the project's operation. These researchers are expected to develop high-quality work and to present it as papers at conferences whether local, national, or international. To this end, encouragement, support and guidance are offered by both senior researchers and by more experienced junior colleagues, which may range from designing a study to submitting it to a journal.

One of the most essential tenets of REDES is maintaining ethical standards. Especially when working collaboratively, an ethical approach is of the highest importance. At the simplest level, it entails giving credit to those who have helped one in the course of an investigation. Such standards are no less vital when international collaboration or the use of information technology is at play.

SETTING THE STAGE

REDES had been developing mainly by means of e-mail since its foundation in 2002, but after the seminar on 'Intercultural Reading' in the summer of that year, some of the Munich students with an interest in the possibilities for communication over the Internet started setting up a website. Junior members of the project from Ludwig Maximilian University Munich began constructing a portal for international communication between the various groups participating. This was an initiative deployed first and only by the students, without any interference from senior researchers in the group. It was done out of the need to acquire the

Figure 1. REDES and its national centers



necessary tools for communication. The structure of the project, whose members are dispersed all over the world (and in different time zones), demanded a simple and cheap form of communication that could be used by all without extra costs or infrastructure. The World Wide Web offered itself as a viable way to allow this communication and the means to achieve it was an Internet forum. Thus, every member was able to read and distribute news, ideas and private greetings (which certainly in the beginning made out a good deal of the communication). Initially, the local REDES groups in Brazil, Germany and Ukraine, showing a high continuity of members, were especially active in the forum.[3]

Shortly afterwards new requirements to the forum arose: it soon emerged that exchanges of the form 1:*n* (one participant writes to *n* potential readers) led to problems in the asymmetric cooperation between local groups and subgroups (see Auracher, Schwaiger & Tiourikov, 2007). On the one hand, it was not possible to respond only to parts of a message in the forum, which meant that many messages soon contained several different 'threads', which in turn were replied to by different people, leading – after a few exchanges – to serious problems maintaining an overview of the ongoing discussion. Although contributions in a forum may be ordered thematically, participants often deviated from the theme or brought up new ones. However, because of the chronological order of contributions, this often led to the situation where it was no longer possible (even for participants in a particular thread) to realize to which aspect individual comments responded. Such problems could be solved by direct communication between some members, for instance, through direct email contact, which meant that other participants could feel excluded.

An attempt was made to circumvent this problem by extending the forum (toward the end of 2004) with a content management system (henceforth CMS). This had two advantages. First, it created a dynamic Internet performance, in which one could optionally add further content and modules. This functionally modular structure allowed each individual participant a free choice between various communication styles adapted to diverse types of messages and their expected reactions by different participants. In this way, a highly flexible system in which a wide range of options of a truly dynamic Internet lay just a few mouse clicks away. Second, this allowed a choice of all possible combinations of direct or relayed communication and of 1:1 or 1:*n* messages. The forum was furthermore extended with a Wiki, a picture gallery and a download facility, where members could download minutes of meetings, questionnaires to be tried out, or other such documents. While chat rooms (which had been available from the beginning) allow a simultaneous exchange – preventing that an idea is frayed out in time – a Wiki provides every member the possibility to contribute to one specific topic together with other participants producing after some time a common text to which diverse authors have contributed. Direct exchange with individual participants also remained possible via private messages.

Because the Internet forum also presented the REDES project to the public at large, the dynamic aspects were complemented with static pages, where an interested visitor might learn about the history, aims and contents of the project.

This initial portal ran on the public German university server as CMS, in order to optimally increase the use of Internet resources and also allow static information. Structurally, only open source software was used (which was changed in 2008) as a functional modular construction. It was construed in an open-ended fashion, so that it could be extended as the need arose. A number of facilities were offered in this user-friendly tool. Registered members could post stories, add/see pictures, download/upload files, add/check relevant web links, send private messages, use chat rooms and describe themselves and their interests in the profile section. However, the most important aspect of the portal was the possibility of enabling

researchers to communicate with one another. This tool both guaranteed the networking within REDES and helped enhance a sense of community. The portal contained a forum in which members could discuss their research projects, ask for help and try to find international partners, but also exchange general information, for instance reviews of recent publications, critical discussions and the like. In addition, members attending courses offered by the different area coordinators posted projects, comments or questions. This way, the portal also functioned as a site where discussions initiated in the classroom were extended and further developed online within the REDES community.

Participation in the forum required a posture which promoted criticism of their peers' work, and thus helped them develop their research. This openness entailed a change in attitude. The portal was a real revolution within REDES. The first reactions in the group were almost euphoric: all of a sudden individual participants disposed of technologies that made it possible to link up people separated geographically by large distances. Part of the success was certainly due to this enthusiasm for these new technological possibilities. As soon as it was operational, it began to be visited by the Brazilian, German and Ukrainian groups to such an extent that soon subcategories of communication had to be created, like 'General', 'Suggestions for reading', 'Technical questions', 'Research Projects', which themselves developed into further subdivisions. A lively interaction over the portal ensued for several years. To give an example: the rubric 'Research Projects' generated 432 posts to 34 threads, being viewed more than 5,000 times.

In addition to the forum, international meetings[4] were held at major international events.[5] During these meetings, administrative issues were dealt with, prospects for future developments discussed and, most importantly, members had their sense of community enhanced once they got to know their colleagues in person and were able to socialize with them.

However, the world is not perfect, and a breaking point occurred when the original generation that had built the portal left the university. The old portal can still be read at http://www.redes.lmu.de/portal/modules.php?name=Forums. Yet, it is no longer functional and only works as an archive. The main problem here was that the portal came under attack from hackers, posting pornography on the site, and later (when the previous damage was repaired) from ultra-rightist groups who posted their materials. This made the site unclear for a long time, since repairing it cost a good deal of time and money. These problems raised the question of how to secure the site from attacks. Still believing that the portal was needed, the new forum was launched and can now be found at www.redes.lmu.de/forum. This was again taken care of by junior members of the REDES group in Germany.

Until the middle of 2008 the old portal used PHP-Nuke for the simple posting of content on the website. For communication, phpBB was used, a software that, like PHP-Nuke, is freely available over the Internet. Extensions and improvements of these programs are produced worldwide by volunteers, which are then made available free to the audience at large. This means that they enjoy wide dissemination. But exactly this extensive diffusion of open source software, which in itself is to be greatly appreciated, also harbors a downside: security. The more a system is used, the more also it will be attempted to bypass its security mechanisms. Windows and Linux are good examples: the by large greater amount of harmful software is programmed especially for computers using Windows, since these computers are much more widespread than computers using Linux. The same befalls, unfortunately, both PHP-Nuke and phpBB, which are victims to hacker attacks time and again. This happened to the REDES portal twice, as mentioned above. Although extra security updates were installed several times, the maintenance of such is in the long run hardly possible, also because of costs.

Hence it was decided to further use a form of commercial software, in this case the well established system vBulletin. It contained all functions that used to be installed complementarily before. Besides, it is relatively simple to keep the system updated, as one is regularly informed about latest developments in the administrator's part. Everything is managed from one central point, while before all changes had to be carried through from various areas. Security in this software is not only checked regularly by users: the firm Jelsoft, in addition, constantly ferrets out and closes security holes. What is more, the use of the program reCAPTCHA averts that spam-bots (programs that register automatically in forums and install advertising) can access the forum.

The contributions and contributors from the old portal, however, could not be transferred to the new one. In the former, no new users could register. Additionally, one of the greatest security gaps, the upload of documents, was blocked. Finally, no new themes or replies could be posted. Finally, with the changeover to a real forum software an important separation was reintroduced, namely, that between communication and information platforms. Information purposes are served by the REDES main page, which is managed for a limited number of users through a self-developed CMS. For interaction, the communication platform is used.

CASE DESCRIPTION

The REDES group has been carrying out collective research for about seven years now. One of the most relevant contributions of joint work was the writing of *Muses and Measures: Empirical Research Methods for the Humanities* (van Peer, Hakemulder & Zyngier, 2007), totally conceived and written online by three REDES senior members over a period of five years. In the meantime, collaboration between two of the chapters, Brazil (REDES-BRA) and Ukraine (REDES-UA), also stands as an example of activity based on purely technologically supported long-distance contacts. In these countries where financial constraints are an issue, such projects would never have taken off if senior and especially junior members had had to travel worldwide to meet their colleagues.

The REDES research group brought a real change to the way students of Literature and Language, especially undergraduates, had studied so far: it opened up the road to conducting their own independent research for the first time. Studies in the Humanities had long relied on a hermeneutic tradition (Wiseman, 2002, p. 13), and imaginative texts have normally been viewed from a 'literary' perspective, which usually means paraphrasing parts of a text, providing comments to it, reviewing previous scholarship on the passage, or proposing ways to interpret it. As it will be clear from the examples, such methods can hardly be called 'research' from a scientific point of view. In this sense, researchers in literary studies tend to work independently from one another, and the very idea of combining the traditional literary view with technology may be quite alien to them. It should be emphasized here that the kind of research carried out in the framework of REDES is still genuinely 'literary' or 'linguistic' or 'cultural' since it deals with such objects of study like texts, readers, authors, etc., but that the approach differs from the more traditional one. The range of questions asked is considerably stretched: whereas previously the focus was mainly on the texts themselves, what they mean, how to interpret them, the range was now broadened to include questions to do with the functioning of these texts in the lives of individuals or groups, the various kinds of effects the reading of such texts may have, or why such texts are there in the first place, following the tenets of the Empirical Science of Literature (Schmidt, 1982). In a way, REDES has moved from a text-centered approach to encompass a larger scope which involves the sociology and psychology of literature (Schram & Steen, 2001).

This is a significant widening and deepening of perspective, which does not do away with the

older and more philological methods. However, it now embeds these in a social framework where such traditional questions and methods may be critically reviewed and, in some cases, left for other ones. After all, literature is not created for commentators at universities, but to fulfill real functions in people's lives. Neglecting to investigate these has greatly impoverished the study of literature and culture over the past decades. This is in itself strange, since the beginnings of literary studies in the West owe their existence precisely to such social perspectives. Both the literary theories emanating from the writings of Plato and Aristotle, the foundations of Western poetics and literary studies, start from the question about what literature contributes to society, and only later ask how the poets do this textually. Without ignoring traditional analytical strategies, REDES members set out to enrich them with questions and methods better adapted to analyze the psychological, sociological and anthropological aspects of literature. All this has been possible and has been made faster through the easy, fast and efficient communication of present-day information technology.

For REDES researchers, observation, theory, and application are equally important, and technology is part of the methodological tools. Consequently, actively using the REDES portal and establishing day-to-day on-line contacts between junior and senior researchers acquired extreme importance in supporting and encouraging participants' efforts. New topics appeared, and the number of posts both in general and regional sections grew every day.

This kind of trust in long-distance technology was especially relevant to Ukrainian and Brazilian junior and senior researchers, who tend to remain on the margins of mainstream Euro-centered exchanges. The cooperation resulted in a number of full-scale projects presented at various international forums and a history of joint publications, as mentioned above.

One specific product of cooperation between REDES-BRA and REDES-UA was testing strategies for Literary Awareness (Zyngier, 1994a) in the Ukrainian context. The methodology to increase readers' sensitivity to imaginative texts had been applied in Brazil for several years before the idea was expanded to the Ukrainian context. It would have been hardly possible to have such development without the information technology as all discussions were carried out on-line through the REDES portal under the topic 'A new idea about literary research'. All in all, the topic attracted 1,993 views and 190 comments in 27 months. The first post was submitted on January 14, 2005 by a Brazilian member, who invited other groups to join her in applying the method in different contexts. Three days later, a reply was posted by a Ukrainian REDES member, and the discussion started. The participants shared their ideas about the content and structure of the classes, about the material to be used during practical sessions, etc.

Many of the resources themselves were sent to the Ukrainian group by their Brazilian colleagues as DOC or PDF files; simultaneously, local meetings in Brazil and Ukraine were held on a regular basis. The Brazilian senior member in charge of REDES in this country, who actually conceived the program of Literary Awareness, then joined the discussion on March 10, 2005 to ensure the project would get off the ground and cooperation would start between junior members. The Ukrainian REDES chapter coordinator also participated in shaping up the project. PowerPoint presentations of the research in progress were discussed as well and presented at a conference in Brazil, at the REDES seminar in Germany, and at the UNESCO conference in Ukraine.

As a result of the on-line cooperation, in 2005, the course on Literary Awareness (Zyngier, 1994a, 1994b) was launched at Kyiv National Linguistic University and then expanded to yet another Ukrainian university, Horlivka State Pedagogical Institute of Foreign Languages. Both Ukrainian groups of teachers who were delivering the course as well as their students communicated long-distance – not to mention their frequent consultations with the

author of the book, who was thousands of miles away from both schools. In October 2005, she was invited to Kyiv to conduct a workshop on Literary Awareness, which materialized in April 2006. The preparation for the visit, including planning the workshop, was also carried out long-distance.

The pedagogical component of introducing Literary Awareness in Ukraine by way of on-line cooperation is crucial to Ukrainian education, in the Humanities in particular. In many countries today, university education faces a serious threat, as Barreto & Fialho (2005) put it: "the students do not experience *flow* while reading a literary text […], do not have a positive response towards literary texts and tend to build an emotional and critical distance towards them" (p. 95), though it is well known that "[r]eading, in any age, also means reading the world, attempting to interpret, to come to terms with, to assimilate, perhaps even one day to understand what surrounds us, in order that we be better equipped to live in the world" (McRae, 1997, p. 19).

The cooperation reported above resulted in a publication (Fedorova et al., 2006) and in a paper (Zyngier, Chesnokova & Viana, 2007) which was also written collaboratively on-line. The Literary Awareness course is to the present moment still being taught at KNLU as an optional subject for 20 undergraduates each academic year.

Continuing with the cooperation, another research project was carried out in 2007–2008 to examine how Brazilian and Ukrainian readers responded to Poe's "Annabel Lee" in Portuguese and Ukrainian. As the project was being developed, the Ukrainian coordinator traveled to the USA and expanded the scope by involving North American participants. The results of this joint project have been published (Chesnokova et al., 2009).

Other research projects also resulted from the cooperation between the Brazilian and the German groups (Fausto, 2006; Teles, 2006) as regards reactions to anti-smoking advertising campaigns, and movie subtitling and dubbing. More recently, Coachman & Weigert (2008) looked at the way Brazilian, German and Japanese respondents reacted to vulgar language in a comparable short text.

Over seven years of stable cooperation (2002 – 2009) have inspired many other research projects and enabled the creation of a global research community where distance communication tools help cross the boundaries of cultures and continents. This is especially valuable for students as they become more and more skilled to operate various computer programs, work with statistics, present their projects before international audiences and work in a team (often under severe time pressure) to successfully progress in their careers – in academia but also beyond it.

All these examples stand as illustrations of the REDES philosophy, itself a product of cooperative work, which states that in this academic global online community "we share experience and knowledge, doing as much teamwork as possible, and using the Internet as a meeting ground" (see www.letras.ufrj.br/redes/philosophy.htm).

CURRENT CHALLENGES

The experience of budding Humanities researchers over the Internet does not go without problems. Nowadays the research group faces different challenges, which may be grouped into three main areas – namely administrative, personal and technological issues.

As regards administrative matters, the first issue to be considered is that of academic calendars. As the project involves at present four different educational systems (Brazilian, Canadian, German, and Ukrainian), it is not always easy to carry out research as part of a relevant course taught and this problem is enhanced further by the non-synchronization of university calendars around the world. For instance, in Brazil, the academic year is divided into two semesters: from February through July and from August through December. In Ukraine, the first term or semester starts in September and ends in late December with

January being an examination period; the second semester comprises February to May, and exams are usually taken in June.

Another administrative problem is related to where each branch coordinator is located. In the Brazilian context, the senior researcher is part of the Postgraduate Program in Applied Linguistics, which allows her to offer her courses as optional subjects. In the Ukrainian situation, the area coordinator is currently taking her full-time post-doctoral course and teaching part-time, which only includes term papers and the supervision of Ph.D.'s as well as graduation exams. The German coordinator has, at the moment, taken upon himself more administrative load and, although still involved in research, has been kept away from tutoring.

The status each coordinator has at his/her university also influences the project because freedom at taking decisions is subject to different university constraints. The Ukrainian area coordinator, for example, in spite of being the Head of the Department for several years, could not fully influence the academic program, as curricula are usually predefined by the Ministry of Education, and introducing new courses involves years of changes and paperwork. In Brazil and Germany, however, the coordinators have had more freedom of action as regards their courses and what to focus on.

Research traditions in each of the four countries should also be considered. Whereas in all of them literary studies are not geared toward empirical investigation, the Brazilian group is stimulated to work in an interdisciplinary way. In Canada, the rigid disciplinary boundaries are aggravated by the bureaucracy with getting permissions to do empirical research. In Ukraine, literary studies and language research are conducted within two different majors and their intersection, together with extensive reference to psychology, philosophy and sociology is not welcome. In Germany, the problem now arising is trying to get students who need to pay for their studies opt for research instead of a seminar they can get away with quickly.

As for personal matters, the most serious problem is that of motivation. More recently, junior researchers have shown a decrease in motivation, especially due to lack of funds. Participation in the group depends on the willingness to see it as an opportunity for personal and academic growth. However, when junior researchers do not get any grants, they also have to finance themselves through their university life. This competition the research group meets with the job market is unfair, since the job opportunities students find outside academia are often more appealing. When having to choose between carrying out independent studies or accepting a job which will provide them with the means to survive – junior researchers have to opt for the latter even though they would rather become full-fledged researchers. In Germany and Canada, the panorama is even more somber. Participants mainly get involved in the project because they get credits in return. As one may anticipate, this situation threatens the group's cohesion and makes long-term projects nearly impossible. In the German and the Canadian settings, voluntary involvement does not seem to work as it does in the Brazilian and the Ukrainian context. In both latter settings, the successful functioning of the group mainly depends on the individual efforts of highly interested students who find enough motivation to see the project as a fruitful ground for their intellectual and personal growth while also financing themselves so as to attend national and international conferences. Finding such individuals in everyday academic environment is always hard, but not impossible.

These problems have raised complex situations. Junior researchers need to understand that carrying out intercultural research implies first and foremost strong commitment with a colleague in another country. They cannot, for instance, decide to leave the research study they may be carrying out unfinished, since this will implicate a student from another group who started working with them. Even if they do need to leave the group, they must

help their partners complete the study, as this is what is ethically expected of them.

There are also linguistic issues involved in interpersonal relationships. As five different languages are involved in project (Brazilian Portuguese, English, German, Ukrainian and Russian), there is the need to use English as a language of integration. Most Brazilian and Ukrainian participants spontaneously use English in the forum in spite of some linguistic inadequacies. German participants, however, have often to be reminded that they must not communicate in their mother tongue unless they risk losing interest and international cooperation.

Over the past seven years work in REDES has shown that junior researchers need to understand that their participation in the research group is a great opportunity to be tutored by experienced senior researchers in their field of study and to share this experience with colleagues from different parts of the world, people they might never have a chance to meet. Moreover, in REDES, they are introduced to empirical methods of research in the Humanities, which is also unusual. Finally, they will be encouraged to carry out their studies autonomously from the very beginning, again not a common practice. Autonomy does not mean that they will work alone. Instead, they get the needed guidance on how to plan and carry out their study, prepare oral presentations, write papers, and so on.

The use of an online discussion forum already solves some problems such as that of time differences. The asynchronous mode of interaction enables participants to access it at their convenience. However, if participants do not visit the forum on a regular and frequent basis, this may cause some problems. In fact, a vicious circle may be created: if the forum is not accessed, there are no new posts; and if participants do not post, they do not feel compelled to visit the forum. With time, this setting may lead to collapse, bringing the forum to a halt. As with several online communication platforms, it is of utmost importance that participants promptly reply to posts. This is why sometimes members need to be reminded to do so as one of the area coordinators did in the following excerpt from the forum: "[Name] has been waiting for a reply as of OCTOBER 9th last year!!! Please make sure you reply to her and get your project off the ground!" If there is no immediate feedback, members may experience frustration. In turn, this may affect one's motivation and engagement in the activity.

Another problem is avoiding the forum and communicating through parallel means. Once participants establish contact with their research partners, cooperation should take place in the forum itself. On some occasions, junior research members have used their private e-mails to exchange messages on a research project. When this occurred, other REDES members were excluded from the exchange and could not comment on the study. In the same post quoted above the area coordinator also draws a junior researcher's attention to this issue: "And please do not use your personal e-mail to discuss the project. Use the Portal... otherwise we won't be able to comment on it." One of the tenets of this community is that advice and/or positive criticism must be offered by all members. If interaction is carried out by e-mail, this becomes a private exchange which does not benefit from the group as a whole.

At present, the group is looking for new ways to make the project thrive. In order to do so, answer to three main questions must be found:

(a) How to reshape the research group?
(b) How to draw/raise active participants' interest?
(c) How to expand research projects to other countries?

The results obtained so far have shown the project is worth the effort and should be continued.

CONCLUSION

Although there are a fair number of problems, they do not prevent the group from producing

and preparing future researchers in the field of Humanities as early as possible in their academic lives. The experience so far has shown how to do away with individualism in the university and stress the importance of collaborative work. In fact, the case described above is applicable to many different disciplines in higher education which aim at preparing budding researchers. REDES has shown that it is a new way of doing research and of preparing independent, creative, and autonomous researchers who abide by the following tenets of its philosophy.

(a) The purpose of university education lies first and foremost in the training of critical abilities which are fostered through the production of new knowledge. The members of REDES are of the opinion that traditional ways of handling knowledge in Humanities departments are not conducive toward such aims, but remain largely confined to the dissemination of existing knowledge.

(b) Even where some allowance is made that students gather research experience, this is usually offered to them at the very end of the study period. We are of the opinion that doing research at the end of their studies is not only far too late, it is also counter-productive, in that it often produces frustration (because students are ill-prepared) rather than interest, confidence and enthusiasm. REDES attaches great value to instruction into modes of knowledge-production from the very beginning of university training.

(c) Members of REDES are dedicated to the insight that the aims of the group can only be achieved through active participation in the research process of all concerned, including beginning students.

(d) Methodological training is underdeveloped in the Humanities; this is paradoxical, because the level of complexity in culture is many times higher than that in natural phenomena. Nevertheless, it is students of the natural sciences who are initiated in methodological matters at a deeper level. We are of the opinion that this situation should be redressed, and, therefore, attach great importance to serious education in methodology.

(e) The REDES project puts emphasis on empirical methods of investigation: we believe that there is a too one-sided emphasis on hermeneutic-interpretative and subjectivist methods in the Humanities. Such methods may have merits, but should be complemented by more scientific investigations of culture.

(f) Those who take part in REDES see research not as an individual enterprise, but as a form of team work that is carried out by groups of people who actively communicate about their plans and progress.

(g) Such groups do not stop at national borders, but should be essentially transnational and cross-cultural forms of cooperation.

(h) Members of this project actively engage with cultural products and propagate the value that cultural products bring to individuals' lives and to society as a whole. Emphasis on empirical ways of investigation is in no way a depreciation of culture, high or low. On the contrary, participants are deeply respectful of cultural artifacts, traditions and preferences.

REDES was born out of the need to offer students a more intense and involved journey towards knowledge. It implies commitment, self-discipline, academic generosity, mutual respect, and, in many cases, volunteer work. In this online research community, we want to prepare qualified thinkers by developing and promoting the exchange of knowledge and ideas, and thus to collaborate for a better world.

In fact, years of cooperation have shown that this community works and functions as a source of cultural education and international exchange, where friendships develop and where differences are recognized. Members understand they are

part of a scientific group as individual beings and thus help each other on several different levels. Belonging to this online project has proven to be a long-term commitment to working together and supporting others' efforts in their research and lives, a dedication which requires more than a minimal engagement during normal office hours. As a consequence, the goals of working towards an ideal academic setting which aims at scientific advancement and the feeling of personal growth, of learning and of sharing has been achieved, mediated by the Internet as a meeting ground.

Besides offering the conditions where learning outside the classroom and the curriculum takes place, the Internet has enabled REDES to become more than just a formal research group. It has turned out to be a place where interpersonal relationships are established and friendships develop. It is this bond of affection between researchers that guarantees that knowledge and experience become long-lasting and memorable. And all this has only been possible because of the advent of information technology. It is true that this work requires a higher than usual level of energy, enthusiasm, openness and dedication. But to those who have made this possible, research has been a thrilling, rewarding and unusually enriching experience.

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ENDNOTES

1 Previously, the group has been referred to as 'Research to the Development of Empirical Studies' and 'Research Development in Empirical Studies'. Although the final version of its name has been used for a couple of years by now, references to these previous versions may still be found.

2 We opt to refer to mature scholars and students alike using the same term, namely, 'researchers'.

3 A former Dutch group contributed very little to the discussions presumably because of the high turnover of its members. The Canadian group had not joined the project at that time.

4 Due to financial constraints, not every REDES member can take part in these meetings

every year or two. Efforts are made so that at least one representative per national center is present.

5 There have also been several REDES meetings at the events organized by its national centers.

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Chapter 34
An Ontological Business Process Modeling Approach for Public Administration: The Case of Human Resource Management

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ABSTRACT

In this chapter, an electronic model of Public Administration's operation using an ontology as a means to a formalized representation of knowledge is presented. According to the proposed model, every public administration procedure is viewed as a service offered to some external entity and is represented as a (Semantic) Web service, semantically annotating its functional parameters, profile, and workflow. The modeling of public administration services/procedures involved the commonly used IOPE (Inputs – Outputs – Preconditions – Effects) model of OWL-S for Semantic Web Service description. This chapter also presents a specific use case about the Human Resource Management department of the Region of Central Macedonia. In order to do so, certain extensions/adaptations of the general methodology were needed. In this chapter the authors fully present and justify these adaptations that were deployed in order to turn the general methodology into a really flexible and re-usable tool to model any public administration procedure. Furthermore, the authors describe the full knowledge engineering cycle for developing the ontology of this department's business processes.

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INTRODUCTION

The main objective of e-Government is the development of user-friendly and efficient services for citizens and businesses. Semantic interoperability between public administration (PA) procedures of different governmental agencies, as well as between public administration's procedures and citizens' and businesses' understanding of them, is a vital issue to solve within this domain. Public organizations produce daily a great volume of administrative documents, in order to fulfill their mission, which is to serve citizens and businesses adhering to constitution and laws. This requires the use of certain procedures incumbent on law provisions and executives' experience. Web powered semantics could help the e-Gov by engineering inter-operable PA procedures, facilitating the performance of daily routine procedures and helping inexperienced civil servants with new tasks, leading "knowledge based government, in a knowledge based economy and society". Knowledge is now a major driving force for organizational change and wealth creation, and effective knowledge management is an increasingly important source of competitive advantage and a key to the success of modern organizations.

In order to capture knowledge that is inherent in PA's operation and procedures, a formal representation framework, such as ontologies, is needed. Ontologies (Staab and Studer, 2009) have been proposed as the main means to capture semantics and organize information in the (semantic) web (Berners-Lee et al., 2001), since they provide a formal description of concepts, terms, and relationships within a given knowledge domain. An ontology provides a shared vocabulary, which can be used to model a domain - that is, the type of objects and/or concepts that exist, and their properties and relations. In addition to describing a domain, an ontology is also used to reason about the entities within that domain.

Business Intelligence (BI) refers to technologies, applications and practices for the selection, integration, analysis and presentation of operational information. The future trend is the expansion of BI applications to more users inside and outside of an organization and a shift to a further automation of the decision making processes. Business Intelligence covers a broad area of practices that can be used in order to improve efficiency and effectiveness of many internal procedures in an enterprise. In the end BI will aim to the big mass of the end users of the enterprise applications which today are not available to them. Intelligent automation of procedures is called Intelligent Process Automation (IPA) (IDC, 2006). IPA is the merger of BI and of the technologies of operational procedure management. It is an automation of the repetitive operational decisions (not the strategic ones). Formal process modeling is needed in order to efficiently address the problem of representing, analyzing and managing knowledge about an organization and its processes (Koubarakis and Plexousakis, 2000).

In this chapter we describe our proposal which envisions an electronic model of PA's operation in a certain field with a possibility of reuse in lots of applications. Ontologies can be a means to the representation in a formalized manner of knowledge fields as they can capture knowledge and provide a commonly accepted conceptualization which can be reused in a variety of applications and by a variety of people. They can provide a common vocabulary of a field and define with different levels of formality of the terminology and the relationship between different entities. Thus knowledge can become a shared property.

The vision of web services is the description of services using semantics understandable by computers. Semantic annotation is a critical point in order to automate retrieval, composition and execution of services. Ontologies are used to help web service technology to be realized worldwide. OWL-S is a representation language of the different characteristics of semantic web services (Martin et al., 2007). OWL (Web Ontology Lan-

guage) is the official language of W3C which is used in web ontologies (OWL Overview).

Our methodology, an extension of (Savvas and Bassiliades, 2009), uses OWL to represent the PA's structure and the entities involved in its procedures and the information (public administration documents) exchanged among them during the execution of these procedures, and OWL-S service models for representing the steps and workflow of these procedures.

In the new era of e-government it is possible to improve service provision by removing redundant tasks and/or simplifying procedures and this can only be performed after a thorough and precise modeling of the involved procedures. To this end, this chapter also presents a specific use case of the general methodology, which is about the Human Resource Management department of the Region of Central Macedonia (RCM). This public administration unit is responsible for providing services, such as staff recruitments, transfers, retirements, etc. For each service provided there is a specific procedure followed. The knowledge of these procedures is usually kept in the minds of the public servants who work in this department. Necessary preconditions for the usage of this knowledge from other servants and citizens are, a) capturing the tacit knowledge that public servants reserve, as well as b) representing captured knowledge in an explicit and formal way.

Actually, this use case is a joint research project between the Logic Programming and Intelligent Systems (http://lpis.csd.auth.gr) research group of the Department of Informatics of the Aristotle University of Thessaloniki and the Region of Central Macedonia (http://www.rcm.gr). The aim of this project was first the acquisition of knowledge held within the Human Resource department's staff of the most critical public administration procedures of the department in order to produce certain public administration acts. In order to do so, these procedures were analyzed in primitive actions/steps (tasks) and the workflow among them. For each task, the entities involved and the documents exchanged between entities were recorded. Finally, these steps were aggregated in larger chunks of conceptually coherent actions that constitute independent sub-procedures within the whole administration procedure, according to the general methodology of (Savvas and Bassiliades, 2009). In order to do so, certain extensions/adaptations of the general methodology were needed. In this chapter we fully present and justify these adaptations that were needed in order to turn the general methodology into a really flexible and re-usable tool to model any public administration procedure.

In the next sections we shall present, firstly, background and related work information, then the ontological public administrator process modeling framework we have devised, along with a full modeling example, and finally conclusions and future work directions.

BACKGROUND

Semantic Web

Today's Web is suitable for human consumption and is organized around content presentation and not information meaning. Getting in touch with other people, seeking information about hotels and tickets, searching for lower prices and ordering products on-line are the majority of activities that take place on the WWW. However, these activities utilize only a small amount of information available on the World Wide Web.

Search engines do a relatively good job, but only in simple queries. Complex queries may yield results not related to the ones the user expected to see or, even worse, the relevant pages may be amongst thousands of others mildly relevant or totally irrelevant to the query. However, even when the search is successful, the information needed may be spanned across various documents and the user must manually put the information pieces together. That would often require more queries

using synonyms of the original keyword or using other sources to find more possible relevant pages.

The Semantic Web initiative (W3C) tries to solve problems related to knowledge representation by suggesting standards, tools and languages for information annotation. Semantic Web can be considered as an extension of the current Web where information has unambiguous and well-defined meaning, enabling machines/agents to understand the semantics of the information and not only base on the syntax. The Semantic Web vision emerged after Information Retrieval (IR) received great attention in the late 90s and the term *metadata* was coined. Metadata is often described as "data about data" and is used to facilitate the understanding, use and management of other data. The aim of the Semantic Web is to allow the creation of advanced knowledge management systems that will organize the knowledge and support easy maintenance and access to it. Tasks like these require the metadata to be machine-readable and machine-interchangeable. Ontologies play a key role to the evolution of the Semantic Web and are widely used to represent knowledge by describing data in a formal and explicit way.

Ontologies

Ontologies are of basic interest in many different fields, largely due to what they promise: a shared and common understanding of some domain that can be the basis for communication ground across the gaps between people and computers (Staab and Studer, 2009). Ontologies are used not only to represent a domain of interest, but also define concepts, describe relations among them and insert individuals. So, an ontology is not just a taxonomy. Sometimes ontology concept is confused with taxonomy, which is a classification of the data in a domain. The difference between them is in two important contexts. Firstly, an Ontology has a richer internal structure as it includes relations and constraints between the concepts too and secondly an Ontology claims to represent a certain consensus about the knowledge in the domain.

To describe information appropriately, knowledge representation languages based on XML have been proposed, such as RDF (RDF) and OWL (OWL). Both languages are used to annotate the information in a formal and explicit way by defining *ontologies*, using classes, properties and instances of classes. The ontologies are used in order to organize knowledge in conceptual hierarchies, providing a controlled vocabulary of concepts, each with explicitly defined and machine processable semantics. The difference between the two most commonly used ontology languages (RDF and OWL) is the degree of expressiveness they offer. Thus, while RDF is capable of defining only subclass and subproperty relationships between classes and properties respectively, OWL goes a step further by offering a higher degree of expressiveness. Having been built on top of RDF, OWL introduces more relationships between classes, properties and instances, allowing the use of property constraints and Boolean operators (union, intersection, etc) in class definitions.

To fulfill the goal of the Semantic Web - a Web understandable by machines - the annotation of information is not enough by itself. The need for a variety of appropriate tools such as reasoners, graphical editors, visualization tools and environments that successfully integrate the various technologies and languages involved in such applications also exists. Reasoners play a significant role, since they can handle and apply the semantics of the ontology language. The formal semantics of the OWL language enable the application of reasoning techniques in order to make logical derivations, involving class membership, equivalent classes, ontology consistency, and instance classification. Therefore, reasoners are important since they are able to extract new information that is not stated explicitly, based on the formal semantics of the language used for annotation (Haarslev & Möller, 2003; Tsarkov & Horrocks, 2006; Sirin, et al., 2007; Medits-

kos & Bassiliades, 2010)0. The rest of the tools mentioned above are equally important, since they can greatly assist the end user in exploiting the Semantic Web to its full extend as well as for gradually increasing the user trust towards the Semantic Web.

Web Services

The advent of Web services is a proof that nowadays the need for communication among loosely coupled distributed systems is bigger than ever. Web services offer a well-defined interface through which other programs may interact by sending messages based on Internet protocols and Web standards (WS Architecture). They may also be combined in order to achieve a complex service whose functionality cannot be achieved by a single one, a procedure that is called *service composition*.

Web Services and their technologies are based on XML. That is because XML as a language allows a platform-independent exchange of data at a basic level. XML and its great adaptation, combined with the rest of the Web Service technologies, allow for global co-operation between organizations. The description of a service interface is based on the Web Service Description Language (WSDL) that describes the syntax of the input and output messages using XML, as well as other details needed for the invocation of the service.

The communication is based on the Simple Object Access Protocol (SOAP) (SOAP, v 1.2), an XML-based framework that provides a message construct that can be exchanged over a variety of underlying protocols. Anyone that consumes a Web Service is not tightly connected to it – the service may change during time and the client will still be able to interoperate with the Web Service. This is called *loose coupling*. In the exact opposite case, the slightest change in the service side would require change in the client side and vice versa.

Semantic Web Services

Web services make functional building-blocks accessible over standard Internet protocols independent of platforms and programming languages, promising a communication revolution in heterogeneous domains where the efficient service-based collaboration among different parties is important, such as in e-commerce and e-business. Although this perspective is quite promising, Web services have not managed yet to reach a widespread adoption in a Web scale (Davies, et al., 2009)0. As an implementation technology of Service Oriented Architecture (SOA), Web services constitute a great solution for modular and component-based software development in closed and isolated business environments. However, businesses and individuals are quite reluctant to publish their Web services mainly because the technologies involved are quite complex. Furthermore, the interface, namely the format of what goes in and out of the service, is often described formally. However, what the service is actually doing, semantically speaking, is usually not described formally, making, thus, difficult to find a Web service with a specific functionality and integrate it in a software system.

In an effort to improve the machine interpretability of Web services, the notion of *semantic Web services* has emerged, where Web services are combined with Semantic Web technologies in order to allow data and service providers to semantically describe their resources using third-party ontologies. Semantic Web services aim at making Web services machine understandable and use-apparent, utilizing Semantic Web technologies for Web service annotation and processing. The idea is to provide ontology-based descriptions of Web services that could be processed by ontology reasoning tools. In that way, intelligent agents would be able to automatically understand what a Web service does and what it needs in order to perform a task.

Service discovery and composition are two fundamental tasks in service oriented architectures. Web service discovery can be defined as the problem of locating suitable Web services to fulfill a given objective. Web service composition refers to the combination of simple Web Services in order to create a complex service of enhanced functionality. Composition can be either manual, where the user participates by selecting appropriate Web services from a set of available ones, or automated, where the composition is generated automatically, based on initial requirements about functional and non-functional properties. In the SWS paradigm, both service discovery and composition are performed over the semantic descriptions of Web services.

There are three major frameworks for the semantic description of Web services: OWL-S (Martin, et al., 2004)0, SAWSDL (Kopecký, et al., 2007) 0and WSMO (Roman, et al., 2005)0. OWL-S consists of three main parts: the *Service Profile*, the *Process Model*, and the *Service Grounding*. More details are given in the next subsection. WSMO defines four top-level concepts in its own specification language WSML (WSML): *Ontologies*, *Goals*, *Web services* and *Mediators*. Ontologies actually constitute the domain knowledge that is used. Goals are representations of an objective for which fulfillment is sought through the execution of a Web service. Web services consist of non-functional, functional and the behavioural aspects of a Web service. Finally, Mediators are used for enabling interoperability and handling heterogeneity. Furthermore, WSMO is a goal-driven approach, in the sense that client's goals are matched against Web service capabilities (Kaufer & Klusch, 2006; Domingue, et al., 2008)00.

Both WSMO and OWL-S follow a top-down approach, requiring first the definition of the conceptual aspects of Web services and then connecting them to the actual Web service. SAWSDL follows a bottom-up approach by extending WSDL. More specifically, SAWSDL consists of mappings of XML schema definitions to ontology concepts and extensions to WSDL attributes for referencing ontology concepts.

OWL-S Ontology

OWL-S (Martin, et al., 2004) is an OWL ontology that offers the conceptual model for semantically annotating Web services. The modeling is performed based on three upper ontologies, namely Service Profile, Process Model, and Service Grounding.

Service Profile

The Service Profile provides the information needed for an agent to discover a service (*advertisement*). An advertisement contains descriptive information, such as the service name, and information about the provider. It describes also the functional properties of the service, that is, inputs, outputs, preconditions, and effects, and nonfunctional properties, such as quality. Each advertisement can be either a direct instance of the OWL-S Profile concept or it can be defined based on a Profile subclass hierarchy. The Profile-based Web service discovery involves the procedure of matchmaking service requests and advertisements, both represented as Profile instances. Inputs and outputs (I/Os) are annotated with ontology concepts (signature), and preconditions and effects (specification) are described using a rule formalism.

Process Model

The Process Model provides information for an agent to make use of a service. It tells a client how to use the service by detailing the semantic content of requests, the conditions under which particular outcomes will occur, and the step by step processes leading to those outcomes. In other words, it describes how to ask for the service and what happens when the service is carried out. For

complex (composed) services, the description is used by an agent in order to: (1) perform a more in-depth analysis of whether the service meets its needs; (2) compose service descriptions from multiple services to perform a specific task; (3) coordinate the activities of the different participants; and (4) monitor the execution of the service.

A Process Model can be viewed as a *process* and it is defined in practice as an instance of the OWL-S ontology class Process. There are two types of processes: an *atomic process* is a description of a service that expects one (possibly complex) message and returns one (possibly complex) message in response. It corresponds to the actions a service can perform by engaging it in a single interaction and it is directly invocable (by passing them the appropriate messages). Atomic processes have no subprocesses and execute in a single step, as far as the service requester is concerned. They take an input message, do something, and then return their output message.

A *composite process* maintains some state and each message the client sends propagates it through the process. It is decomposable into other (non-composite or composite) processes and their decomposition can be specified by using control constructs such as Sequence and If-Then-Else, e.g., if a composite is a Sequence, then the client sends a series of messages that invoke every step in order.

A process either generates and returns some new information based on information it is given and the world state or it provokes a change in the world. In the first case, the information production is described by the *inputs* and *outputs* of the process, whereas in the second case the transition is described by the *preconditions* and *effects* of the process. The inputs represent the information that is required for the execution of the process and the outputs represent the information that the process provides to the requester. There can be any number of preconditions, which must all hold in order for the process to be successfully invoked (the process cannot be performed successfully unless the precondition is true) and any number of effects that denote the condition that should hold after the execution of the process.

Service Grounding

The grounding of a service in OWL-S specifies the details of how to access a particular service. The details mainly concern protocol specification and message formats, serialization, transport and addressing. Actually, the grounding specifies a mapping from an abstract to a concrete specification of those service description elements that are required for interacting with the service. The central function of an OWL-S grounding is to show how the inputs and outputs of an atomic process are realized as messages, which carry those inputs and outputs in some specific transmittable format. In most cases, this realization describes how the abstract specifications of the Process Model are mapped on WSDL artifacts.

Interoperability

Interoperability means working together - collaboration of systems, services and people. When people work together, they need to communicate and make agreements. They need to agree on the tasks they will perform and how they will exchange results. If their nationality is different, they also need to agree on the language in which they will communicate. Moreover, they need to overcome cultural and legal differences. An Interoperability Framework can be defined as the overarching set of policies, standards and guidelines which describe the way in which organizations have agreed, or should agree, to do business with each other. An Interoperability Framework is, therefore, not a static document and may have to be adapted over time as technologies, standards and administrative requirements change.

Administrations that provide electronic services (eServices) are faced with the same situation; they need to elaborate a set of agreements

on a large number of issues, considering organizational, semantic and technical aspects. For example, when administrations exchange data, they must ensure that each party shares the same meaning of the data (semantic interoperability): for instance, when referring to 'price', there is a variety of interpretations, such as the actual price or the price per item.

The European Interoperability Framework (EIF)[1] addresses these issues in order to facilitate the interoperability of eGovernment services at pan-European level. EIF supports the European Union's strategy of providing user-centred eGovernment services by facilitating, at a pan-European level, the interoperability of services and systems between public administrations, as well as between administrations and the public (citizens, businesses). EIF is based on the premise that each Member State has, or is in the process of developing, its National Interoperability Framework (NIF). Consequently, EIF focuses on supplementing rather than replacing, NIFs by adding the pan-European dimension. By providing recommendations and defining generic standards with regard to organizational, semantic and technical aspects of interoperability, it offers a comprehensive set of principles for European cooperation in eGovernment.

EIF is supplemented by the well-established IDABC Architecture Guidelines (IDABC, 2004) that approach interoperability from a more technical and pragmatic viewpoint. The IDABC Architecture Guidelines - and other documents foreseen in the IDABC Work Programme - aim at practical guidance and the building of common standards and infrastructures needed for the implementation of interoperability.

EIF covers the exchange of information at a pan-European level between:

- administrations, citizens and businesses;
- administrations and other Member states administrations.

Member States that wish to interoperate at a multilateral, pan-European level and make their services available to citizens and businesses in other Member States should use the guidance and recommendations provided by this Framework and incorporate the relevant aspects in their National Framework. As a consequence, the ultimate beneficiaries will be citizens and businesses who need the provision of such eServices from governments at a pan-European level.

Dimensions of Interoperability

Three aspects of interoperability need to be considered, according to EIF:

- *Organizational interoperability*: This aspect of interoperability is concerned with defining business goals, modeling business processes and bringing about the collaboration of administrations that wish to exchange information and may have different internal structures and processes. Moreover, organizational interoperability aims at addressing the requirements of the user community by making services available, easily identifiable, accessible and user-oriented.
- *Semantic interoperability*: It is concerned with ensuring that the precise meaning of exchanged information is understandable by any other application that was not initially developed for this purpose. Semantic interoperability enables systems to combine received information with other information resources and to process it in a meaningful manner. Semantic interoperability is therefore a prerequisite for the front-end multilingual delivery of services to the user.
- *Technical interoperability*: It covers the technical issues of linking computer systems and services. It includes key aspects such as open interfaces, interconnection

services, data integration and middleware, data presentation and exchange, accessibility and security services.

RELATED WORK

Related work concerns various aspects of the problem we address, namely use of semantic web technologies, like metadata, ontologies, web services, etc., for e-government and PA knowledge. PA ontology modeling is a fast evolving field as ontologies are considered critical knowledge infrastructure to address semantic interoperability problems. They provide the necessary basis for further development of SW and SWS eGovernment applications. Due to the fast development of SW and SWS technologies and the research interest in applying such technologies in PA, we expect to see in the next few years a substantial growth on demand for reusable and scalable PA domain models and ontologies. Nevertheless, ontologies are considered mainly a social construct and as such the acceptance and adoption of these models is a complex social process which is heavily influenced by various sociotechnical factors.

Interoperability among PA agencies has been identified as a central issue and a critical prerequisite for the effective functioning of contemporary PA systems (Peristeras, et al., 2007). The "European Interoperability Framework", discussed above, defines three interoperability types at the technical level, semantic level and at organizational level. Our main aim in this work is to address semantic interoperability coping with different meaning and usage of documents and information, as well as, organizational aspects dealing with different business processes of different PA units.

Currently there are several research efforts that try to address interoperability/integration issues in eGovernment in all three EIF dimensions. The UK e-GIF (e-Government Interoperability Framework) (UK LAWs Project, 2005) model focuses on 4 perspectives: interconnectivity, data integration, e-services access, and content management. In (Guijarro, 2007) a survey of existing e-Government interoperability initiatives and enterprise architectures in the EU and USA is presented. Park and Ram in (Park and Ram, 2004) also give a description of semantic interoperability conflicts regardless of the application domain, while in (Ram and Park, 2004) the resolution of these conflicts is proposed using an ontology. The Semantic Interoperability Community of Practice (SICoP, 2005) has identified the semantic conflict types in information systems and has recognized the importance of Semantic Web (SW) technologies in this area.

In a recent survey paper (Peristeras, et al., 2009), model-driven initiatives and efforts to achieve eGovernment interoperability are reviewed and compared. This type of modeling supports PA interoperability in an indirect though effective way. They are usually introduced as standards/specifications or blueprints to be consulted, or open standards to be followed. According to this survey the various initiatives and efforts can be categorized according to their scope (global, national, sub-domain), their owner (governmental programs, research initiatives) and modeling perspective (data, process/service, organizational).

Our research effort, mainly concerns "normative" countries' PAs (Billiets et. al., 2006), namely PAs that their operation and relations between public entities and civil society are governed by a distinctive type of law, called public law. Moreover as "in all democracies across the world the use of documentary evidence to support PA operations is a common feature" (Sabucedo and Rifon, 2006) according to the scope criterion there is no reason why our generic model could not be applicable and reusable across different countries, thus becoming global, according to (Peristeras, et al., 2009). Finally, we have already applied our general model in three different domain areas, such as state project funding, naturalization and human resource management; therefore, we have

managed to delve into different sub-domains, which helped our general model to evolve.

According to the modeling perspective criterion, our research effort focuses both on modeling the objects/entities involved in the PA, namely the "administrative act", so it can be characterized as a *Data Modeling* approach and also on modeling the services offered by the PA as well as the processes that these services are based on, being thus a *Process/Service Modeling* approach, too.

Two types of data models that enhance interoperability exist:

- *Domain models*; these are attempts to model the basic entities of a specific PA domain following an application-independent approach.
- *Generic data models*; these are more abstract models that cover the overall PA domain. Amongst other things, these models can be used for constructing lower level and domain specific models.

In our case, we re-use the OWL-S ontology for Semantic Web Services as a generic data model for describing processes of PA procedures that lead to services offered by PA, and we extend it with PA domain-specific classes, which are independent of any application. Thus, we use a *domain model*. However, in the case of describing PA entities and documents (such as acts and laws), we follow a *generic data model* approach, using OWL, covering the overall PA domain in the top-level classes and properties of the ontology. In both cases, our scope covers the global public administration system with top level (reference) descriptions reusable in several PA sub-domains, taking a holistic view. Finally, the representation power of our model is OWL-DL (description logics).

The advantages of generic data models lie on their reusability, the development of a common understanding/language and the anticipated cross-domain conformance to standardized conceptual descriptions. Generic data models are applicable across the PA domain, taking a top-level, abstract view and are used as blueprints for the construction of more concrete and domain/case specific models.

Several research efforts and governmental initiatives fall into this category, such as the UK Government Common Information Model (Office of e-Envoy UK, 2002), the Governance Enterprise Architecture (GEA) (Peristeras, 2006), as well as, a large number of national and international attempts to propose eGovernment metadata descriptions based on the Dublin Core Metadata Initiative, described thoroughly in (CEN, 2003).

In the following we will briefly describe the UK GCIM effort, which is the most representative one of the generic data model category. Specifically, the GCIM is a high-level information model for all activities undertaken by PA. It is part of the more general UK e-Service Development Framework (Office of e-Envoy UK, 2002). The central GCIM concept is the Service Interaction. According to GCIM, every PA service is different and the only way to enable reuse of components is to use an agreed reference structure. GCIM provides such a structure, which ensures that stakeholders share a common view of the domain. While each e-service development project can develop its own domain model, the classes used in the various domain models should be categorized under the top-level GCIM concepts.

Based on its purpose, the view of the GCIM model is focused on the transactional aspects of electronic service provision by PA. According to the GCIM model, the operational level of the model consists of objects Subject, Identifier, Location, Evidence, Outcome, Rule, Service, Service Interaction and relationships amongst them modeling transactional aspects. Service Interaction is typically an exchange of information with a common set of identifiable participants (Subjects/Identifiers) in a certain Location and involves a type of a Service, governed by Rules, requiring Evidence and generating Outcomes.

Process modeling has become a popular aspect of business modeling during the last fifteen years with the rise of the Process Reengineering and Innovation imperative and the subsequent process-oriented approach of contemporary organizational systems. The use of Service Orientated Architectures (SOAs) has shifted modeling attempts from process orientation to service orientation. These architectures are specifically focused on issues related to advertise, discover, invoke, compose and monitor services available from multiple providers over the web. This shift of interest resulted in the development of the Web Services (see Background section).

More recently the Semantic Web (SW) (Berners-Lee, et al., 2001) initiative provides models and methods that have led to the emergence of the Semantic Web Service (SWS) technologies. The core of a Semantic Web Service (SWS) remains the service: its description is a key concept. This description should be computer-interpretable, thus formal. There is a growing literature on formal service description, such as OWL-S, the Web Service Modelling Ontology (WSMO), the Semantic Web Services Framework (SWSF) and the Semantic Annotations for WSDL and XML Schema. For more details, see the Background section. Based on these service ontologies, work has been already conducted in Web Service discovery and composition. There is a growing interest in instantiating these generic service ontologies to the eGovernment domain.

Following a Semantic Web Service approach, the Ontology enabled E-Gov Service Configuration (ONTOGOV) project (OntoGov, 2006) has proposed an eGovernment domain specific service ontology, also called meta-ontology. The proposed ontology is heavily based on the two major generic service ontologies, namely OWL-S and WSMO, but ONTOGOV claims not to reuse OWL-S or WSMO as such. The reason for developing a PA specific service ontology was claimed to be inefficiencies in the generic ontologies. However, the PA specific concepts introduced in the model are rather limited and the PA service is modeled with rather poor PA specific semantics.

The ONTOGOV meta-ontology specializes and instantiates in the eGovernment domain some features of the two generic frameworks (but mostly of OWL-S). It consists of two parts: the profile that is used for the service discovery and the process model that is used to describe the process flow. To define the ONTOGOV meta-ontology profile, the OWL-S service profile ontology has been extended.

Initially, the property "hasReferencedBusinessRule" was introduced, that establishes a reference between the service description and the business knowledge in the form of a Business Rule ontology, namely a Legal Ontology, in the case of E-Government. Secondly, an extension from the business process modeling point of view was introduced. In order to model the resources involved in a business process, some new entities were added, namely "requires" property and "Resource" concept, establishing a bridge between the common language used by business people to describe the business processes and the ontology language used for describing web services. Finally, the CEN Application Profile v.1.0 metadata standard (CEN, 2003) was used to describe the non-functional aspects of a PA service, considering the standard metadata defined for the particular domain.

Regarding the process model, several differentiations to the OWL-S process ontology were introduced, relevant to e-Government. First, each service is associated to the law it is based upon. Also, each service is associated with the software component that implements it, along with security levels. Finally, information about cost and time restrictions has been specified. Since it is required that inputs/outputs are defined in the domain ontology, the additional concept "Reference" was introduced. This allows a property may be attached to several domain concepts. Furthermore, a concept defined in the domain ontology may have a number of properties and only a subset

of them is used as an input. This is achieved via the properties "hasConcept" and "hasProperty".

While OWL-S uses preconditions and effects to refer to the changes in the state of resources, ONTOGOV uses the WSMO interpretation. Preconditions are used for defining what a service expects for enabling it to provide its service, while postconditions define what the service returns in response to its input. Composite services have the property "hasFirst" to indicate the first service in the process flow and the transitive property "consistsOf" to indicate all included services. There are some consistency preserving rules, such as that if a part of a service is related to some part of the law, then the service itself is related to the same part of the law. The control structures supported are Sequence, Split, Join and If-Then. Services and control constructs are connected through the properties "hasNextControlConstruct" and "hasPreviousControlConstruct" whose domain is "Service" and range is "ControlConstruct" and their inverses "hasNextService" and "hasPreviousService".

Governance Enterprise Architecture (GEA) has been proposed as a top-level, generic (and thus reusable) Enterprise Architecture for the overall governance domain. Following a Model-Driven Development (MDD) approach, GEA claims to be a Computational-Independent Model describing the business context and business requirements (ATHENA Project, 2005). Thus, a key aspect of GEA is that it attempts to be technology neutral. This means that the GEA models may be applicable to different technological environments. A GEA overview can be found in (Peristeras, 2006).

GEA adopts a two-dimensional framework in order to build a set of inter-related models that describe the overall governance system. In the horizontal dimension, the process versus object modeling perspective has been introduced.

According to the object model of GEA for service provision, a Societal Entity requests a Service. A PA entity can have one of the four roles: a) Service Provider that provides the service to the Societal Entities (clients), b) Evidence Provider that provides necessary Evidence to the Service Provider in order to execute the PA Service, c) Consequence Receiver that should be informed about a PA Service execution, and d) Service Collaborator that participates in the service execution workflow.

PA Services are governed by Preconditions usually specified in Laws, which set the general framework for the service and the business rules that should be satisfied for its successful execution. Preconditions can be expressed formally as a set of clauses and are validated by a Piece of Evidence, stored in numerous alternative Evidence Placeholders. For example, the age of a citizen, which is a Piece of Evidence for a service that depends on age limitations, can be contained in alternative Evidence Placeholders, such as the ID card, the passport or the birth certificate.

A PA Service may have different types of results (Outcomes): Output, Effect and Consequence. Output is the documented decision of the Service Provider regarding the service asked by a Societal Entity, similarly to our notion of "Act". This "documented decision" is embedded and reaches the client in the form of an administrative document or decision. The execution of a service may result in a change in the state of the world (e.g. transfer of money to an account). This is the Effect of the service as defined also in OWL-S and WSMO. In the PA domain, the service Effect is the actual permission, certificate, restriction or punishment the citizen is finally entitled to. A Consequence is information about the executed PA Service that needs to be forwarded to interested parties.

Among other efforts that concern e-government ontologies is the Smartgov project (SmartGov Project)0 where an e-government service ontology about generic business activities is described, using the KAON modeling tool 0. The ontology comprehends four broad categories: Activity, Organization, Strategy and Marketing. Another initiative taken by the Essex County Council within the DIP project (DIP project)

aims to develop a whole governmental Ontology, modeling a very wide range of concepts related to the British government and other important community agencies, their services and citizens.

Legal ontologies aim at achieving semantic interoperability through the modeling of the legal domain with respect to legal concepts and law discipline. A number of projects, including e-Court, e-Power, FF Poirot, "Financial Fraud Prevention-Oriented Information Resources using Ontology Technology", CLIME, and SEKT (SEKT Project), aim at improving the access and understanding of large collections of legal information through the Internet, exploiting Semantic Web technologies in the legal domain.

The SEKT project provides support to newly recruited judges, based on ontologies of professional legal knowledge (Casanovas, et al., 2005) rather than ontological models for theoretical legal knowledge, as most previous attempts. The ontology was built in OWL Lite as a specialization of the Proton upper ontology and its structure resulted from the answers that judges gave to a questionnaire in order to reflect everyday tasks.

Our ontology refers to administrative entities, procedures and documents rather than legal hierarchies. Public administration serves its own goals and objectives by producing acts that have their own rationale, which is quite different from the one of the courts. Acts use laws, as well as jurisprudence and administrative precedents. Our approach models administrative act, a "performative" document, as an object using the right legal and institutional framework. Furthermore, it gives emphasis to the structure of the public administration in order to better represent the units that are pertinent to the production of documents as well as the workflow among them. Procedural aspects of the ontology are represented in a Semantic Web Service framework, namely OWL-S. The purpose for this is twofold: firstly, to allow easy sharing and re-use of the process models among different administration units and, secondly, to cater for future integration into e-government services.

PA's structure is specified by laws and it is not a result of the consensus of professionals. Laws are usually needed, in specific circumstances described by a settled context. Organization of legal norms into legal areas that reflect scientific or professional fields or notions raise complexity for PA since a legal field may refer to entirely different administration areas. PA and whoever interacts with it copes with procedures. These procedures may combine legal rules in a unique way. This might lead to a unique rationale, which is not the aggregation of a number of norms. Therefore, PA's procedures are the result of a combination between legal knowledge and administrative practice. This requires interpretation of the legal framework by the senior officers and the explication of the tacit knowledge of everyday practice.

In this work we mainly regard PA's entities as production units. We focus on the backoffice operation for the production of PA's outputs. Communication issues between citizens and businesses and PA for service retrieval are not yet fully addressed. In accordance to GCIM, every PA service is different and the only way to enable reuse of components is to use an agreed reference structure, which in a sense could be a meta ontology like in the case of ONTOGOV.

AN ONTOLOGICAL PUBLIC ADMINISTRATION PROCESS MODELING FRAMEWORK

Each public organization produces a huge amount of public documents, both administrative acts ("performatives") and informative ones. An administrative act is produced by an authorized body and it is directed to the external environment of PA, i.e. it concerns citizens and businesses. As already mentioned, knowledge is usually captured in ontologies.

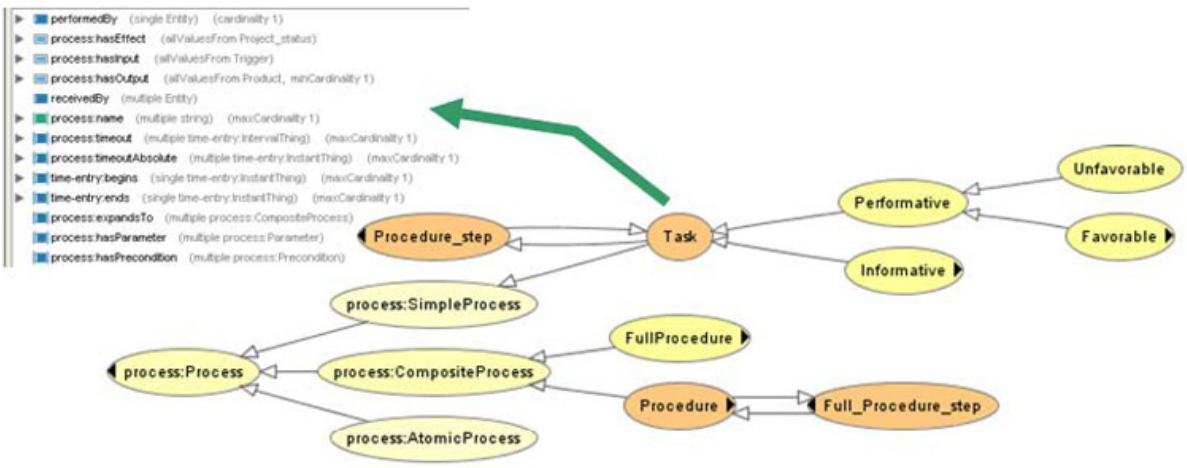
Ontology of Greek Public Administration Procedures

The ontology of Greek public administration procedures, based on (Savvas and Bassiliades, 2009), represents which types of *documents* are produced by which public administration *units* and how these documents *flow* among these units. The ontology consists of two parts. The first part represents, in OWL, the Greek public administration *structure* (i.e. administrative units and their hierarchical relationships) and *documents*, which are either used by these units as a legal framework or they are produced by them. Thus, documents are further divided in Judicial/legislative and Administrative/citizen. In the second part, the *procedures* are represented in OWL-S service models. The ontology is updated continuously as new laws, administrative regulations and procedures are issued.

Note that Public administration structure is hierarchical and it is regulated by laws and decisions. On the "structural aspect" of the ontology, all agents (actors) of the administrative universe of discourse are included (Figure 1), namely the three independent authorities (judicial, administrative and legislative), as well as citizens and businesses. In this work we consider in detail only the structure of the administrative authority. Moreover, the public administration document type hierarchy is distinguished in four major classes (or entity types):

- Administrative documents, i.e. documents produced by PA, which can be either *informative*, i.e. they do not have actual impact on the real world but they just inform a citizen or an administrative unit about something, or *acts*, i.e. the decisions have an impact for citizens or business (e.g. an approval for funding). Administrative documents also play the role of *products* of PA procedures.
- Citizen documents, i.e. simple documents that are produced by the citizen and are used as input to procedures, such as requests and declarations,
- Laws, i.e. documents that set the legal framework of the PA and have a general validity, i.e. they are applied in any case,
- Case Law, i.e. decisions made by the Supreme Court or an administrative court in the past and are regularly used for decision making. Case Laws are usually made on individual cases and they are used as a guideline for new cases, but sometimes

Figure 1. The public administration procedure ontology as an extension of OWL-S



they refer not to individual citizens but to a broader category of people (regulatory acts).

The public administration procedure ontology is represented as an extension to OWL-S (Figure 1). The key concepts of the ontology are procedures, full procedures, and tasks. Full procedures (or total procedures, as called later in the revised ontology) are composed by one or more procedures and procedures are composed by one or more tasks. Every procedure (and task) has a name which declares or indicates its objectives. The language used to depict this objective might not be strictly administrative. Thus, each procedure has a name, title and a short description providing the possibility to citizens and inexperienced civil servants to understand its aim. The title of an administrative act is used as a title for the procedure that produces this act.

Tasks are atomic activities that cannot be further cut down to smaller ones, performed by a single administration unit. Every task has just "title" as it is always used in the framework of a procedure. The title of the task is the same with the title of the administrative act or the informative document the task produces. Every task has as input any kind of text, namely administrative, legal, etc. The output of the task is the document that it produces.

We call *procedure* each integrated part (or step) of a *full procedure* (service), which includes at least one informative task (i.e. it tries to find or notify some information from/to another unit) and only one "performative" task (i.e. it produces a single act). "Performative" and informative tasks in the same procedure may not be performed by the same administrative entity. In certain circumstances, where only one act is produced by an administrative unit, the informative part may be included in the announcement/notification of the act. No further informative task is performed then.

Furthermore, in certain procedures and due to communicative barriers, set by the administration hierarchy, the unit which produces an act and the unit that communicates it to the interested parties may be different. The latter is the one that receives the act in the first place, as it affects its world.

We study public administration procedures whose products address to the organization's external environment. This environment includes citizens/businesses, other public organizations and public servants acting as citizens. Thus we are not interested in internal trivial, routine processes that produce no document for one of the previous actors/entities.

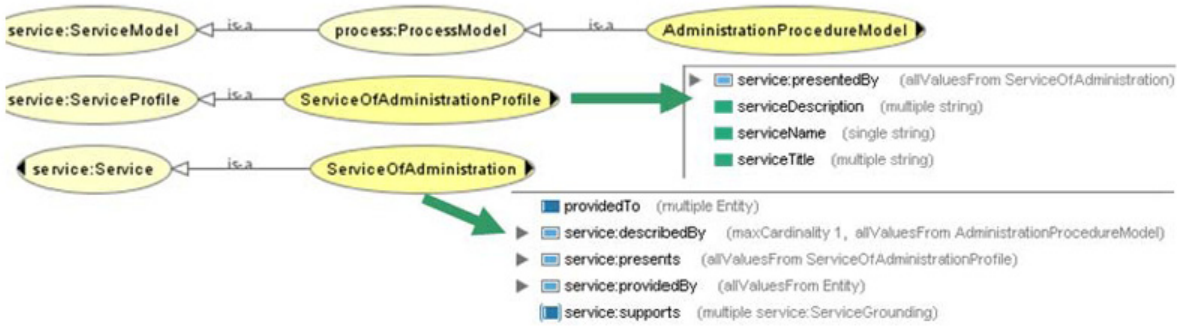
We call *Full procedure* a number of procedures intertwined. A full procedure may reflect to the provision of a service to one or several entities (property *providedTo*). Figure 2 shows the specializations of the OWL-S service, service profile and service process model classes. Procedures may be sequential or in an acyclic graph. In our ontology, we adopt the control constructs of OWL-S. Some examples of procedures that can be represented using our ontology are:

1. Hierarchical control that is anticipated by a law.
2. Hierarchical control that is performed due to objections/appeals.
3. Communication between public organizations due to joint responsibilities for the expression of agreement in order for a project to accomplish.
4. Sequential procedures that lead to the provision of a service.

THE HUMAN RESOURCE MANAGEMENT TESTBED

Human Resource Department of the Region of Central Macedonia like any other HRM department of the Greek PA is responsible for executing cervices concerning public servants and their transitions. The purpose of this project was to set the base for knowledge management in the HRM

Figure 2. Specializations of OWL-S service, service profile and service model



department. In this department certain repetitive tasks are executed in a daily basis concerning the whole spectrum of public servants' transitions. Moreover these tasks concern the whole of Public Organizations as the code and the laws that rule Greek Public Administration and Servants are the same regardless of their territorial or thematic responsibility. Therefore the registration and formalization of this knowledge is a prerequisite in order to remain in the organization as public asset. This could help to the improvement, simplification and support of the service provided. Furthermore, it could be used as training material for the novice public servant of the department.

Knowledge Engineering Process

In the Human Resource Management use case, we have initially analyzed the organogram of the Human Resource Department of the Region of Central Macedonia and the operations of the Department. Then, we have studied the Greek legislation on human resource management for public servants. Finally, we have concluded that a hybrid knowledge engineering process should be followed in order to acquire the necessary knowledge for constructing the ontology for the human resource department and the PA processes this department performs.

PA is a special knowledge-based formation/structure as most of its procedures are based on law; therefore, they are defined in a rigid and explicit manner (explicit knowledge). However, there are cases where legislation only defines a general lawful framework in which the PA must provide its services to the citizen, constraining its actions, without dictating a unique procedure that must be followed. This means that the same service could be provided by different PA units following (slightly) different procedures, without violating the law. Therefore, there is ground for a knowledge acquisition/elicitation process in a PA unit, in this case the Human Resource Management Department of the Region of Central Macedonia. Several concepts, entities, processes, roles, restrictions and preconditions of processes/services can be found in the legislation, whereas some of the above can only be accurately acquired by the personnel of this PA unit (aka "the domain experts").

In our case, knowledge acquisition was initiated with interviewing the director of the department, who is considered to be the primary domain expert (Medsker, et al., 1995). The primary expert set the knowledge framework, describing the organogram (structure) of the department, defining its main services/procedures, listing the relative acts that its produces and indicating the relevant legislation that these acts are based on, and finally, recommending secondary experts, namely appropriate personnel of the department, that would

fill-in the knowledge acquisition process with all the necessary details about the unit's procedures.

Then, the knowledge engineering team, which consisted of multiple knowledge engineers in order to cross-verify the understanding of the acquired knowledge (Gaines and Shaw, 1993), studied carefully the acts produced by the department, the documents exchanged and the underlying procedures in order to identify the entities involved and the legislation about the human resource management in the PA. Furthermore, the knowledge engineering team tried to identify those laws that instead of defining the exact procedures for the PA services, they just set the framework and let each PA unit work out for itself the best (legal) way to conclude them.

After the knowledge engineers have acquired the adequate domain knowledge background they interviewed the secondary experts suggested by the primary expert in order to confirm that the entities involved in each procedure have been correctly identified, to record the exact procedure, namely the individual steps involved and the workflow among them, to define exactly which documents are exchanged between the procedure steps, and to clarify all the preconditions, inputs, outputs and effects of each step and procedure. All the above are necessary according to the PA service modeling scheme of our approach, which has been presented in the previous section.

During interview sessions, knowledge engineers presented to the secondary experts some preliminary flowcharts of the procedures, which illustrated the entities, the sequence of steps of the procedure, as well as the exchanged documents between each step. These flowcharts were prepared by the knowledge engineers during the study period of the domain background knowledge, as a preliminary model of the domain. More on these flowcharts will be presented in the next subsection. In this way, the secondary experts could visually confirm the proper understanding of the procedure from the knowledge engineer and, in some cases, to suggest corrections or extensions to the flowchart model, when these preliminary flowcharts did not reflect reality in an accurate way.

Procedure Flowchart Template

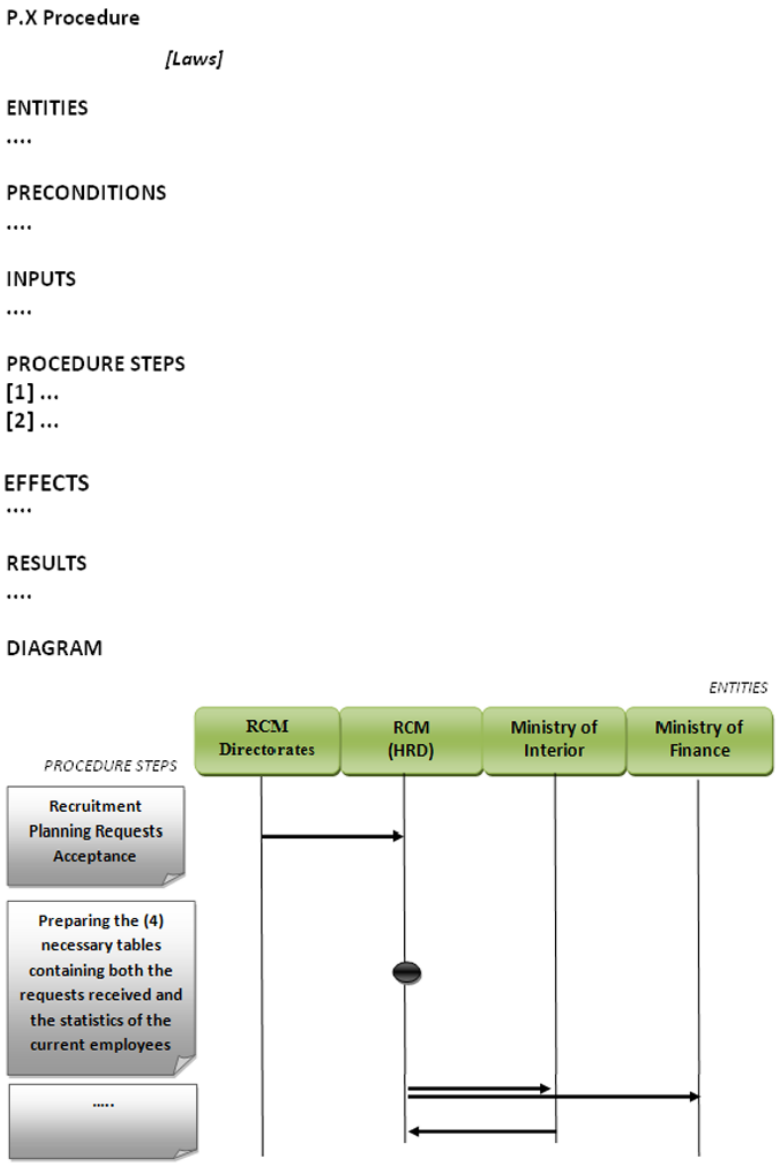
As explained in the previous subsection, in order to elicit and record the domain experts' knowledge about the PA entities, procedures and documents, a series of procedure flowcharts were prepared by the knowledge engineers during their familiarization with the background domain knowledge by studying the relevant legislation. Then, these flowcharts were presented to the secondary domain experts of the PA unit in question, in order to approve them, correct them, or enhance them. In this subsection we will give details on the structure of the flowcharts, presenting an abstract template.

The procedure flowchart template we designed consists of six modules, presented in Figure 3.

- Entities: individuals, PA units, ministries, etc.
- Preconditions.
- Inputs: e.g. prerequisite documents such as applications.
- Procedure Steps.
- Outputs: output documents.
- Effects: i.e. changes made in the real world.
- Procedure diagram.

Each of the above pieces of information has been chosen to closely reflect the structure of our ontological modeling approach, as it will be clearly demonstrated in a full example in the next sections. For example, entities correspond to subclasses of the entity class of our ontology. The literals that appear in this field during knowledge acquisition will be later matched against existing classes of the ontology. When no such class is found a new class, subclass of the entity class, should be created. However, the placement of such a class in the ontology hierarchy requires knowledge about the hierarchy of PA units; therefore; the knowledge

Figure 3. Procedure flowchart template



engineers have to go back to the (primary) expert to ask for advice on where to place the new entity in the hierarchy.

Preconditions, Inputs, Outputs, and Effects are all related to the corresponding properties of the final service modeled. Therefore, Inputs and Outputs correspond to a document (administrative text) class. In the same spirit above, either an existing class is used, or a new one is created and placed in the hierarchy using the opinion of the primary expert. Preconditions and effects are handled as SWRL conditions.

The Procedure Steps and diagram define the workflow of the tasks and (simple) procedures. Typically the sequence construct is used. Each step is a simple task. Some steps are grouped together to form a simple (procedure). All the simple procedures together form a total procedure,

which is the procedure attached to the final service. The diagram also indicates document exchanges between the tasks. Actually, these are of the same nature as Inputs and Outputs that concern the inner (simple) services or tasks, rather than the total service. Therefore, their treatment is much the same as we mentioned above.

Extensions / Adaptations of the Generic Object / Process Models

What we have learned by the knowledge representation phase is that the initial generic PA procedures modeling ontology of (Savvas and Bassiliades, 2009) does not always cover our use case. Therefore, some (but not many) adaptations should be performed to this generic modeling framework. These adaptations should be general enough, in order to be applicable not only to the current use case, but to be re-applicable to the use cases already developed using the generic framework.

A significant development in the (revised) generic object / process model is the modeling of the performative task. More specifically, the new ontology contains two types of administrative documents that harmonize with the products' role produced by the performative procedure found in Public Administration:

1. *Act*: It includes all the acts that can be produced by the Public Administration's procedures.
2. *Announcement of Act*: It includes only the acts that are announcements of decisions either to another PA unit or to individuals. Announcements, although sound like informative tasks only, because they just deliver information to the interested parties, we consider them as performatives, because according to the Greek Law, the enforcement of an act begins only after its announcement; therefore, the announcement of an act has effects on the real world.

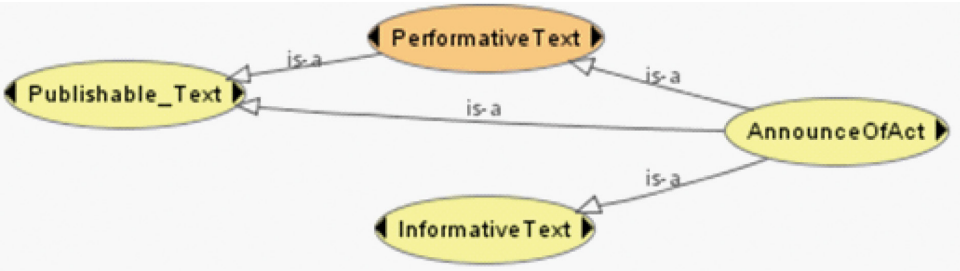
In the revised PA procedure modeling framework, every task that produces an act or an announcement of act is considered to be a performative task. The rest of the tasks are considered as informative ones. Thus, a *procedure* consists of:

1. One or more informative tasks
2. Exactly one performative task (Act or Announce of Act)

A *total procedure* consists of at least one or more (simpler) procedures; therefore, a total procedure is usually composed of:

1. One or more informative tasks,
2. One or more performative tasks, one for each (simple) procedure,
3. One announcement of act, usually in the last (simple) procedure of the process.

Figure 4. The document (product) types involved in the Public Administration



Note that a task is considered performative for a PA unit (say RCM) only when the act is carried out by the RCM. That means that the same task could be performative for one PA unit and informative for another depending on the point of view. When modeling RCM, for instance, acts performed by other PA units, external to RCM are informative tasks. However, this happens only because we have chosen to model PA procedures only internal to the RCM. In a case of modeling the entirety of PA procedures, this duality would not exist.

Ontology Statistics

This revised ontology, as already mentioned, was based on the generic ontology presented in the previous section. The revised ontology extended the initial with a variety of new classes, properties and instances. More specifically, there was an increase of 88%, 125% and 375% in classes, properties and instances, respectively. Statistics can be found in Table 1.

Entities and Documents Hierarchy

The entities and documents hierarchy was maintained in the revised ontology. However, it was enriched with various new classes. For instance, three new classes were added in the entities hierarchy (presented in Figure 5). Mention that the new classes are in capitals.

Additionally, in the documents hierarchy there was an increase of 95% as shown in Figure 6. This large difference from the entities case is because the ontology has already been used for modeling other RCM's departments and processes. Therefore, the entities coming from the RCM's structure were almost already there, whereas the documents are mostly new, since each department issues different documents from each other.

Table 1. Ontologies' statistics

Statistics	Initial	Revised
Metrics		
Class Count	156	293
Object Property Count	45	109
Data Property Count	23	44
Individual Count	145	688
DL Expressivity	SHOIN(D)	SHOIN(D)
Class Axioms		
SuClassOf Axioms Count	250	374
EquivalentClasses Axioms Count	4	14
DisjointClasses Axioms Count	0	6
Hidden Gci Count	8	14
Object Property Axioms		
SubObjectPropertyOf Axioms Count	2	12
EquivalentObjectProperties Axioms Count	0	5
InverseObjectProperties Axioms Count	6	19
ObjectPropertyDomain Axioms Count	25	90
ObjectPropertyRange Axioms Count	26	91
Individual Axioms		
ClassAssertion Axioms Count	149	689
ObjectPropertyAssertion Axioms Count	341	1351
DataPropertyAssertion Axioms Count	63	29
Annotation Axioms		
AnnotationAssertion Axioms Count	2	71

Finally, the performative documents hierarchy was also enriched by 70% (presented in Figure 7).

Example of Modeling a Procedure: The Case of Recruitment Planning

In this subsection we present a full example of modeling one of the procedures of the human

Figure 5. Entities hierarchy



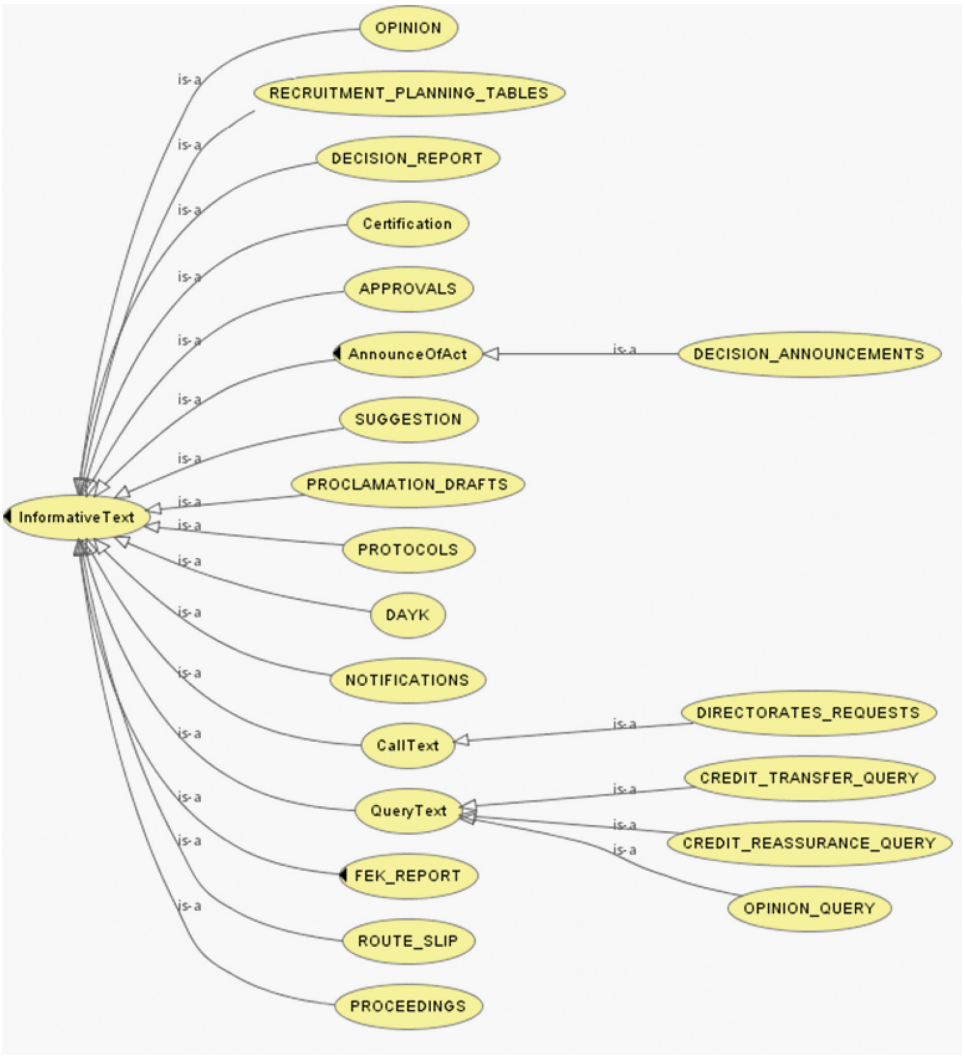
resource department of RCM using the methodology presented above.

First of all the total procedure was analyzed in sub–procedures, as shown in the flowchart presented in Figure 8.

The recruitment planning procedure in particular is composed by four sub–procedures described below:

1. *Recruitment planning Requests Acceptance*: Upon receiving requests from all Directorates of the RCM, the RCM's Human Resources Department (HRD) prepares the necessary tables containing both the requests received and the statistics of the current employees. This procedure therefore requires the cooperation of all departments of the RCM.
2. *Covering Report Writing*: Based on the data obtained by the requests, the Secretary General of RCM writes the accompanying report containing the reasons for recruitment needs.
3. *Special Substantiation Writing*: Based on the above report and the accompanying, the RCM's HRD prepares a special substatiation for each branch and specialty.
4. *Recruitment Decision Announcement*: The RCM sends all these data, ie tables, the accompanying report and the special substantiation to the Ministry of Interior and the Ministry of Finance and as soon as it receives the respective approvals announces the decision.

Figure 6. Informative documents hierarchy



Task Categorization

1. Informative
   a. Recruitment Planning Requests Acceptance Task
2. Performative
   a. Recruitment Decision Publication Task
   b. Special Substantiation Compilation Task
   c. Covering Report Compilation Task

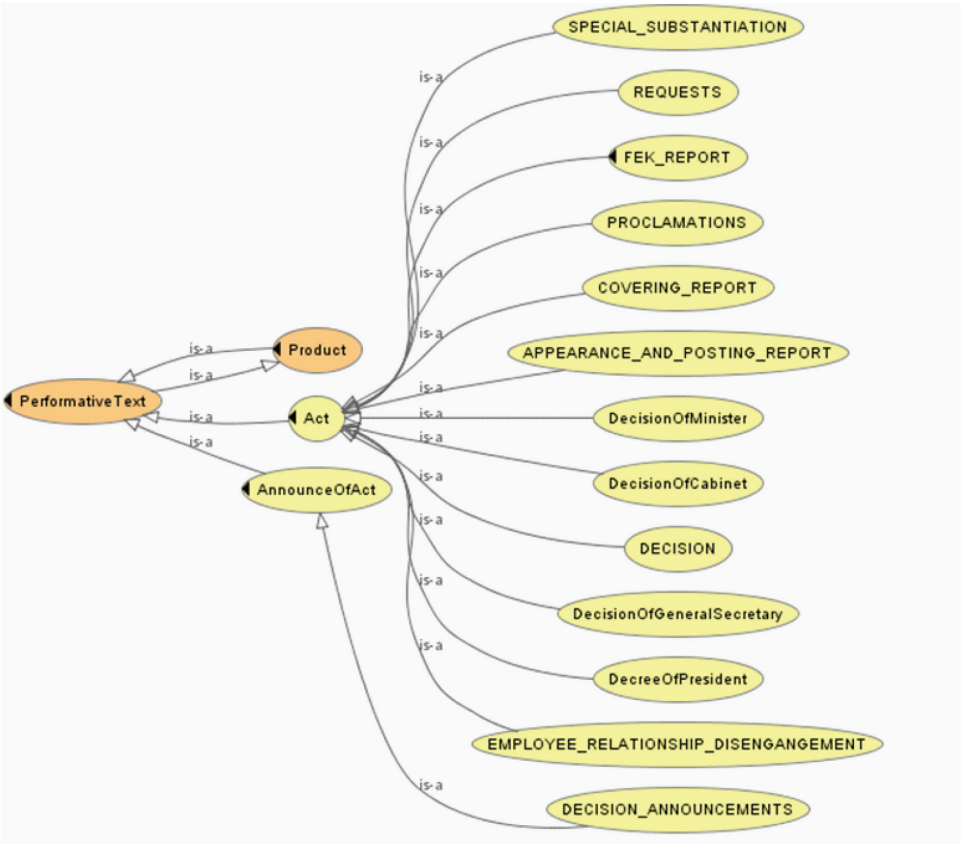
Note that informative tasks produce informative documents and performative tasks produce performative documents.

Procedures Definition

The procedures are actually task clusters that describe a critical semantic act. In the above case there are three procedures:

1. **Covering Report Writing**, that is composed by the two tasks below:

Figure 7. Performative documents hierarchy



a. Recruitment Planning Requests Acceptance Task
b. Covering Report Compilation Task

2. **Special Substantiation Writing**, composed by:
   a. Special Substantiation Compilation Task
3. **Recruitment Decision Announcement**, composed by:
   a. Recruitment Decision Publication Task

Total Procedures Definitions

A total procedure is referred to the sequence in which its sub–procedures are performed. As mentioned above, the recruitment planning's total procedure is composed of three simpler procedures. First has to be performed the covering report writing procedure, then the special substantiation writing procedure and finally the recruitment decision announcement procedure.

Ontology Modeling

Task Modeling

The tasks are modeled according to their type, informative or performative in particular.

Similarly for performative tasks are created subclasses of class Performative (Figure 10).

As already reported, for each class is generated an object that defines the properties and the setting values of the ontology. An action described by the following attributes:

- *hasInput*: refers to the required inputs.

Figure 8. Recruitment planning flowchart

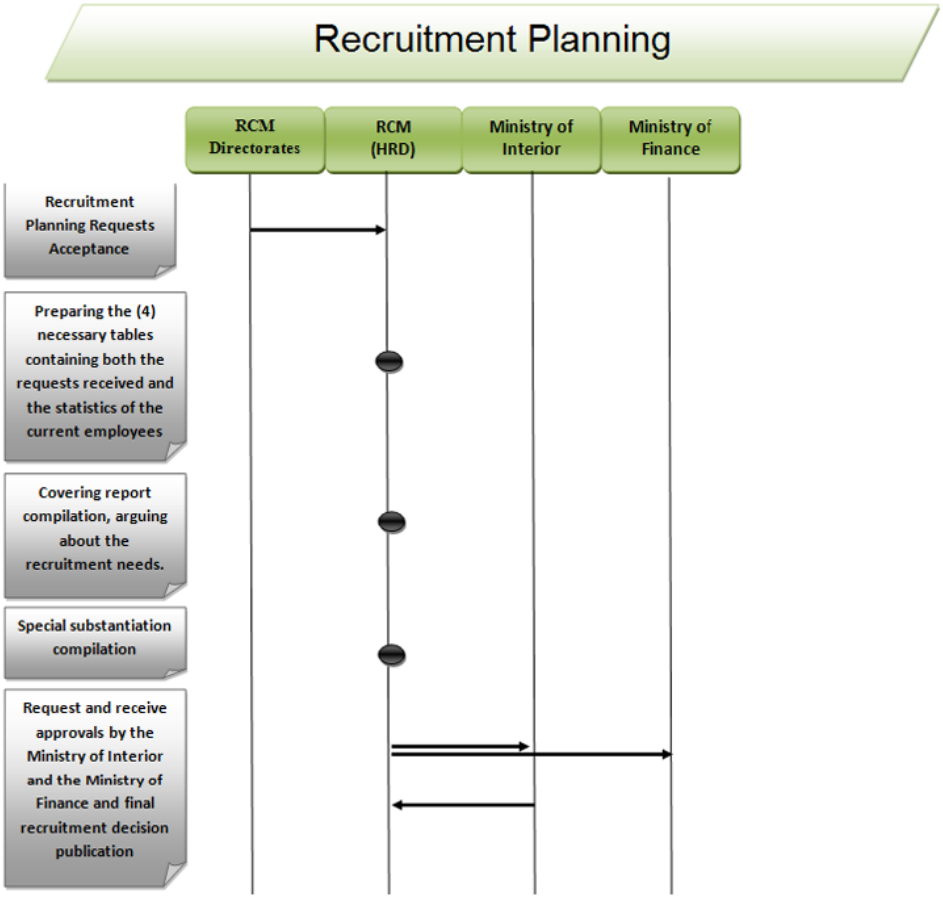
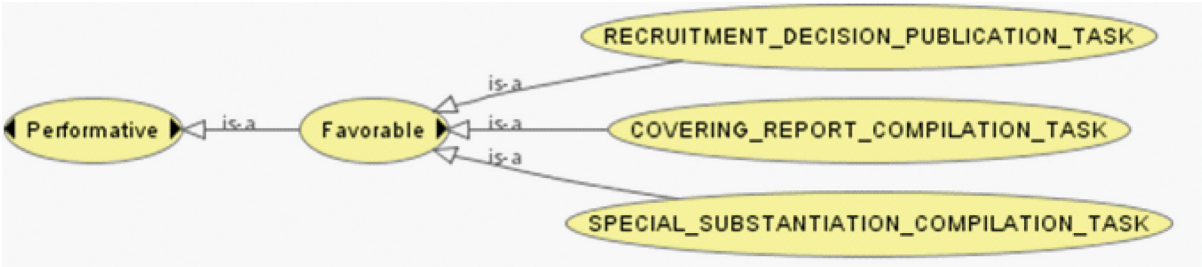


Figure 9. The informative's subclass that is used for the case's informative task



Figure 10. The performative's subclasses that are used for the case's performative tasks



- *hasOutput*: refers to the task's results, ie produced documents.
- *performedBy*: refers to the entity that performs the task.
- *receivedBy*: refers to the entity that receives the task's results.

For example, the recruitment planning requests acceptance object (Class EMPOYMENT_PROGRAMMING_REQUESTS_ACCEPTANCE_TASK) contains the values (Figure 11).

More specifically, the task has as input the directorates requests (i.e. instances of class DIRECTORATES_REQUESTS) and produces the necessary tables (instances of class RECRUITMENT_PLANNING_TABLES). This task was performed by the RCM's HDR. All values are actually objects of different classes available in the ontology. For example, the HDR is part of the entities hierarchy (class ENTITY) which defines the various entities encountered in the procedures of the Public Administration. Respectively, the documents are objects belonging to the documents hierarchy (class TEXT).

Similarly are modeled the rest ontology's objects. Thus, new objects are created for each of the classes, namely Classes COVERING_REPORT_COMPILATION_TASK, RECRUITMENT_DECISION_PUBLICATION_TASK andSPECIAL_SUBSTANTIATION_COMPILATION_TASK. It should be noted that these acts are performative, thus the produced documents are performative too, according to the document hierarchy (Figure 12).

Procedure and Total Procedure Modeling

Following the same principle, both the procedures and the total procedures are modeled as class objects. These classes are actually subclasses of the (OWL-S) CompositeProcess class (Figure 13).

Thus each procedure and total procedure has an associated object in the ontology which refers to its acts or procedures, respectively. For this purpose are used objects of the class ControlConstruct that allow the determination of the tasks' sequence (workflow – procedures) or the procedures' sequence (in the case of total procedures).

Web Services Modeling

For each procedure are defined all the necessary OWL-S objects, in order to model eventually each

Figure 11. Recruitment planning requests acceptance object's values



Figure 12. Part of the documents hierarchy

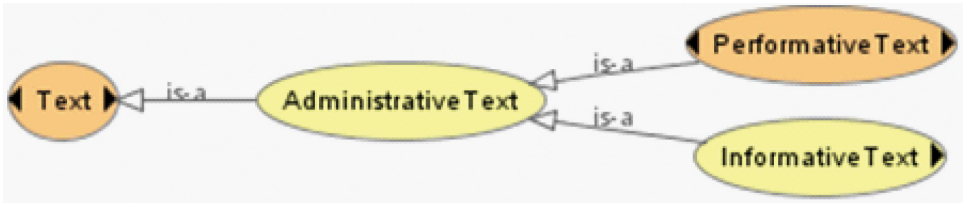
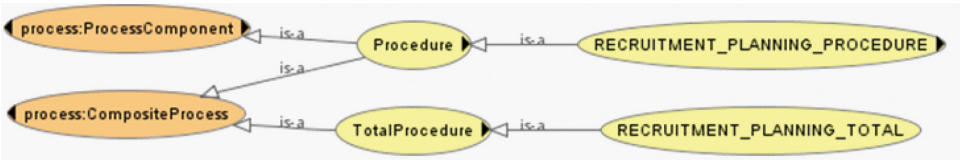


Figure 13. Part of the procedures hierarchy



of the procedures as web service. For this purpose are defined three important classes, namely Service, ServiceProfile and ProcessModel. In the case studied here, the object of the ServiceProfile class is referred to the Service class through the presentedBy attribute. Similarly, the object of the Service class is referred to the ServiceModel class through the describedBy attribute. Finally, the object of the ServiceModel class is referred to the whole modeled procedure. Thus, the web service is consisted of a total procedure that includes two procedures; each of them consists of a number of tasks.

CONCLUSION AND FUTURE RESEARCH

Achieving e-government requires radical organizational redesign of public administration. In this context, ontologies are the mean to reduce or even eliminate the public administration's disparity. This chapter presented the modelling process of the Human Resource Management procedures in OWL language. The developed ontology contains concepts and entities found in the Region of Central Macedonia use case and it is used to represent semantic processes in the form of Web services in order to produce a well-defined and formal knowledge base that can be reused and extended.

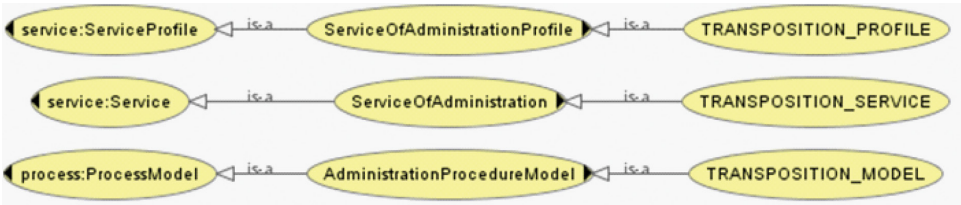
In the future, our research will focus on enriching the semantic web services ontology with non-functional properties, namely attributes concerning the monitoring of efficiency and effectiveness of Public Administration services and units. To this end, efforts for the development of an algorithm which could be detect inefficiencies and malfunctions of Public Administration units, using these non-functional properties, have already been made.

Another line of research is to study in more details ways to bring closer our modeling effort with similar modeling and standardization efforts presented in the related work section. This would allow a more pan-European aspect of our PA modeling effort, at least in "normative" countries. However, in order to do this, all the interoperability dimensions defined in the EIF guidelines need to be addressed, whereas the focus of our work so far has been only the semantic interoperability level.

ACKNOWLEDGMENT

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Figure 14. General class hierarchy



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KEY TERMS AND DEFINITIONS

Interoperability: The ability of information and communication technology (ICT) systems and of the business processes they support to exchange data and to enable sharing of information and knowledge.

Ontology: A specification of a shared conceptualization using a formal language.

OWL-S: An OWL ontology that offers the conceptual model for semantically annotating Web services.

Semantic Web Services: Ontology-based descriptions of Web services that could be processed by ontology reasoning tools.

Semantic Web: The extension of the current Web where information is given well-defined meaning, enabling computers and people to work in better cooperation.

Web Ontology Language (OWL): The W3C recommendation for creating and sharing ontologies on the Web.

Web Service: The server end of a client–server system for machine-to-machine interaction via the World Wide Web.

ENDNOTE

[1] http://ec.europa.eu/idabc/en/document/2319/5644.html

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Chapter 35
Developments of e-Government in Sri Lanka: Opportunities and Challenges

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ABSTRACT

This chapter investigates the status of e-Government development, explores the opportunities created for citizens and government, and identifies the challenges for an effective implementation of e-Government in Sri Lanka. The study reveals that the dissemination of public information online, the provision of call centre services, and the establishment of tele-centres in rural areas have generally improved the well-being of citizens. It further shows that the development of information and communication technology infrastructure and the taking of the human resource capacity building initiative in public organizations have had a positive impact on the performance of public organizations. The study, however, reveals that the continuous development of e-Government in Sri Lanka is troubled by the uneven access of rural citizens to e-Government services, the low e-Readiness of citizens, the delay in implementing major e-Government projects, and the insufficient funding for successfully implementing all the e-Government initiatives.

INTRODUCTION

Electronic government (e-Government) is commonly referred to as the delivery of government information and services through the use of Information and Communication Technologies (ICTs) (Akman, et al., 2005; Horan & Abhichandani, 2006). It can be approached from different perspectives including e-Citizens and e-Services, e-Administration, and e-Society. E-Citizens and e-Services focus on developing the relationship

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between government and citizens by improving public service delivery, encouraging the participation of citizens in government, and informing citizens about governmental activities (Heeks, 2002; Ndou, 2004). E-Administration aims to improve public processes by cutting costs, linking processes and public organizations, empowering public employees, and improving transparency and accountability in government (Heeks, 2002). E-Society tries to develop the relationship between government, businesses, and societies (Heeks, 2002) through improving the interaction between government and business and building the social and economic capacity of a civil society (Heeks, 2002).

Significant benefits are promised from the rapid development of e-Government worldwide. Such benefits include providing quality public services to citizens, improving organizational effectiveness, increasing transparency and accountability in government (UNDESA, 2008), improving the quality of life, reducing the communication and information cost, bridging the digital divide, and encouraging the participation of citizens in government (Jaeger & Thompson, 2003; Akman, et al., 2005). As a result, e-Government is widely considered as the new way for governments to improve their performance in developing countries (Dada, 2006).

There is no exception in the development of e-Government in Sri Lanka (Hanna, 2007; Karunasena & Deng, 2010a). In 2002, the government of Sri Lanka officially launched the e-Sri Lanka initiative with the assistance of World Bank (ICTA, 2005; Hanna, 2007; Hanna, 2008). Under the umbrella of the e-Sri Lanka initiative, the reengineering government program is proposed for reforming the public sector to provide citizens with transparent, effective, efficient public services and to improve the quality of the life of citizens (ICTA, 2010a). Numerous e-Government projects were initiated—leading to the rapid development of e-Government in Sri Lanka. A recent study reveals that Sri Lanka is the first runner-up in the South Asian region in e-Government development (UNDESA, 2008). The Network Readiness Index (NRI) shows that Sri Lanka is at the 72nd position worldwide concerning e-Government development in 2009/2010, which is 14 positions up from 2006 (Mia & Dutta, 2007, 2008, 2009, 2010). There is, however, a lack of studies assessing the status and the future of the e-Government development in Sri Lanka.

To fill this gap, this chapter aims to assess the progress made concerning development of e-Government in Sri Lanka. It investigates the opportunities generated for both citizens and government and identifies the challenges that Sri Lanka comes across as a developing country in its pursuit of implementing various e-Government projects. It is assumed that this study will eventually serve as a lesson on the various aspects of e-Government being investigated to other countries, especially those in the developing world context.

RESEARCH METHOD

The objective of this study is to evaluate the progress of e-Government development in Sri Lanka, to explore the opportunities generated through e-Government, and to identify the challenges that Sri Lanka faces in the implementation of e-Government projects. To fulfill these objectives, several research questions have been formulated as follows:

1. What is the status of e-Government developments in Sri Lanka?
2. How is this status achieved?
3. What are the opportunities generated in Sri Lanka through the implementation of e-Government projects?
4. What are the challenges that Sri Lanka faces in the implementation of e-Government projects?

To adequately answer these research questions, a mixed-method approach is used in this study. The use of such an approach helps answer both quantitative and qualitative questions in the study (Creswell & Clark, 2011). The power of numbers (quantitative data) can be expanded and elaborated with the rich context of the lived experience of people (qualitative data) (Sosulski & Lawrence, 2008). As this research aims to answer quantitative and qualitative research questions (what and how questions), the use of the mixed-methods approach in this study is appropriate.

Quantitative data is collected from various sources such as survey reports, Internet, books, and government reports for answering the quantitative type questions. As summarised in Table 1, such data includes the statistics relating to e-Government and network readiness and statistics on government ICT usage, public staff training, public staff and citizens' attitudes towards e-Government, telecommunication users, household computer literacy, and availability of e-Mail and Internet. Survey data is obtained from various government organizations including the Statistical Survey Department (Sathasinghe, 2007; DCS-SL, 2007; DCS-SL, 2009), Telecommunication Regulatory Commission of Sri Lanka (TRCSL, 2009), and the Information and Communication Technology Agency (ICTA & MGC, 2008a, 2008b, 2008c, 2008d). Furthermore, there are several global e-Government surveys (UNDESA, 2003, 2005, 2008, 2010; Dutta & Mia, 2007, 2008, 2009, 2010) used for extracting useful data in evaluating the performance of e-Government development in Sri Lanka.

The qualitative data for this study is obtained from interviews with fifteen participants. Open-ended interviews were conducted with the Information and Communication Technology Agency (ICTA) officials and Chief Innovative Officers (CIOs) of respective government organizations. Initial contact with ICTA officials and CIOs was made through telephone conversations with a brief description of the purpose of the research. Interview questions were pre-tested with the help of academic experts, e-Government specialists and e-Government users. An approximately two-hour interview was conducted with each of the eight staff members. Such interviews with the ICTA officials and CIOs are useful for (a) identifying the e-Government development programs implemented in Sri Lanka, (b) understanding how these programs have been implemented, (c) identifying the opportunities created for government, and (d) identifying the challenges for an effective implementation of e-Government in Sri Lanka. To obtain citizens' perceptions on e-Government, volunteers were recruited from those who visited tele-centres to access the Internet. Approximately thirty to forty-five minute interviews were conducted with seven volunteers. All the interviews were recorded with the permission of the participants. The collected qualitative data was transcribed for performing thematic analysis. Table 1 summarises the data collected in this research.

Table 2 summarises the demographic characteristics of the interview participants. As presented in Table 2, interview participants had varied

Table 1. An overview of the quantitative and qualitative data in this study

Quantitative Data	Qualitative Data
• government ICT usage and staff training, • staff's attitudes towards e-government, • the usefulness of the tele-centres centres, • fixed and mobile telecommunications users, • households computer literacy, • household computers and Internet penetration, • socio-economic data.	• e-Government programs implemented, • how these programs have been implemented and what results have been achieved, • opportunities generated for the government, citizens and businesses, • challenges in implementing e-government, • direct benefits of e-Government.

Table 2. Demographic characteristics of interview participants

Age Profile		Educational Profile		Employment Profile	
Age Group	**No. of Participants**	**Highest Education Level**	**No. of participants**	**Category**	**No. of Participants**
16-20	1	School Level	2	CIO	4
21-30	3	Undergraduate	6	ICT sector	4
31-45	4	Postgraduate	4	Finance	3
46-60	6	Professional	3	Agriculture	1
Over 60	1			Education	2
				Unemployed	1

demographic characteristics. For example, out of fifteen participants, a majority is in the age group of 46-60 and most of them have university education.

IMPLEMENTATION OF E-GOVERNMENT IN SRI LANKA

Sri Lanka has used computing in government for nearly 48 years, even before the notion 'e-Government' came into play. Using computers in the Sri Lankan public sector was initiated in 1962, with the introduction of IBM accounting machines to the Insurance Corporation, followed by the introduction of computers to some other public organizations such as State Engineering Corporation, and Department of Census and Statistics (Hanna, 2008). Subsequently, many computerization programs in the public sector were initiated. Most of these initiatives, however, failed to make any significant contribution to the overall development of e-Government in Sri Lanka until the e-Sri Lanka initiative was launched in 2002.

The concept of e-Sri Lanka originated from the private sector with the involvement of the National Chamber of Commerce, local software industry leaders, and the United States Agency for International Development (USAID) (Hanna, 2007). Motivated by the achievements of the Indian software industry, the initial e-Sri Lanka concept mainly focused on developing the software industry in Sri Lanka (Hanna, 2007). With the active involvement of the World Bank, public service, civil society, consultative groups and many donor agencies, the e-Sri Lanka concept was revised and expanded (Hanna, 2007) by recognizing ICT as key for achieving growth, equity, and peace through technological transformation of all sectors in Sri Lanka (MOST, 2002). As a result, improving the delivery of public services, bridging the digital divide, uplifting the quality of life of citizens, improving social development, and supporting the country's growth and poverty reduction through the development of e-Government became the objectives of the e-Sri Lanka initiative (ICTA, 2005; Hanna, 2007, 2008). ICTA was established under the Information Communication Technology Act 27 for coordinating and funding these e-Government initiatives.

To achieve the objectives of the e-Sri Lanka initiative, six e-Development programs have been adopted including the following:

1. a re-engineering government program for providing transparent, effective, and efficient public services;
2. an information infrastructure development program for ensuring affordable access to information, communication, electronic services, and other content;

3. an e-Society development program for empowering the most vulnerable communities in Sri Lanka;
4. a human resources capacity building program for building up a skilled workforce;
5. private sector capacity development program for developing the domestic ICT sector to ensure a sustainable economic growth in the country; and
6. a regulatory environment development program for creating policy and regulatory environment, and developing leadership and institutional capacity building to support ICT based developments and reforms (Karunasena & Deng, 2009; ICTA, 2010).

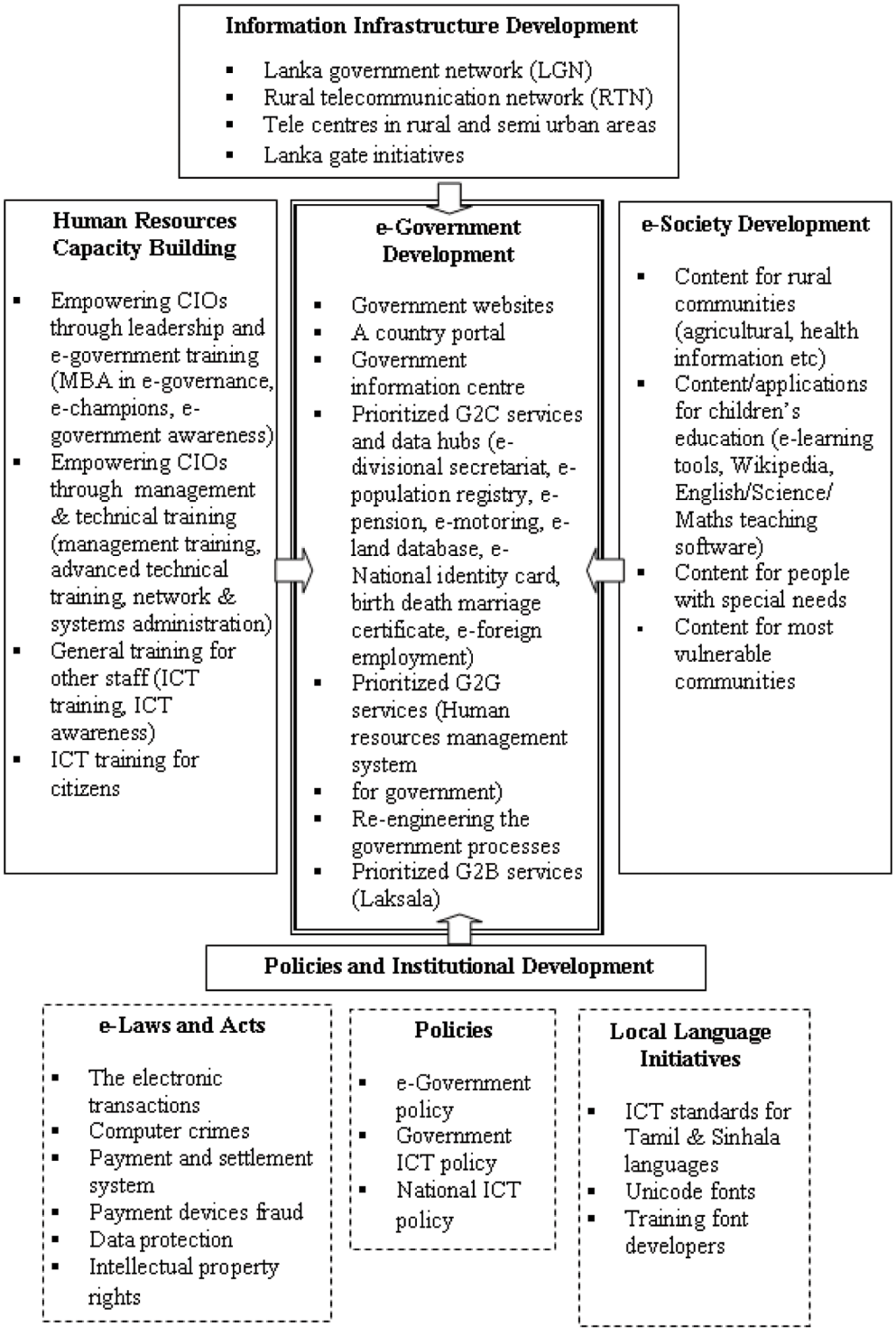
Sri Lanka has implemented a unique e-Government program with the implementation of various re-engineering government projects (Karunasena & Deng, 2009, 2010a, 2010b). The uniqueness of the e-Government program is due to the specific context that Sri Lanka is in as a developing country with a majority of citizens living in rural areas, low ICT literacy among citizens, low householder Internet users, poor information infrastructure, and low e-Readiness in government (Hanna, 2007, 2008). Implementing e-Government projects is bound to have a significant impact on Sri Lankan citizens and the society (Karunasena & Deng, 2009; Karunasena, et al., 2011). The re-engineering government program is facilitated by four e-Development programs including (a) an information infrastructure development program, (b) a human resources capacity building program, (c) a policy, regulatory environment, and institutional development program, and (d) an e-Society development program. These four programs create an enabling environment for the effective development of e-Government in Sri Lanka. Figure 1 shows an overview of the e-Government development programs adopted in Sri Lanka.

The re-engineering government program aims to improve the efficiency and effectiveness of the delivery of the public services by re-engineering processes with the implementation of various e-Government applications (ICTA, 2010a). A number of e-Government projects are initiated including website development, call centre services, data hubs, e-Services developments, and government process re-engineering. To equip the public staff with appropriate skills, upgrading ICT infrastructure in public organizations, interconnecting public organizations, and creating an enabling environment for facilitating the successful implementation of e-Government are identified as the key objectives of this program (ICTA, 2010a).

The information infrastructure development program promises (a) efficient and effective ICT infrastructure for public organizations and (b) an affordable access to information, modern communication and electronic services at any time regardless of their geographical location (ICTA, 2010b). In this context, the Lanka Government Network (LGN) development project is implemented for setting up an underlying information infrastructure for connecting all the public organizations in a cost-effective manner to provide Internet, e-Mail, IP based voice services (VIOP), and exchange e-Government data in a secure and reliable manner (ICTA, 2010b).

The Regional Telecommunication Network project (RTN) has been identified as a priority under the information infrastructure development program which seeks to ensure affordable access to telecommunication, Internet services, e-Services, and e-Content to all rural communities. This project invests on laying two fiber backbones along with the necessary infrastructure covering rural Sri Lanka. Development of this project is extremely important since access to the telecommunication and other ICT infrastructure is unaffordable to citizens in rural areas. Sri Lanka is a country where 85% of the total population lives in the rural areas (UN, 2008), and the total contribution by the rural sector to total poverty of the country is 82.1% (DSC-SL, 2007). Develop-

Figure 1. An overview of e-government development in Sri Lanka



ment of affordable information infrastructure is, therefore, highly important.

The Nenasala' (Knowledge centre/tele centre) development project is introduced for ensuring equal and affordable access to e-Government resources for rural and semi-urban communities. A Nenasala centre is supplied with telephone connections, a minimum of five computers, broadband Internet connectivity, a scanner, a photocopier, webcams, and other computer devices to facilitate rural and semi-urban citizens' access to the computers, Internet, and e-Services (Nenasala, 2007). Development of this project is necessary because of the low ICT readiness among citizens. As at 2003 there were only 13.2 personal computers and 10.56 Internet users per 1000 persons in Sri Lanka (UNDESA, 2003). Moreover, only 3.1% of rural households had computers in 2004 (Satharasinghe, 2007).

The policy and institutional development program focuses on developing policy and institutional environment necessary for achieving the overall objective of e-Government in Sri Lanka. One of these goals is '*to create a pro-active policy and a regulatory environment that is supportive of ICT reform and ICT-based development, to develop ICT leadership and capacity, and to communicate these initiatives and policies to the wider stakeholder audience*' (ICTA, 2010c). In the context of a regulatory environment, the government has developed laws and regulations relating to electronic transactions, data protection, computer crimes, payment devices frauds, payment and settlement, privacy, and intellectual property rights protection (ICTA, 2010c). Such laws are essential to protect e-Government users. Intellectual property rights protection laws are extremely important for generating innovation in terms of overall ICT development in the country (Dutta & Mia, 2010). Adequate training is provided to judges, lawyers, and other law enforcement personnel to execute these e-Laws.

As shown in Figure 1, supporting local language initiatives is another sub-program of the policies and institutional development program. Under the local language initiatives, the government has facilitated the development of ICT standards for Sinhala (SLS 1134, 2004) and Tamil (SLS 1326, 2008) languages, and Unicode compliance fonts. Moreover, training is provided to local font developers (ICTA, 2010c). All these activities are useful for the government as they facilitate the delivery of e-Government information and services in local languages.

The ICT related policy development is another sub-program of the policy and institutional development program. The e-Government policy document is extremely important for the effective development of e-Government at the organizational level. This document acts as a blueprint for government institutions for planning, developing, procuring, using e-Government, and creating an enabling environment for e-Government development at the organizational level. The e-Government policy approved by the Cabinet in 2009 emphasises that all government organizations should aim to achieve the following:

1. establish an ICT unit and appoint a Chief Information Officer (CIO) to lead e-Government related activities in their organizations;
2. draft and implement an annual ICT plan which indicates how ICT is used for realizing the organization's mission and vision;
3. allocate an adequate budget for e-Government related activities;
4. use e-mail for all types of official communications;
5. develop trilingual websites which comply with the government's website standards and register them under the 'gov.lk' domain;
6. use Sinhala and Tamil Unicode fonts;
7. connect to the LGN for using government's common network service;
8. use Lanka Gate as the middleware infrastructure and the country portal for delivering government services through electronic means;

9. use licensed software or use open source software; and
10. assess the training and skills needs of public staff at all levels and incorporate them in the annual ICT plan (ICTA, 2010b).

The human resources development program is aligned with the e-Government development program. The prime objective of this program is to develop an e-Leadership capability in government staff for leading and driving the process of e-Government development. Under this initiative, the government has appointed CIOs across all government ministries, departments, statutory bodies, and other grass root level public organizations for driving e-Government and ICT-based transformation processes within those organizations. Therefore, empowering CIOs with strategic ICT planning, e-Government practices, IT project management, outsourcing and managing projects, government process re-engineering, change management, and knowledge management is a key objective of this program (ICTA, 2010d).

The e-Society development program is another program implemented under the e-Sri Lanka initiative. Although it does not directly contribute to the adoption of e-Government, it facilitates the social development of most vulnerable groups in Sri Lanka using ICT (ICTA, 2010e). Among many other objectives of this program, increasing awareness among disadvantaged groups of how ICT can improve the quality of their lives, empowering women and youth with ICT, increasing economic opportunities and equity by facilitating wide use of ICT in agriculture, health, and education, and developing local content are important (ICTA, 2010e).

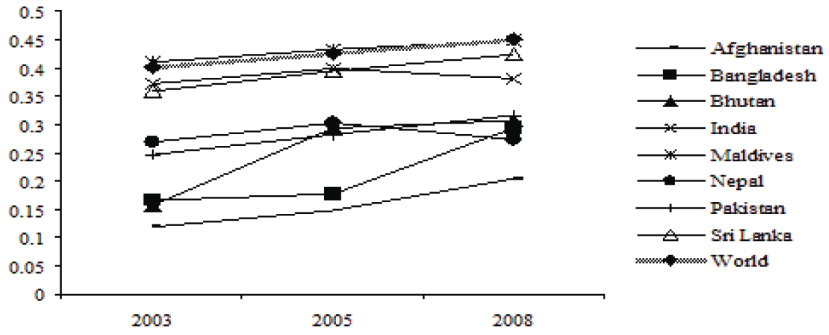
STATUS OF E-GOVERNMENT DEVELOPMENT IN SRI LANKA

The e-Sri Lanka initiative has been operational for the last 7 years. The implementation of the e-Sri Lanka initiative has a positive impact on increasing the e-Readiness of the country. This is demonstrated through the continuous improvement in (a) the United Nations e-Government development index, (b) the individual readiness index, (c) the government readiness index, (d) the individual usage index, (e) the government usage index, (f) the political and regulatory index, and (g) the infrastructure environment index.

The United Nations e-Government readiness survey (UNDESA, 2003, 2005, 2008) is a popular survey for measuring the "*capacity and willingness of countries to use e-Government for ICT-led development*" (UNDESA, 2005, p. 14). Figure 2 below shows a significant growth in Sri Lanka's e-Government readiness score from 0.385 in 2003 to 0.4244 in 2008 (UNDESA, 2003, 2005, 2008). In 2008, Sri Lanka was the runner-up in the e-Readiness score in the South Asian region with the Maldives occupying the top spot. Sri Lanka's e-Government readiness score (0.4244) was below the world average (0.4514) but well above the regional average (0.3395) in 2008. The recently developed United Nations e-Government development index (UNDESA, 2010), which examines how far governments have actually advanced in e-Government development, indicates that Sri Lanka is at the 111th position out of 183 member countries. Although Sri Lanka is ranked at the 111th position, e-Readiness scores indicate that the country has been gradually progressing as far as e-Government development is concerned over the past several years.

The NRI is another popular index for examining the overall ICT performance of individual countries (Dutta & Mia, 2010). It examines the enabling factors for ICT readiness in a country from the perspective of government, individuals, and businesses (Dutta & Mia, 2010). Existing statistics reveal that Sri Lanka has gone up in the NRI rank and NRI score although the overall ICT development is not mature like that in developed countries. Sri Lanka's ranking has improved from the 86th position in 2006/2007 to the 79th in

Figure 2. Sri Lanka's e-government readiness



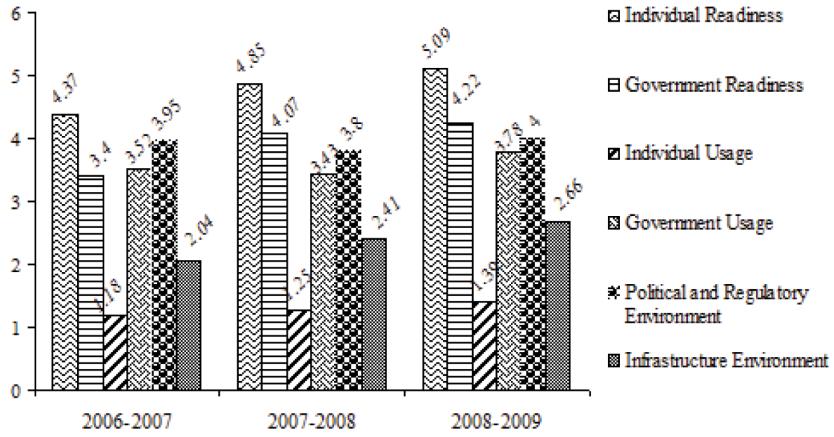
2007/2008, and to the 72nd in 2008/2009 and 2010 among 133 countries (Dutta & Mia, 2007, 2008, 2009, 2010). In other words, the country's rank has gone up by 14 positions since 2006. This is strong indication that the e-Development programs have positively influenced the overall ICT development in the country.

NRI consists of several sub-dimensions such as readiness, usage, and the environment for examining the ICT readiness in a country (Dutta & Mia, 2010). Several indicators are usually utilised in this dimension including individual's readiness, government's readiness, individual's usage, government's usage, political and regulatory element, and infrastructure element (Dutta & Mia, 2010). Individual readiness measures citizens' preparedness to use ICT by considering those aspects of telecommunication, Internet and their costs. Government readiness is reflected by government efforts to incorporate ICT in the national agenda and procure high-tech products to improve the organizational efficiency and innovation (Dutta & Mia, 2010). The individual usage element measures ICT penetration and diffusion at the individual level. Individual usage is exemplified by mobile users, broadband users, Internet subscribers, availability of personal computers, and so forth. The government usage assesses the actual usage of ICT by the government (Dutta & Mia, 2010). Political and regulatory element measures the degree to which the national legal framework facilitates innovation and ICT development (Dutta & Mia, 2010). The infrastructure element assesses the quality of the ICT infrastructure in respect to the telephone lines, Internet bandwidth, secure Internet servers, digital content, electricity production, and human resources (Dutta & Mia, 2010). As shown in Figure 3, Sri Lanka's overall ICT development has been leaping up in all the dimensions since 2006. All these statistics reveal that the e-Development programs are immensely contributing to the creation of an enabling environment necessary for effectively pursuing the e-Government development in Sri Lanka.

OPPORTUNITIES FROM E-GOVERNMENT DEVELOPMENTS IN SRI LANKA

In Sri Lanka, government agencies are under represented in rural and semi-urban areas. Hence, people living in these areas have to visit Colombo, the financial capital of Sri Lanka, for transactions with government agencies, and even to obtain information or obtain relevant documents. This caused a lot of significant inconveniences to citizens before e-Government was introduced. As a result of the e-Government initiatives, however, this situation has been dramatically changed, and tremendous opportunities have been created for citizens and the government itself. To date, there are more than 100 central government departments and ministries which disseminate public

Figure 3. An overview of the progress of the overall ICT development in Sri Lanka



information through websites giving anytime and anywhere access to the public. As at 2008, nearly 35% of government agencies had their own websites (ICTA & MGC, 2008a). Most of these government agency websites nowadays disseminate information in local languages and in English. Information dissemination in local languages is extremely important because Sri Lanka is home to multiple ethnic groups and a majority of citizens communicate in local languages (Karunasena, et al., 2011). Almost all the grass root level public services delivery entities (divisional secretariat offices) have been linked to the divisional secretariat Web portal counting up to a total of 356 mini-sites. Moreover, Gov. lk is a trilingual static portal which provides links to individual government agency websites. Lanka Gate was developed to fulfil the need of a country portal (www.srilanka.lk) by providing a single window access to government services and information. A recent survey shows that government websites are the most used e-Government channel in Sri Lanka (ICTA & MGC, 2008a).

A trilingual call centre operates from Monday to Saturday to provide information to citizens about 1300 different government services of more than 90 government organizations. The purpose of the call centre is to respond to the general inquires of citizens such as how to get services from the public sector, which government agency should be contacted, which documents should be filled and so forth (Karunasena, et al., 2011). This information could not be accessed by the citizens previously unless they went to the respective public organizations holding the information. The call centre receives nearly 2500 calls per day and about 85% of which are responded to successfully. The call centre service is the second most used e-Government channel in Sri Lanka (ICTA & MGC, 2008a).

Many e-Service projects are being implemented for providing maximum benefits to citizens. These e-Services initiatives include (a) the e-Divisional secretariat project for facilitating an efficient and effective delivery of public services at grass root level public organizations, (b) the e-Samurdhi project for maintaining up-to-date data relating to income and livelihood of low income communities, (c) the e-Population registry for maintaining unique ID numbers and basic information of citizens enabling the registration of life events such as births, marriages, and deaths, and enabling access and exchange of citizen information by other relevant agencies regardless of geographic location, (d) the e-Foreign employment project for helping people seek jobs overseas, (e) the e-Pension project for developing a high responsive pension application

process system, and (f) the e-Motoring project for maintaining motor vehicle registration and issuing drivers' licenses. The birth marriage and death certificate issuing system is currently in operation at selected divisional secretariat offices for increasing the efficiency and effectiveness of issuing certificates. Citizens are now able to obtain these certificates within 5 minutes from ICT enabled front office counters which took several days to be issued using a manual system which was previously used.

There are several Government to Government (G2G) and Government to Business (G2B) services which were promised under e-Sri Lanka initiatives. For example, Human Resources Management System (HRMS) was introduced as a G2G application for effectively managing the records of 40,000 public sector employees who belong to 14 all island services and working in public agencies scattered all over the island (ICTA, 2010a). As a G2B service, 'Laksala' project was initiated for promoting and protecting Sri Lankan handicrafts. It provides opportunities and livelihoods for handicraftsmen by allowing them to purchase and sell their items through a Web portal (www.laksala.lk).

More than 350 government organizations around the country are now connected to a high speed secured network through the implementation of LGN. These organizations are supplied with broadband Internet connectivity, computers, and other relevant computer peripherals. Moreover, official email accounts are supplied for public staff. To date, these organizations have had a tremendous opportunity of saving a significant amount of public money through the use of VOIP phones to communicate with other organizations.

To provide the rural and semi-urban citizens with equal access to e-Government information and services, 600 tele-centres (Nenasala) have been established in those areas. Using these resources, rural and semi urban citizens can access government information and services. Low income people are given vouchers to access the resources available in these centres. Some of these centres are also being operated as e-Libraries. Some other centres are being operated as distance learning centres. Some of these centres also conduct ICT training to rural children for affordable rates (about US$2 per month). Moreover, these centres further contributed to social and economic developments in rural and semi-urban areas. For example, nearly 41% of Nenasala users claim that they found jobs as a result of computer training provided in the centres and 26% users found jobs by using the Internet facility available at the centres (ICTA & MGC, 2008c). Furthermore, 31% centre operators believe the Nenasala centres help them improve their existing business or develop new business opportunities (ICTA & MGC, 2008c).

Skilled people with appropriate ICT skills are essential for successful implementation of e-Government. Therefore, the government has taken necessary steps to fulfil the requirement of a skilled work force, by implementing the human resources capacity building program. As a result of this program, to date about 450 CIOs actively participate in various ICT-based public sector reforming activities. Moreover, government offers the CIOs an opportunity to undertake a specialized Masters degree in e-Governance. Furthermore, various other staff at various levels are also provided with trainings such as management training, general ICT training, advanced technical trainings, network and system administration, and e-Government awareness. 10,000 public organizational staffs have been trained to support public sector reform. Moreover, statistics reveal that 66% of executive staff and 64.5% of non-executive staff have been formally trained (ICTA & MGC, 2008d). Developing the ICT skills of citizens is a secondary objective of this program. As result of this program, about 3000 citizens have been trained with ICT.

A recent study revealed that the government staff's attitudes towards e-Government are positive. 66% of executive staff and 74.3% of non-executive staff strongly believe that e-Government

can improve organizational efficiency (ICTA & MGC, 2008d). About 11.3% of executive staff and 10% of non-executive staff believe that e-Government can reduce the difficulties faced by the public in accessing public services. About 8% of the executive staff and 7.6% of non-executive staff think that e-Government can improve the quality of public service. This shows that there is an extremely strong support from the public staff for an effective implementation of e-Government in Sri Lanka. Table 3 presents a summary of the e-Sri Lanka initiatives' objectives and achievements.

The next section presents the general challenges to effective e-government implementation in Sri Lanka.

Table 3. High-level program objectives and achievements

Program	Objectives	Achievements
Re-engineering the government	To improve the efficiency and effectiveness of the delivery of the public services	• More than 100 central government agencies disseminate information through websites • Country portal and government official web portal provide single access to services and information • Grass root level public service delivery entities are connect to a web portal which contains 356 mini-sites • Trilingual call centre services provide information on 1300 government services • G2C projects including, e-divisional secretariat, e-population registry, e-pension, e-motoring, e-land database, e-foreign employment and e-NIC are being implemented • Birth marriage death certificate issuing systems help citizens obtain these certificates within 5 minutes which previously took several days • The Laksala project is developed for promoting handicraft • e-Human resources management systems are implemented
Information infrastructure development	To provide efficient and effective ICT infrastructure to public organizations, and to provide citizens anywhere any time access to ICT and its applications	• More than 350 public organizations are connected to a high speed secured network • 600 tele-centres (Nenasala) have been established in rural and semi-urban areas for providing equal access to e-Government information and services • Nenasala centres operate as distance learning centres • Low cost ICT training for rural children • 41% of Nenasala users claim that they found jobs as a result of computer training provided in the centres, 26% users found jobs by using the Internet facility available at the centres and 31% centre operators believe that the Nenasala centres help them improve their existing businesses or develop new business opportunities.
Policies and institutional development	To develop policy and institutional environment necessary to achieve the overall objective of e-Government in Sri Lanka	• Developed laws and regulations relating to electronic transactions, data protection, computer crimes, payment devices frauds, payment and settlement, privacy and intellectual property rights protection • Training is provided to judges, lawyers and other law enforcement personnel on e-laws • The e-Government policy is established • Local language initiatives: ICT standards for Sinhala (SLS 1134: 2004) and Tamil (SLS 1326: 2008) languages, and Unicode compliance fonts are developed.
Human resources capacity building	To develop an e-leadership capability in government staff to lead and drive the process of e-Government development	• About 450 CIOs were trained and they actively participate in various ICT-based public sector reforming activities • Another 10,000 public staff have been trained to support public sector reform. 66% of executive staff and 64.5% of non-executive staff have been formally trained. • 3000 citizens have been trained with ICT • Positive attitudes towards e-Government developments
e-Society development	Social development of most vulnerable groups	• Increased awareness among disadvantaged groups of how ICT can improve the quality of their lives • Women and youth empowered with ICT • Economic opportunity and equity through using ICT

CHALLENGES TO AN EFFECTIVE IMPLEMENTATION OF E-GOVERNMENT

Sri Lanka faces numerous challenges in its pursuit to achieve an effective implementation of e-Government initiatives. These challenges include (a) ICT infrastructure related issues pertaining to the lack of computers, Internet, telecommunication infrastructure to access e-Government, (b) human capital development related problems including the lack of skills to use e-Government applications, (c) leadership issues such as the lack of political and organizational support, lack of motivation, and unnecessary external influences, (d) budgetary constraints that affect investment in e-Government at the organizational level, and so forth (Ndou, 2004; Chen, et al., 2006; Hanna, 2007). Among them, lack of ICT infrastructure for rural citizens to access e-Government resources, the low e-readiness among citizens, budgetary constraints are prominent as barriers to effective implementation of e-Government (Karunasena & Deng, 2009, 2010a; Karunasena, et al., 2011).

Telecommunication is a catalyst for a country's development (Tripathi, 2006). Sri Lanka is a country with a moderate access to telecommunication infrastructure (ITU, 2008). The current telecommunication network comprises 16.1% fixed line and 62% mobile phones (TRCSL, 2009). Since fixed lines are the dominating Internet carriers in Sri Lanka, poor telecommunication infrastructure in rural areas means that access to the Internet is uneven and unaffordable (Hanna, 2007; Karunasena & Deng, 2010a). Statistics reveal that 42% of the total fixed line subscribers represent the province (Western Province) where the country's capital city is located (TRCSL, 2009). As shown in Figure 4, as of December 2009, fixed lines were distributed unevenly throughout the provinces in Sri Lanka (TRCSL, 2009).

Existing statistics reveal that only 11.1% of the rural household population have Internet access (DCS-SL, 2009). This is a significant barrier to the deployment of e-Government in Sri Lanka where the majority of the population live in rural areas. Inability to access the available e-Government resources due to the unavailability of connectivity for a majority of citizens can result in the failure of e-Government (Karunasena & Deng, 2010a). The Rural Telecommunication Network project, which promises rural citizens affordable and anytime anywhere access to the Internet, is a viable solution to this problem. However, this project has not been implemented. Alternatively, there is potential to use mobile phones as a channel to deliver e-Government services since, as shown in Figure 5, there has been a tremendous growth in mobile phone sub-

Figure 4. The provincial distribution of fixed phones in Sri Lanka

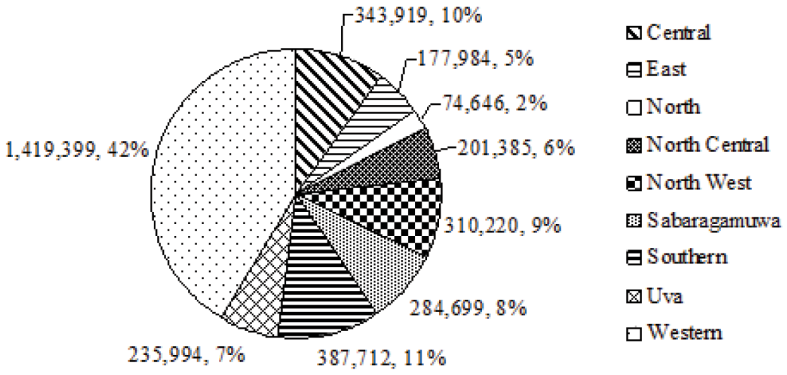
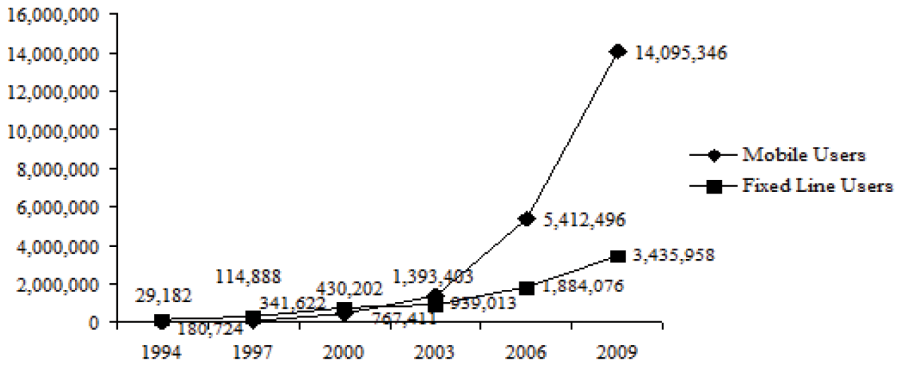


Figure 5. The growth in mobile phone subscribers



scribers over the last several years in Sri Lanka (Karunasena, et al., 2011).

The low e-Readiness of citizens increases the challenge for e-Government deployment (Karunasena & Deng, 2009; Weerakkody, et al., 2009; Ali, et al., 2009; Karunasena, et al., 2011). In Sri Lanka, only 20.3% of households are IT literate. 31.1% of urban households have computer literacy while the computer literacy of rural households is at 19.3%, and of the estate sector (estate sector is defined as the plantation areas, which are more than 20 acres in extent and having not less than 10 residential labourers) is at 8.4% (DCS-SL, 2009). Moreover, there are significant differences in computer awareness across the sectors. The highest (60%) computer awareness was reported from the urban sector households and the lowest (15.8%) awareness was reported by the estate sector households in 2009. In Sri Lanka, 11.4% of households have computers. Again, significant differences are evident across the different sectors of the country. As at 2009, 26.3% of urban households, 9.8% of rural households, and 3.3% of estate sector households had computers (DCS-SL, 2009). Furthermore, Internet and email usage in Sri Lanka is very low. As statistics reveal, only 13.1% of households use Internet and 12% use email (DCS-SL, 2009). All these statistics show the low e-Readiness among citizens. Due to these reasons, providing equal opportunities to every citizen through e-Government is extremely challenging in Sri Lanka.

Delays in implementing major e-Government projects are another problem in Sri Lanka. As noted before, e-Sri Lanka initiative contains several e-Services delivery projects such as e-Population registry, e-Foreign employment, e-Pension, e-Motoring, e-Land registry, and so forth. Although the e-Sri Lanka initiative has been in effect for several years, these projects are still at the early stages of development at the time of this study (Karunasena & Deng, 2010a). Since there is a significant delay in implementing these initiatives, the citizens in Sri Lanka have not yet had the opportunity of enjoying the full benefits of e-Services (Karunasena, et al., 2011). Moreover, significant delay in implementing RTN is further challenging to the sustainability of Nenasala centres. The RTN was supposed to provide connectivity for these centres at affordable rates. Due to the delays in implementing the RTN project, some centres have to depend on expensive satellite connectivity, which is not viable for long term sustainability.

Poor ICT usage in government is still a challenging factor in Sri Lanka. As a result of unimplemented major e-Services projects, the ICT usage of a majority of government organizations' is confined to the use of simple databases, spreadsheets, word processors, and presentation tools. Most of the public organizations heavily

use these software packages. For an example, 100% of ministries, departments, and statutory boards use word processing packages (ICTA & MGC, 2008a). Moreover, use of emails for official communications among public sector staff is really low, being less than 10% across all public organizations (ICTA & MGC, 2008d). Only about 13% ministries, 7% departments, 22% statutory boards, and 3% divisional secretariat offices use emails for official communications (ICTA & MGC, 2008a).

Limited funding for e-Government development is another challenge faced by Sri Lanka (Weerakkody, et al., 2009; Ali, et al., 2009). The e-Sri Lanka initiative heavily depends on international donor agencies including the World Bank and the Korean EXIM bank (ICTA, 2005). Sri Lanka has implemented a centralized funding model rather than a decentralized model for e-Government investment. In other words, major e-Government projects implemented at the organizational level are funded by the ICTA. Therefore, the majority of government organizations do not have adequate fund allocations to implement their own e-Government projects. Only 7% of the government organizations had a separate budget for IT as at 2008 (ICTA & MGC, 2008a). This creates negative impacts on e-Government project development at the organizational level. However, the e-Government policy introduced in the year 2009 emphasises that all the government organizations should have an ICT budget for implementing e-Government initiatives at the organizational level.

FUTURE RESEARCH DIRECTIONS

It is clear from the study that the Sri Lankan government has invested millions of dollars in developing various e-Government initiatives to provide maximum benefits to citizens while facing various barriers to the effective implementation of e-Government. With the increasing pressure on accountability for government investments nowadays, conducting a comprehensive and in-depth investigation of the effectiveness of e-Government initiatives in Sri Lanka would be a worthwhile next step in the research in this area (Karunasena, et al., 2011). Conducting such a study can not only help the Sri Lankan government to understand the effectiveness of their investment in e-Government initiatives, but it can also facilitate formulation of effective strategies and policies for improving the performance of e-Government in Sri Lanka (Deng, 2008; Karunasena, et al., 2011).

CONCLUSION

This study evaluates the progress of e-Government in Sri Lanka and explores the opportunities generated through e-Government, and identifies the challenges that Sri Lanka faces in implementing e-Government. It reveals that Sri Lanka has been progressing well in e-Government development with the implementation of various e-Government initiatives, including developments of government websites, call centre services, a government wide network, tele-centres for rural communities, building the capacity of public sector staff, and development of a legal and regulatory framework to support e-government.

Several challenges, however, hinder the effective development of e-Government in Sri Lanka. Uneven access of rural citizens to the information and telecommunication infrastructure, low e-Readiness among citizens, delays in implementing major e-Government projects, and insufficient funds to implement e-Government initiatives at organizational levels are some of the barriers to an effective implementation of e-Government. From the results obtained in this study, it can be concluded that a country with a majority of citizens living in rural areas, poor ICT infrastructure, and low ICT literacy among the citizens faces enormous challenges in deploying e-Government initiatives.

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KEY TERMS AND DEFINITIONS

CIO: Chief innovative officer.

E-Development: Use of ICT to bring about social and economic development in a country.

E-Government: Delivery of government information and services through the use of ICT.

e-Sri Lanka: An e-development initiative implemented in Sri Lanka which recognizes ICT as a key factor for achieving growth, equity and peace through technological transformation of all sectors in Sri Lanka. Improving the delivery of

public services, bridging the digital divide, uplifting the quality of life of citizens, improving social development, and supporting the country's growth and poverty reduction are the key objectives the e-Sri Lanka initiative.

ICT: Information and communications technologies.

LGN: Lanka government network is a wide area network implemented in Sri Lanka which connects public organizations across the country.

VOIP: Voice over Internet protocol.

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Chapter 36
A Systematic Review of Distributed Software Development
Problems and Solutions

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ABSTRACT

In last years, software development activity tends to be decentralized, thus expanding greater development efforts towards more attractive zones for organizations. The type of development in which the team members are distributed in remote sites is called distributed software development (DSD). The main advantage of this practice is mainly that of having a greater availability of human resources in decentralized zones with less cost. On the other hand, organizations must face some disadvantages due to the distance that separates the development teams related to project organization, project control and product quality. Coordination becomes more difficult as the software components are sourced from different places, and new processes and tools are needed. This chapter presents a systematic review of the literature related to the problems of DSD with the purpose of obtaining a vision about the solutions proposed up to the present day.

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1 INTRODUCTION

Nowadays, software industry tends to relocate their production units to decentralized zones with greater availability of skilled workforce, taking advantage of politic and economic factors (Aspray, et al., 2006). The objective consists of optimizing resources in order to develop higher quality products at a lower cost than is in co-located developments. In this sense, Software Factories (Greenfield, et al., 2004) is an approach that, automate parts of software development by imitating industrial processes originally linked to more traditional sectors such as those of the automobile and aviation, decentralize production units, and promote the reusability of architectures, knowledge and components.

Distributed Software Development (DSD) allows the team members to be located in various remote sites during the software lifecycle, thus making up a network of distant sub-teams. In this context the traditional face-to-face meetings are no longer common and interaction between members requires the use of technology to facilitate communication and coordination.

The distance between the different teams can vary from a few meters (when the teams work in adjacent buildings) to different continents (Prikladnicki, et al., 2003). The situation in which the teams are distributed beyond the limits of a nation is called Global Software Development (GSD). This kind of scenario is interesting for several reasons (Herbsleb and Moitra, 2001), mainly because it enables organizations to abstract themselves from geographical distance, whilst having qualified human resources and minimizing cost (Werner, et al., 2001), increasing their market area by producing software for remote clients and obtaining a longer workday by taking advantage of time differences (Ebert & De Neve, 2001). On the other hand we must confront a number of problems (Layman, et al., 2006), caused mainly by distance and time and cultural differences (Krishna, et al., 2004), which depend largely on the specific characteristics of each organization.

In this context, "offshoring" refers to the transfer of an organizational function to another country, usually where human resources are cheaper. We speak about "nearshoring" when jobs are transferred to geographically closer countries, thus avoiding cultural and time differences between members and saving travel and communication costs. Outsourcing is a way to contract an external organization, independently of its location, instead of developing in-house (McConnell, 1996).

The aforementioned development practices have as a common factor the problems arising from distance that directly affect the processes of communication as well as coordination and control activities (Damian, et al., 2003). In these environments, communication is less fluid than in colocalized development groups, as a consequence, problems related to coordination, collaboration or group awareness appear which negatively affect productivity and, consequently, software quality. All these factors influence the way in which software is defined, built, tested and delivered to customers, thus affecting the corresponding stages of the software life cycle.

In order to mitigate these effects and with the aim of achieving higher levels of productivity, organizations require facilities to support collaboration, coordination and communication among developers through new technologies, processes and methods (Damian and Lanubile, 2004). Iterative approaches are commonly used in contrast to traditional waterfall or sequential methods, but they become more difficult to use consistently when teams are geographically distributed (Cusumano, 2008).

This work presents a systematic review of the literature dealing with efforts related to DSD and GSD with the purpose of discovering the aspects upon which researchers have focused until this moment. The objective is to identify, evaluate, interpret and synthesize most of the important studies on the subject, by conducting a rigorous and objective review of literature which will allow us to analyze the issues and the solutions contributed

up to the present about de-located development with the aim of obtaining information with a high scientific and practical value through a rigorous systematic method.

2 THE IMPORTANCE OF SYSTEMATIC REVIEWS

A systematic review of literature (Kitchenham, 2004) permits the identification, evaluation and interpretation of all the available relevant studies related to a particular research question, topic area or phenomenon, providing results with a high scientific value by classifying studies between primary studies and secondary or relevant studies, by means of synthesizing existing work according to a predefined strategy.

This systematic review has been carried out within the context of the FABRUM project, whose main objective is the development of a process with which to manage the relationships between a planning and design center and a software production factory, serving this work as starting point to focus future research to carry on

In order to carry out this study we have followed the systematic search procedure proposed by (Kitchenham, 2004), and the selection of primary studies method followed in (Pino, et al., 2007).

2.1 Question Formularization

The research question is: What are the initiatives carried out in relation to the improvement of DSD processes?

The keywords that guided the search to answer the research question were: *distributed*, *software*, *development*, *global*, *enterprise*, *organization*, *company*, *team*, *offshore*, *offshoring*, *outsource*, *outsourcing*, *nearshore*, *nearshoring*, *model*, *strategy* and *technique*.

During a first iteration, we also included the keywords CMM, CMMI, COBIT and ITIL in an attempt to obtain studies based on these standards, but due to the scarcity of good results these words were misestimated in subsequent iterations.

The ultimate goal of this systematic review consists of identifying the best procedures, models and strategies employed, and to determine the most important improvement factors for the main problems found. The population will be composed of publications found in the selected sources which apply procedures or strategies related to DSD.

2.2 Sources Selection

By combining the keyword list from the previous section through the logical connectors "AND" and "OR", we established the search strings shown in Table 1.

The studies were obtained from the search sources: *Science@Direct*, *Wiley Interscience*, *IEEE Digital Library and ACM Digital Library*. The quality of this sources, guarantee the quality of the studies. The basic search chains had to be adapted to the search engines of each source.

2.3 Studies Selection

The inclusion criteria for determining whether a study should be considered relevant (potential candidate to become a primary study) was based on analyzing the title, abstract and keywords from the studies retrieved by the search to determine

Table 1. Basic search strings

	Basic search strings
1	("*distributed software development*" OR "*global software development*") AND ((*enterprise* OR *organization* OR *company* OR *team*) AND (*offshore* OR *offshoring* OR *outsource* OR *outsourcing* OR *nearshore* OR *nearshoring*))
2	("*distributed software development*" OR "*global software development*") AND (*model* OR *strategy* OR *technique*)

whether they dealt with the DSD subject orientated towards process improvement, quality, coordination, collaboration, communication and related issues that carry on any improvement about the subject.

Upon analyzing the results of the first iteration of the systematic review, we decided to exclude those studies which, despite addressing the issue of DSD, did not contribute to any significant improvement method, and we also dismissed those studies which focused solely upon social issues, cultural or time differences or focused solely upon free software, although we have taken into account other articles that address these topics in a secondary manner.

To obtain the primary studies we have followed the iterative and incremental model proposed by (Pino, et al., 2007). It is iterative because the search, retrieval and information visualization of results is carried out entirely through an initial search source and then repeats the same process on the rest. It is incremental because the document evolves incrementally, including new studies to complete the final version.

By applying the procedure to obtain the primary studies, 612 initial studies were found, of which 467 were not repeated. From these, we selected 135 as relevant and 60 as primary studies (the complete list of primary studies is shown in Appendix A). Table 2 shows the distribution of studies found according to the sources employed.

2.4 Information Extraction

The process of extracting information from the primary studies followed an inclusion criterion based on obtaining information about the key success factors, improvement strategies employed, processes improved and the most important ideas in each study, thus establishing a categorization between objective and subjective results. All articles were categorized by attending to the methodology study followed according to the models presented in (Zelkowitz & Wallace, 1998). We used the following categories: case studies, literature review, experiment, simulation and survey. The nonexperimental model for studies which makes a proposal without testing it or performing experiments was also applied.

3 TRENDS IN DISTRIBUTED SOFTWARE DEVELOPMENT RESEARCH

This section analyzes and discusses proposals and success factors in order to extract relevant information from the information provided by the primary studies. In (Prikladnicki, et al., 2008) is studied DSD attending to its evolution providing quantitative analysis. They indicate that distributed software development should be better contextualized. Their main conclusions were referred to the lack of studies related at the level of projects or focused on technical aspects.

Table 2. Distribution of studies found

	Studies					
Sources	**Search date**	**Found**	**Not repeated**	**Relevant**	**Primaries**	**%**
Science@Direct	30/04/2008	170	140	52	**19**	32,0
Wiley InterScience	30/04/2008	27	18	15	**12**	20,0
IEEE Digital Library	30/04/2008	7	7	5	**5**	8,0
ACM Digital Library	02/05/2008	408	302	63	**24**	40,0
	Total	612	467	135	**60**	100,0

Attending to our results, Figure 1 (*left*) shows that most of the primary studies analyzed are case studies and experimental articles. Surveys and nonexperimental studies also have a significant representation, in which members involved in the distributed development take part in outlining their difficulties.

On the other hand, as is shown in Figure 1 (*right*), the majority of primary studies are focused upon the enterprise field, but studies in the university environment also appear, in which groups of students carried out developments in different locations. Near 45% of the studies did not indicate their field of work or their characterization did not proceed, while 10% were from organizations which did not specify their corporate or university environment.

3.1 Publications Tendency

After attending to the number of relevant studies found through the systematic search carried out, it can be concluded that the subject of DSD is evidently an area which was not widely studied until a few years ago, and it is only recently that a greater number of publications have appeared; thus in Figure 2 we can see that 2006 is by far the year in which most studies were published, bearing in mind that the data shown for 2008 only reflects the studies found before May.

3.2 Improved or Analyzed Processes

Taking the primary studies analyzed as a reference, we carried out a classification in terms of processes in the software life cycle to which improvements were proposed or success factors or areas to be

Figure 1. Type of articles analyzed (left) and environments of study development (right)

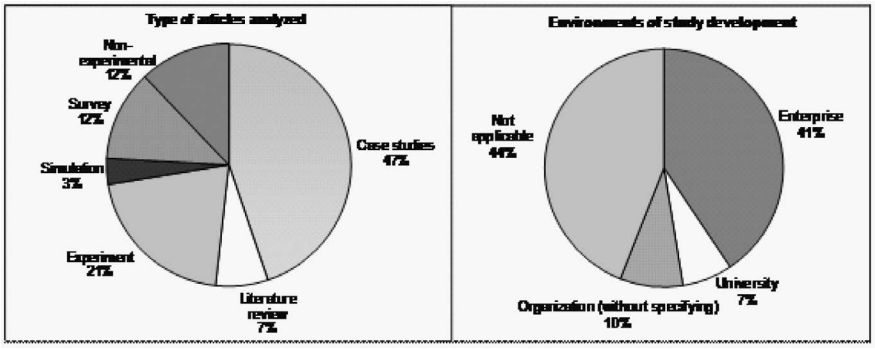
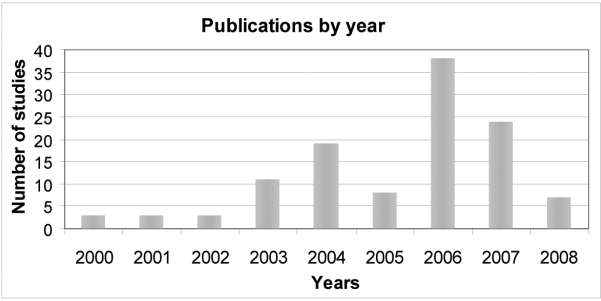


Figure 2. Trends in publications about DSD



improved related to DSD were discussed. Primary studies were classified according to the improved or studied processes, in each case based on the ISO/IEC 12207 standard (2002), with the aim of obtaining a vision of the processes life cycle that requires special attention when working in a distributed environment and discovering the improvement efforts carried out until that moment.

The ISO 12207 standard establishes the activities that may be carried out during the software life cycle, which are grouped into main processes, support processes and general processes. The results are presented graphically in Figure 3 where for every process, its frequency in function of the number of studies that address it is indicated.

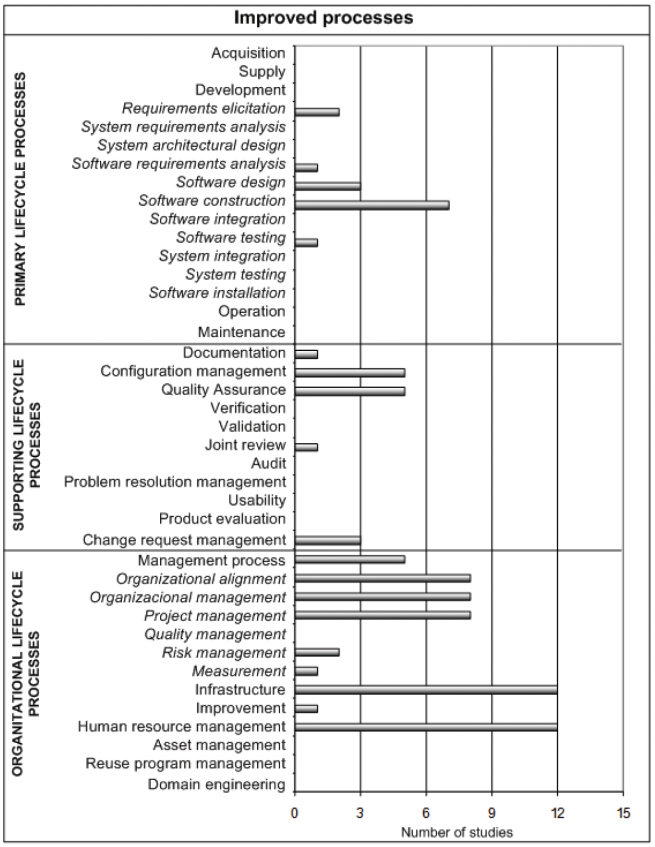
The results obtained indicate that greater efforts are focused on human resources, infrastructure, software construction and management and project organization processes. From these data we can infer that communication between team members is a critical factor. On the other hand, other processes, such as software installation or usability are not mentioned in any study. This information will be useful in the focusing of future research efforts.

3.3 Employed Standards

Attending to the standards followed by the organizations, we found that there is a need for more studies focused on capability models.

Figure 4 presents the standards that the analyzed articles address. Based on the available data, it may be inferred that few studies indicate the use of specific standards. In part, this is attributable to the fact that the great majority of studies deal

Figure 3. Improved or analyzed processes by the primary studies adjusted to ISO 12207



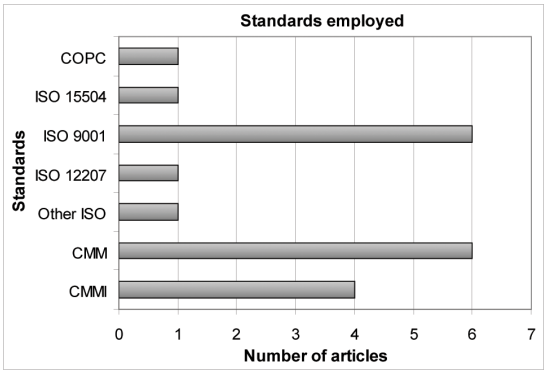
with issues such as communication difficulties in which the standard used does not matter. The standards supported by most primary studies are CMM and ISO 9001, it being common to jointly apply both. All applications of CMM and CMMI studied employed a maturity level 2 with the exception of one which was certified at CMM level 5. No studies relative to ITIL or COBIT models were obtained.

3.4 Contents of the Studies

Table 3 shows in a schematic way the lines towards which the primary studies have focused. Most of the works study tools or models designed specifically for DSD which attempt to improve certain aspects related to development and coordination. Another large part of the studies are related to communication processes and integration of collaborative tools, combining tools such as e-mail or instant messaging, and studying their application by means of different strategies. Most of the studies address the subject of communication difficulties in at least a secondary manner, presenting this aspect as being one of the most important in relation to the problematic nature of DSD.

On the other hand, 63% of the studies analyze or provide strategies, procedures or frameworks related to DSD. The remaining 37% study tools were designed specifically for distributed environments. As an example, tools such as FASTDash (Biehl, et al., 2007), Augur (Froehlich and Dourish, 2004) or MILOS (Goldmann, et al., 1999) may be of particular interest.

Figure 4. Standards employed in the studies



4 PROBLEMS AND SOLUTIONS

In this section, we synthesize the problems and solutions identified through the systematic review, discussing the main subjects.

4.1 Communication

The software life cycle, especially in its early stages, requires a great deal of communication between members involved in the development who exchange a large number of messages through different tools and different formats without following communication standards and facing misunderstandings and high response times. These drawbacks, combined with the great size of personal networks which change over time, are summarized in a decrease in communication frequency and quality which directly affects productivity. To decrease these effects, both methodologies and processes must be supported by collaborative tools as a means of avoiding face-to-face meetings

Table 3. Thematic areas dealt with in the primary studies

Thematic areas	Studies (%)
Process control, task scheduling and project coordination	43,6
Collaborative tools, techniques and frameworks orientated towards communication and integration of existing tools	35,9
Configuration management	6,4
Multi-agent systems	5,1
Knowledgement management	5,1
Defects detection	2,6
Test management	1,3

without comprising the quality of the results, as is proposed by M. A. Babar et al. (2007). K. Mohan and B. Ramesh (2007) discuss the need for user-friendly tools, integrating collaborative tools and agents to improve knowledge integration. M. R. Thissen et al. (2007) examine communication tools and describe collaboration processes, dealing with techniques such as conference calls and email.

Cultural differences imply different terminologies which cause mistakes in messages and translation errors. Different levels of understanding the problem domain exist, as do different levels of knowledge, skills and training between teams. The use of translation processes, and codification guidelines is therefore useful (Carey, 1998; Prikladnicki, Audy, Damian, & de Oliveira, 2007).

4.2 Group Awareness

Members who are part of a virtual team tend to be less productive due to feelings of isolation and indifference. They have little informal conversation across sites, and their trust is reduced. Developers need to know the full status of the project and past history which will allow them to create realistic assumptions about how work is done on other sites. Frequent changes in processes, lack of continuity in communications and lack of collaborative tool integration cause the remote groups to be unaware of what is important because they do not know what other people are working on. As a consequence, they cannot find the right person and/or timely information which will enable them to work together efficiently, resulting in misalignment, rework and other coordination problems.

M.-A. D. Storey et al (2005) proposes a framework for comparing and understanding visualization tools that provide awareness of software development activities, giving a solid grounding in the existing theoretical foundation of the field. In this way, it is described Augur, a visualization tool that supports DSD processes by creating visual representations of both software artifacts and software development activities, thus allowing developers to explore relationships between them.

J. D. Herbsleb et al. (2001) present a tool that provides a visualization of the change management system, making it easy to discover who has experience in working on which parts of the code, and to obtain contact information for that person.

4.3 Source Control

Distributed environments present problems derived from conflicts caused by editing files simultaneously. Coordination and synchronization become more complex as the degree of distribution of the team grows. Source control systems must support access through internet, confronting its unreliable and insecure nature and the higher response times.

To reduce these drawbacks, S. E. Dossick and G. E. Kaiser (1999) propose CHIME, an internet and intranet based application which allows users to be placed in a 3D virtual world representing the software system. Users interact with project artifacts by "walking around" the virtual world, in which they collaborate with other users through a feasible architecture. With the same purpose, J. T. Biehl et al. (2007) present FASTDash as a user-friendly tool that uses a spatial representation of the shared code base which highlights team members' current activities, allowing a developer to determine rapidly which team members have source files checked out, which files are being viewed, and what methods and classes are currently being changed, providing immediate awareness of potential conflict situations, such as two programmers editing the same source file.

A. Sarma et al. (2003) presents Palantír, which complements existing configuration management systems informing a developer of which other developers change and calculating a measure of severity of those changes.

4.4 Knowledge Flow Management

The team members' experiences, methods, decisions, and skills must be accumulated during the development process, so that each team member can use the experience of his/her predecessor and the experience of the team accumulated during development, saving cost and time by avoiding redundant work. For this purpose, documentation must always be updated to prevent assumptions and ambiguity, therefore facilitating the maintainability of the software developed. Distributed environments must facilitate knowledge sharing by maintaining a product/process repository focused on well understood functionality by linking content from sources such as e-mail and online discussions and sharing metadata information among several tools.

To solve the drawbacks caused by distribution, H. Zhuge (2002) presents an approach that works with a knowledge repository in which information related to every project is saved, using internet-based communication tools and thus enabling a new team member to become quickly experienced by learning the knowledge stored.

K. Mohan and B. Ramesh (2007) present an approach based on a traceability framework that identifies the key knowledge elements which are to be integrated, and a prototype system that supports the acquisition, integration, and use of knowledge elements, allowing knowledge fragments stored in diverse environments to be integrated and used by various stakeholders in order to facilitate a common understanding.

4.5 Coordination

Coordination can be interpreted as the management of the right information, the right people and the right time to develop an activity. Coordination in multi-site developments becomes more difficult in terms of articulation work, as problems derived from communication, lack of group awareness and the complexity of the organization appear which influence the way in which the work must be managed. In this sense, more progress reports, project reviews, conference calls and regular meetings to take corrective action are needed, thus minimizing task dependencies with other locations. Collaborative tools must support analysis, design and development, allowing monitoring activities and managing dependencies, notifications and implementation of corrective measures. We shall deal with many of these issues in the following sections:

- **P. Ovaska et al. (2003)** study the coordination of interdependencies between activities including the figure of a chief architect to coordinate the work and maintain the conceptual integrity of the system.
- **S. Setamanit et al. (2007)** describe a simulation model to study different ways in which to configure global software development processes. Such models based on empirical data, allow research into and calculation of the impact of coordination efficiency and its effects on productivity.
- **J. D. Herbsleb et al. (2001)** suggest that multi-site communication and coordination requires more people to participate, which causes a delay. Large changes involve multiple sites and greater implementation times. Changes in multiple distributed sites involve a large number of people.
- **C. R. de Souza et al. (2007)** presents the tool Ariadne which analyzes software projects for dependencies and help to find coordinations problems through a visual environment.

4.6 Collaboration

Concurrent edition of models and processes requires synchronous collaboration between architects and developers who cannot be physically present at a common location. Software modelling requires concurrency control in real time,

enabling geographically dispersed developers to edit and discuss the same diagrams, and improving productivity by providing a means through which to easily capture and model difficult concepts through virtual workspaces and the collaborative edition of artifacts by means of tools which permit synchronized interactions.

A. De Lucia (2007) proposes STEVE, a collaborative tool that supports distributed modelling of software systems which, provides a communication infrastructure to enable concurrent edition of the same diagram at the same time by several distributed developers.

A further approach is presented by J. Suzuki and Y. Yamamoto (1996) with the SoftDock framework which solves the issues related to software component modelling and their relationships, describing and sharing component models information, and ensuring the integrity of these models. Developers can therefore work analyzing, designing, and developing software from component models and transfer them using an exchange format, thus enabling communication between team members. S. Sarkar et al. (2008) develop CollabDev, a human assisted collaborative knowledge tool to analyze applications in multiple languages and render various structural, architectural, and functional insights to the members involved in maintenance.

J. T. Biehl (2008) present IMPROMPTU, a framework for collaborating in multiple display environments which allows users to share task information across displays via off-the-shelf applications.

In another direction, W. Xiao et al. (2007) study Galaxy Wiki, an on-line collaborative tool based on the wiki concept which enables a collaborative authoring system for documentation and coordination purposes, allowing developers to compile, execute and debug programs in wiki pages.

4.7 Project and Process Management

Due to high organizational complexity, scheduling and task assignment becomes more problematic in distributed environments because of volatile requirements, changing specifications, and the lack of informal communication and synchronization. Managers must control the overall development process, improving it during the enactment and minimizing the factors that may decrease productivity, taking into account the possible impacts of diverse cultures and attitudes.

In this context, S. Goldmann et al. (1999) explains the main ideas of MILOS, a system orientated towards planning and scheduling which supports process modeling and enactment.

The maturity of the process becomes a key factor for success. In this sense, M. Passivaara and C. Lassenius (2003) propose incremental integration and frequent deliveries by following informing and monitoring practices. B. Berenbach (2006) describes different organizational structures that can overshadow technical problems caused by globalization, enumerating the problems introduced and the mitigation techniques that were effective.

R. J. Madachy (2008) deals economic issues presenting a set of cost models to estimate distributed teams work taking into account diffent environmental characteristics of the teams, localized labor categories, calendars, compensation rates, and currencies for costing.

4.8 Process Support

Processes should reflect the direct responsibilities and dependencies between tasks, notifying the people involved of the changes that concern them, thus avoiding information overload of team members. Process modeling and enactment should support inter-site coordination and cooperation of the working teams, offering automated support to distributed project management. Problems derived from process evolution, mobility and tool integration appear within this context. Process engines have to support changes during enactment. Furthermore, distributed environments usually involve a large network of heterogeneous, autonomous and distributed models and process engines,

which requires the provision of a framework for process system interoperability.

In relation to these problems, A. Fernández et al. (2004) present the process modelling environment SPEARMINT, which supports extensive capabilities for multi-view modelling and analysis, and XCHIPS for web-based process support which allows enactment and simulation functionalities.

S. Setamanit et al. (2007) describe a hybrid computer simulation model of software development processes to study alternative ways to configure GSD projects in order to confront communication problems, control and coordination problems, process management and time and cultural differences.

N. Glasser and J.-C. Derniane (1998) analyse CoMoMAS, a multi-agent engineering approach that describes different viewpoints in a software process, permitting the transformation of conceptual models into executable programs. In this context, the agents will be able to cover with the high mobility of the members involved in the development process, taking charge of the management of information and permitting artifacts to communicate both with each other and with human users.

4.9 Quality and Measurement

Quality of products is highly influenced by the quality of the processes that support them. Organizations need to introduce new models and metrics to obtain information adapted to the distributed scenarios that could be useful in improving products and processes. With this aim, K. V. Siakas and B. Balstrup (2006) propose the capability model eSCM-SP, which has many similarities with other capability-assessment models such as CMMI, Bootstrap or SPICE and the SQM-CODE model, which considers the factors that influence software quality management systems from a cultural and organizational perspective.

J. D. Herbsleb et al. (2000) work with several interesting measures, such as the *interdependence measure* which allows the determination of the degree of dispersion of work among sites by looking up the locations of all the individuals. In this sense, F. Lanubile et al. (2003) propose metrics associated with products and processes orientated towards software defects such as: discovery effort, reported defects, defects density, fixed defects or unfixed defects.

Furthermore, software architecture evaluation usually involves a large number of stakeholders, who need face-to-face evaluation meetings, and for this reason adequate collaborative tools are needed, such as propose M. A. Babar et al. (2007).

4.10 Defects Detection

In distributed environments it is necessary to specify requisites with a higher level of detail. Software defects become more frequent due to the added complexity, and in most cases, this is related to communication problems and lack of group awareness. Defects control must be adapted by making a greater effort in relation to risk management activities.

To minimize these problems, F. Lanubile et al. (2003) define a process, specifying roles, guidelines, forms and templates, and describe a web-based tool that adopts a reengineered inspection process to minimize synchronous activities and coordination problems to support geographically dispersed teams.

An adequate model cycle must allow the localization and recognition of defect-sensitive areas in complex product development. In this line, J. van Moll et al. (2004) indicate that transitions between constituent sub-projects are particularly defect-sensitive. By means of an appropriate modelling of the overall project lifecycle and by applying adequate defect detection measures, the occurrence of defects can be reduced. The goal is to minimize the amount of defects that spread to the subsequent phases early in the software life cycle, and reuse existing components or the appli-

cation of third-party components, thus minimizing product quality risks by using tested components.

5 SUCCESS FACTORS

From the experimental studies analyzed, we have extracted the following success factors of DSD.

- Intervention of human resources by participating in surveys (Babar, Kitchenham, Zhu, Gorton, & Jeffery, 2007; Herbsleb, Mockus, Finholt, & Grinter, 2000). Their problems, experiences and suggestions can be very helpful.
- Carrying out the improvement based on the needs of the company, taking into account the technologies and methodologies used (Akmanligil & Palvia, 2004). The tools employed at the present must be adapted and integrated (Sarma, Noroozi, & van der Hoek, 2003).
- Training of human resources in the tools and processes introduced (Herbsleb, Mockus, Finholt, & Grinter, 2001). Their skills are an important factor for a successful application of both tools and processes.
- Registration of activities with information on pending issues, errors and people in charge (Biehl, Czerwinski, Smith, & Robertson, 2007) and provide awareness of software development activities (Storey, Čubranić, & German, 2005).
- Establishment of an efficient communication mechanism between the members of the organization, allowing a developer to discover the status and changes made within each project (Baentsch, Molter, & Sturm, 1995; Biehl, Czerwinski, Smith, & Robertson, 2007).
- Using a version control tool in order to control conflictive situations (Pilatti, Audy, & Prikladnicki, 2006).
- There must be a way to allow the planning and scheduling of distributed tasks, taking into account costs and dependencies between projects, application of corrective measures and notifications (Froehlich & Dourish, 2004; Madachy, 2008).
- Application of maturity models and agile methodologies (Lee, DeLone, Espinosa, 2006) based on incremental integration and frequent deliveries.
- Systematic use of metrics tailored to the characteristic of the organization attending to the different types of distribution (Herbsleb, Mockus, Finholt, & Grinter, 2001).

6 CONCLUSION

In this work we have applied a systematic review method in order to analyze the literature related to the topic of DSD within the FABRUM project context whose main objective is to create a new DSD model to manage the relationships between a planning and design center and a software production factory, this work serving as a starting point from which to establish the issues upon which subsequent research will be focused.

Results obtained from this systematic review have allowed us to obtain a global vision of a relatively new topic which should be investigated in detail. However, every organization has concrete needs which basically depend on its distribution characteristics, its activity and the tools it employs. These are the factors that make this such a wide subject, and lead to the necessity of adapting both the technical and organizational procedures, according to each organization's specific needs.

Generally, the proposals found in the analyzed studies were mainly concerned with improvements related to the use of collaborative tools, integration of existing tools, source code control or use of collaborative agents. Moreover, it should

be considered that the evaluation of the results obtained from the proposed improvements are often based on studies in a single organization, and sometimes only takes into account the subjective perception of developers.

On the other hand, it should be noted that maturity models such as CMM, CMMI or ISO, which would be of particular relevance to the present investigation, represent only 17% of all analyzed works. The fact that almost all experimental studies that employed CMMI and CMM applied a maturity level 2 suggests that the cost of implementing higher maturity levels under distributed environments might be too high. The application of agile methodologies based on incremental integration and frequent deliveries, and frequent reviews of problems to adjust the process become important success factors.

Finally, we must emphasize that the search excluded studies which addressed the subject of DSD but did not contribute any significant method or improvement in this research context. However, since this is such a wide area, some of these works present interesting parallel subjects for the development of this investigation, which is why their study would be important in a future work.

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KEY TERMS AND DEFINITIONS

Nearshoring: Transference of an organizational function to geographically closer countries, thus avoiding cultural and time differences between members and saving travel and communication costs.

Offshoring: Transference of an organizational function to another country, usually where human resources are cheaper.

Outsourcing: Is a way to contract a particular function to a third-party organization defining how the client and the supplier will work together.

Primary Study: Individual studies obtained by applying an inclusion and exclusion criteria whose information is extracted and synthesised to contribute to a systematic review.

Relevant (or Secondary) Study: Studies related to a particular research question but which has a secondary interest.

Software Factory: is an organizational structure that, automates parts of software development through an assembly process, decentralizing production units, and promoting the reusability of architectures, knowledge and components.

Systematic Review: Literature review focused on a research question which tries to identify, evaluate and interpretate all high quality studies to answer the question following a well-defined method.

Virtual Team: Group of individuals who work physically separated across time and space and who primarily interact through electronic media and may meet face-to-face occasionally to achieve a task.

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Chapter 37
Making Room for E-Government through Succession Planning

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ABSTRACT

Few innovations have more impact on government's work culture and the delivery of public services than e-government. E-government is a global phenomenon that is much researched, but researchers often neglect to research the demands it places on the human resources, the administrative infrastructure, and training and development. There is very little written on e-government and why it matters in succession planning. Those who design and implement well executed e-government systems need technological and culturally relevant competencies to make e-government responsive to e-citizens. In addition, there is no shortage of articles on government budget overruns tied to IT projects. The rush to have needed technologies has outpaced recruitment and training strategies to manage the technology infrastructure that makes e-government work. The infrastructure of e-government includes concepts tied to the provision of a seamless flow of services, logical one-stop-shops, efficiency, and an ability to do more with less. These concepts, however, will not support e-government indefinitely without adequate succession planning. The succession planning for this year and beyond must include training, maintaining and transitioning employees in a world where technical competencies need to be addressed and citizens clamor for more direct involvement. Succession planning can train employees to create a work culture that promotes accountability, transparency, efficiency, and build an appreciation for a competent representative bureaucracy. Succession planning, more than any other tool, can tap into the diversity pipeline, something that could narrow the digital divide. Human resources in the public sector faces fierce competition for talent. Talent is recruited nationally and internationally. Thus the public service is at risk if it persists in holding onto 20th century technology and 20th century cultural world-views.

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INTRODUCTION

Government public relations no longer happens solely through public relations professionals. It is now decentralized through blogs, social networks, text messaging, photo sharing, wikis and virtual worlds – the Web 2.0 World. Succession planning can address the benchmark strength in human resource capacity tied to e-government. The thrust of e-government requires a closer look at employees and the kind of talent needed to communicate through technology in a way that is usable, helpful and easy. E-government thus requires that management employ its talent differently. Without a tool to identify talent management needs and how to address them, e-government or any other kind of service delivery, will not meet the complex challenges currently posed by globalization, economic woes, unprecedented retirements, and existing challenges in the competition for talent. A skilled public work force and one trained for a world of globalization and increasing diversity will be needed in a twenty-first government that will have to govern with the aid of civil society (Huddleston, 2000).

E-GOVERNMENT RECRUITMENT

The practice of e-government will not achieve best practices status until it addresses systems of recruiting, maintaining, training and planning for the provision of public services. No doubt e-government is an integral part of public service delivery for many governments, particularly in the United States. Public Human resource organizations, however, have not been quick to take the lead in using Web 2.0 technologies that could benefit them including LinkedIn, Facebook and Twitter – this is not an exhaustive list. Web 2.0 technologies are interactive and important to learning the communication venues frequented by Generation X. Recruitment of this generation will not be easy without embracing the online places they frequently visit. The Obama administration is noted for attempting to revamp the federal government and making it "cool" for young people to work for the public service. Without embracing Generation X communication venues, however, it is tough to make government a desirable place for young professionals to work.

The recruitment benefits using Web 2.0, social media and social networking are not fully known. Still there is no better time to learn relevant social media tools. The variety of communication outlets means that there are many different ways to connect with talent and people looking for jobs. There are myriad online ways to learn about what the competition is doing in terms of recruitment. There are blogs (http://www.recruitingblogs.com/), web sites (http://hrmtoday.com/), wikis (http://thehumanresource.wikispaces.com/page/diff/Home/88551151) and more. In London for example, there is a civil service live network (http://network.civilservicelive.com/). These technologies bring dramatic changes in communication, which can be static, interactive, transactional or transformational (Melitski, 2003). The transformational usages of e-government are also evident where succession planning takes center stage.

e-government cannot exist without e-Public Servants to provide services to its e-Citizens. Each of the e-Players exists in concert. They are networked in a communication system that may include an e-Manager, e-Planner, or e-Collector of revenue working from their office or their home to offer a government service. Succession planning can assess whether a government has a workforce capable of facilitating the delivery of services in a networked system. If the prediction of unprecedented number of retirements does not move succession planning to the fore, the economy and technology will be a couple of major reasons to move to take an in depth review of succession planning and e-government (Roberts 2003; Roddy 2004).

Succession planning is a tool to continuously and systematically identify, assess and develop

personnel to enhance performance (Kim, 2003). Initially it focused on leadership gaps left by baby boomer retirements and developed to identify and develop leaders to replace those leaving. It has evolved into a tool for an organization-wide effort to continuously assess competencies and skills gaps throughout an organization. It also offers an opportunity to plan for the future and work toward a diverse workforce to address nontraditional working arrangements and a multigenerational workforce (Helton and Jackson 2007; Fillichio 2006). Succession planning was initiated following predictions that baby boomer retirements would lead to a knowledge gap of crisis proportions in the public service. It goes beyond the baby boomer talent retiring from the workforce. It is now about being able to compete for talent with the private sector, have a preparedness to meet technology demands, work easily with a diverse work force, and have cross training to do more with less (Fillichio 2006). Without infusing technological skill sets into succession planning, the competition for talent may be lost. This is a world that few could have envisioned a decade ago (Roddy 2004.)

Nearly ten years ago, Congress addressed the need for investing in IT to build competency and capacity in the government infrastructure and human resource pool (Seifert, 2008). The Clinger-Cohen Act created the Office of Electronic Government to manage security, build capacity and address issues of access (Government Accountability Office, December 2004). The Act addressed the need to include citizens, improve government operations, communications and public services (Government Accountability Office, March 2004). In 2007 Congress passed the eGovernment Re-Authorization Act.

Beyond these acts of Congress, it takes real leadership to make dramatic change manageable within organizations. It is important to have a leader that has the ability to change an organization to succeed in a modern world. Organizational culture does not adapt easily to change even if needed changes represent an improvement (Hartley & Allison, 2000) Leadership is part of a clear succession plan, one that results in major organizational change. Strong and effective leadership can ameliorate the culture clashes that come with rapid change. Such leadership can provide the vision necessary to help employees experience the benefits of a diverse workforce. Dimensions of diversity include demographics such as race, culture, gender, sexual orientation, ethnic origin, body shape, disability, etc. Another dimension includes career patterns, mobility, and an ability to work any place and any time (Fillichio 2006) Within this diverse workforce, those who are most comfortable with technology are workers from Generation X. This generation has a work orientation that puts their age cohort at odds with other cohorts, such as Baby Boomers who enjoy more structured, traditional work and workplaces.

HOW MIGHT THE OBAMA ADMINISTRATION INFLUENCE E-SUCCESSION?

President Barack Obama campaigned through texting, Facebook, email and other electronic communication forms. This is evidence that mastering technology and its benefits builds an effective organization. President Obama could be dubbed the first Web 2.0 president. The White house Web site includes Facebook, YouTube, Twitter, Flickr, MySpace, iTunes, Vimeo, and LinkedIn (http://www.whitehouse.gov/2010). Clearly for this president, the time has come to embrace a more open Internet, a *connected* system of representation, technology in schools and world-wide-web (www) use to promote transparency. It seems remiss to not talk about what public management has to do with a networked system, especially when the World Wide Web is being promoted as a tool to achieve transparency. The morale of public servants has suffered after decades of Reagan like government bashing. Any study of e-government

and the personnel system behind it benefits if we ask, "what does trust have to do with it?" Succession planning is important to keep the personnel system sound and can address employment gaps that would preclude transparency from becoming a best practice in government (2010 Talent Management). The training necessary to use technology in an honest, efficient and transparent way can lure talent into the public sector. Linking technology to employee recruitment and development serves as a talent management plan.

It may be unrealistic to suggest that e-government can solve issues tied to the public trust. The tension or distrust between leaders and their public is a historic one (Taylor & Burt, 2005). Divided government, checks and balances, a two chamber legislature and separate but shared powers were written into the Constitution because of distrust in government. Madison is repeatedly quoted for saying "If men were angels, no government would be necessary." Thus trust issues are an ongoing incentive to work on the government's relationship with its citizens. Succession planning is one tool and e-government is another to improve the relationship between government and the citizens. Both succession planning and e-government in tandem can serve as a vehicle to help achieve the ideals of justice, equality and freedom.

What does the availability of e-government do to the quality of the exchange between e-Citizens and e-Public Servants? It means the capacity to change the nature of the relationship between leaders and their public has to do with the ability of public servants to develop an electronic platform that enhances transparency and accountability (Roy, 2003). If public trust matters and contributes to the quality of the exchange, it is important to recruit, train and develop people to make e-government serve as a true paradigm shift toward transparency and strengthening social capital (Carter & Belanger, 2005; Farazmand, 2002).

E-government offers an opportunity to make government more transparent and accountable – variables that correlate to public trust. While it is hard to get at the precise meaning of quality for public services, in a democratic system it has something to do with being honest, trustworthy, civic minded, and be responsive to humanity in shared public and virtual spaces (Hard, 1989). Political machine run governments such as in nineteenth century New York City, Kansas City and Chicago, were able to deliver services, but not able to do so in a way that was transparent or accountable. These governments were associated with distrust and corruption. It follows that citizens are more satisfied with a service if they receive it through an exchange that is courteous, service oriented and honest. The New Public Management focused not only on services but also on civility, customer services and running government more like a business. The culture of civil service had to change with the values ushered in by the New Public Management. From the 1990s to the present, governments at all levels have focused on performance, customer service, diversity, and doing more with less. Current public servants need to provide a high level of customer service through exchanges in the online world. However, what does service with a smile look like when there is no face-to-face interaction? The answer to this goes back to leadership, training and development.

Leadership and organizational change go together. Succession planning started out with an effort to address a gap in leadership. It has expanded to include efforts to prepare for workforce changes throughout an organization. E-government involves technological and cultural changes that reconfigure the world-of-work. Today the disappearing bureaucrat might have something to do with retirement. But it can also have something to do with the fact that e-government means many bureaucrats can do their job from home. Now that public employees engage in everyday communication via the World Wide Web, it is important to assess the benchmark strength provided by knowledge workers inside government and the technology needed to provide services. Just what kind of leadership, training and person-

nel are needed to provide e-government that is customer service friendly? This question relates e-government to the customer-oriented values of the New Public Management.

E-government means that all types of current public employees are using e-Communication or assisting with digital service delivery to some degree. E-government utilizes information technology (IT), information sharing and access, and changes the definition of what constitutes public knowledge (Freidman, 2007). The challenge therefore is to train public servants to first address security issues and make use of technology to achieve transparency goals; then it becomes an issue of leadership to instill the change in the organizational culture. Public officials engaged in budgeting need skills to post a budget online in a user friendly way. One of these skills is the ability to communicate online. The hierarchy of communications flattens when more people engage in Web 2.0 technologies, e-government, or other technological innovations. E-government, along with new media networking, changes and strengthens pluralism as we know it. The distinction between the knower and the known is no longer distinguishable. Public managers need to manage information networks and know the implications of citizens having ready access to public information. Thomas Friedman's flat world (2009) plays out through e-government. Today more than ever, the public has come to expect a responsive government. As journalist Friedman demonstrated throughout his book *The World Is Flat*, the public is expecting more information in a faster amount of time. Being constrained by a system largely designed before the proliferation of the Internet into mainstream culture has caused the public sector to fall considerably behind the private sector in terms of responsiveness and also on many other levels. Again, this is another situation where public administration leaders will have to encourage the use of technology to increase responsiveness, while at the same time ensuring subordinates abide by what may appear to be antiquated regulations and laws (Friedman, 2007).

How do public managers insure a process that monitors information to guarantee that e-government works to arrive at public interest? How do they receive the competencies to do this? The knower and the known become less distinguishable because citizens have blogs, as do government entities. Public servants need to not only manage service delivery but also manage information on the World Wide Web. Knowledgeable citizens are preferable but it requires that people working on the other side of the exchange also have the skills and competencies to provide an added value to the exchange. Training, leadership, and succession planning have much to contribute to bringing about these changes.

E-government also introduces a new technology, a new work culture and new environment to the public workforce. Hence it radically changes the nature of work. Without planning for the development and recruitment of talent, e-government loses its potential to provide short and long term improvements to the quality of the exchange between citizens and their government. The rise of e-government presents fundamental reasons to do succession planning. For example, instead of looking for the top three candidates who apply for a position, succession planning works to get the right persons into critical positions. At a time when there is mandate to manage diversity, a massive flood of retirements, and the perennial need for talent, the changes imposed by e-government offers one more reason for succession planning to be the vehicle for managing multiple engines of change.

E-government can enhance transparency and also offer accountability. It can keep multiple stakeholders informed. Information, communication and citizen engagement can lower public distrust in government (Marlowe, 2004). E-government needs leadership to shepherd support for investment in the proper information infrastructure and related training to prevent budget

overruns and facilitate implementation (Taylor & Burt, 2005). Another important aspect of IT is that makes communication across vast distances easy and inexpensive. Networking within and between countries requires a new skill set and worthy of studying further. The United States is no longer in the lead here and can learn from developing nations who have had a long history of collaborating between states (Freidman, 2007). Early adapters in technological innovations have a resource that other countries may not have in that technological skills and resources are definitely a sought after commodity. For instance, India is a resource rich nation with a large population of technically competent citizens. There is thus a regrouping of nations that would not have been predictable without easy communication across large distances through the Internet. People are now one click away from each other. The world is a smaller stage like never before. Nations that use e-government to enhance transparency and accountability open communication with citizens and with each other. The United States may have its first Web 2.0 Presidency, but someone needs to manage the change that not only requires a regrouping within the government bureaucracy but also a skilled facilitator to address the changes that must also occur in the organizational culture within government.

WHY E-GOVERNMENT NEEDS SUCCESSION PLANNING

Employees trained in the practice of e-government can work to give it better definition. Government is still lagging when it comes to working with technology that builds relationships in new ways and forms. By viewing e-government as a process and not an outcome, it still comes down to people forging relationships within government and outside. Just like the man behind the curtain representing the Wizard of Oz, there is a person behind the computer, smart phone, or other technology. Again, the new types of relationships formed as a result of e-government mean that someone has to manage organizational cultures that prove resistant to public service delivery modes such as e-government. Succession planning offers yet another opportunity to lead organizations through change in a way that makes government organizations more adaptable to e-government.

Succession planning has evolved to plan for diversity, train for new modes of delivery, and to create an organizational culture that works beyond today. Succession management is currently done in conjunction with a strategic plan to identify competencies that will meet with the mission and goals of the organization. Human resources capacity, for example, can be measured in terms of *bench strength.* This bench strength encompasses training, development and recruitment, which are tied to technology. Technology is thus one way for organizations to keep current. It also takes time, money and resources to be current in the field. The fast evolution of e-government parallels the retirement of Baby Boomers. This is fortuitous, particularly since the implementation of E-government meets with the resistance of the Baby Boomer organizational culture (Crumpacker 2007). The transition of old and new talent can ease the pains associated with e-government's rise (Holden, Norris & Fletcher, 2003). Almost by definition e-government conjures up an image of someone plugging-in government to illuminate it further. More research needs to be done on how e-government is more than just a technological innovation. People providing e-government services need to be brought on board to bring about improvements in the public service. Reform is another one of those elusive terms that could be applied to e-government, but any innovation that increases citizen participation is bound to be an improvement.

E-GOVERNMENT, PUBLIC TRUST AND SUCCESSION PLANNING

Without public trust, it will be harder to mobilize public support for huge investments in technological infrastructure at a time of IT project cost overruns, budget deficits and daily news accounts of states going broke across the U.S. This does not bode well for the public's support of continued funding for such projects. Succession planning could help get the right people in the right positions to make more accurate estimates of technology projects. It makes sense to call for training programs and assess staffing needs tied to IT projects (Roddy, 2004; Kim & Kim, 2003). It also makes sense to highlight the benefits of e-government. Today more than 70% of taxpayers filed taxes on line. Driver's license renewal is another example where citizens are participating in increasing numbers (Baumgarten and Chui 2009). This is a time saver and it reduces citizen's aggravation with government red tape. Trained employees at all levels are the key to being proactive and to spread the word about useful technologies that make working with government easy, time saving and effective (Davis, 1989). It is unlikely that citizens will go out of their way to promote technology, but employees can promote e-government services through their own web site, facebook, wiki's, blogs or other resource. The greatest shift in organizational culture lies in the citizen participation that is allowable in blogs, wikis and mashups. This may be where technological innovations meet the resistance of organizational culture.

Along with these technological changes, everyone across the world is adapting to the unprecedented ethnological changes. There are major benefits to training employees to stretch and build their skills in adaptability, technology and diversity (Kim & Kim, 2003). Succession planning offers a road map to government organizations today. Today it is a tool to build a future that embraces diversity, technology and shared ownership in civic and organizational culture. Succession planning is all about adaptability and therefore should address issues that minimize the digital divide (Justice, Melitski & Smith, 2004). Within this digital divide there are social justice issues present in statistics showing poorer and less educated citizens not participating in technological innovations (Justice, Melitski & Smith, 2004).

The investment in technology provides mounting justification to advocate succession planning. E-government will lose support if it does not give universal benefits to all (Holden, Norris & Fletcher, 2003). However, cost limits to implementation of technological and succession planning for e-government will present leadership challenges (Chen & Perry, 2003). Organization capacity requires constant attention to who is retiring and who needs to be hired to allow for continuity where necessary, and accommodate change when required (Helton & Jackson 2007). Human resources information systems (HRIS) offer many types of systems to assist with succession planning.

The fears over technology and technological security fit in the complicated balancing act between liberty and order. It takes training to be able to make decisions in areas that have no easy answers. Trained employees are important to effective implementation of e-government. These employees must uphold values inherent in the United States Constitution. Liberty and technological security are both important. There is no doubt that technological security is an issue. Fraud, Internet viruses, identity theft and other crimes that have been yet to be invented are all security considerations. In designing e-government service delivery it is important to allow for discussions, communications and feedback in a world that requires internal and external communications (Kim & Kim, 2003). However, adequate security must also be maintained, which requires a delicate balancing act for government,

E-GOVERNMENT IS A TOOL OF PUBLIC ADMINISTRATION

E-government can be an effective tool for public administration. At the same time, however, change does not come easy, particularly when it does not fit with an existing organizational culture. For this reason, ongoing succession planning must accommodate the ever-changing organization. Baby Boomers will retire; Generation Xers will come on board. One way to accommodate these changes is to use a *stages* approach, which offers a continuum for training through change that is static, interactive, transactional and transformational (Melitski, 2003). Subsection planning can take government employees through this continuum to incorporate and prepare for change. This same concept of *stages* can be applied to the citizens embarking on the new world of e-government. E-government has been designed to be user friendly, but many citizens will struggle with understanding and institutionalizing the technology and subsequent changes in the way they formerly dealt with their government (Marlowe, 2004). The relationship between citizen satisfaction, government performance, public trust and social capital are part of civil society. The question is what a networked society does to civic culture

The stage analysis of change suggests that transformation will not occur without thinking through the ways public servants make e-government happen. This process includes a discussion of what enhanced citizen engagement and communication would look like and how employees might play a role using e-government as a tool for building civil society. At a minimum it is necessary to know the competencies necessary for citizens to participate in e-government. In order for e-government to be successful, the IT infrastructure requires an investment to build capacity in human resources through training and development and by building a pipeline for diversity (Roddy, 2004; Siegel 2007). Public managers must work jointly with human resources to address competencies tied to succession planning in e-government. Government organizations can streamline planning efforts to build organizational capacity. Succession planning fits nicely in the effort to implement e-government infrastructures. Large-scale change of any kind requires assessment methods, scheduled evaluations and alignment (Melitski, 2003).

Succession planning addresses entire organizations in terms of innovations, retirements and diversity needs and the usual buzz words such as efficiency and effectiveness, demand adaptability as well as cultural and technical competencies. E-government adds value to an arena that already has plenty of technical competencies (Justice, Melitski & Smith, 2006). E-government can improve the relationship between the governed and those who govern, but it takes planning to have any hope that the public finds it in their interests (Marlowe, 2004). There are a lot of forces at play and without adequate planning; public officials will not be able to utilize e-government to capacity.

When governments address succession planning, they also must address globalization at the same time. Globalization makes competition for knowledgeable employees paramount (Kudo, 2008). Since the U.S. is at a juncture to re-evaluate what it means to be a strategic player in a "flatter" world and simultaneously address financial woes, the justification for human resource planning, succession planning and the investment in an e-government infrastructure matter greatly. E-government and e-services are producing other global super powers (Jreisat, 2004). In order to make e-government an asset, it is timely to hire and train talent to make digital services convenient to everyone (Holden, Norris & Fletcher, 2003). The search for new talent works to build organizational capacity and adaptability (Chen & Perry, 2003). E-government therefore adds a new dimension to what we already know about outsourcing and succession planning (Chen & Perry, 2003).

E-government technology offers HR professionals an ability to do more with each government

professional and offer more services while spending less money the potential to do more with less (Eoyang, 2008). In essence, with e-government citizens are performing administrative tasks and are administrators by proxy (Brown, 2005). The distinction between routine and nonroutine, however, is where the public employee matters once more. The public employee is the professional pulling strings behind the curtain that handles matters of administrative discretion. In keeping it simple, participation and engagement must come with assurance of security and ease (Kim & Kim, 2003). Public administrators need to either be IT specialists or work closely with IT professionals to be keenly aware of the digital divide. Employees must work to broaden access at every innovation. The mantra becomes make online services accessible, convenient and user friendly to everyone (Justice, Melitski & Smith, 2006). Security measures, however, can get in the way of simplicity but this is where the public administrator exercises his or her craft (Kim & Kim, 2003). Information sharing is part of representative government. Integration and data sharing goes with the territory of technology and e-government (Melitski, 2003). Here investment in an e-government infrastructure offers opportunities for civil society.

CONCLUSION

The process of e-government is an evolving one. It requires leadership in public administration, investment in human resources and IT infrastructures and adaptability. The newer versions of succession planning require proponents to justify its need, particularly in today's economic hard times. E-government enthusiasts need to argue for the investment in technology, time and human resources to overcome barriers to implementation. Change happens in stages and requires strong leadership and organization to guide it (Kim & Kim, 2003).

Ultimately the investment in succession planning and e-government infrastructure offers promise. Not only does it allow for global networking but it also shifts the emphasis toward citizen driven service delivery, which helps civil society (Brown, 2005). The new public administration draws from private sector values to run governments more like a business. In this sense, it means treating citizens more like customers and employing user-friendly service delivery mechanisms (Brown, 2005). The emphasis on customer service requires a culture shift – a transition that can be achieved through succession planning, new technology, training and strategic planning. Business values, however, do not always work especially where participatory government is encouraged and valued. There are times where the cacophony of citizen voices can keep a citizen from ever being treated like a customer. It is an example of the ongoing need to offer the best customer service possible in a way that is tailor made to fit with competing values in the public sector.

E-government has taken over so rapidly that it is surprising to say that it is still in the early stages. It radically changes everyday life in the government work force. It changes the government and citizen relationship and plays out differently depending on the level of government size and target audience served (Holden, Norris & Fletcher, 2003). Instead of sharing usable knowledge, the government is offering usable technology to be used by the public work force and those they serve. The ease of use is related to those who use it. The theme of useable technology goes along with the need to adapt networks used by growing numbers of citizens. The Obama campaign and now the Obama administration mastered the various social networks, such as Facebook, MySpace, and YouTube. While this is far from an exhaustive list, it is exemplary of the growing number of users in both public and private sectors. The adaptation toward multiple versions of e-government services is another chapter in reinventing government. The idea that public

employees are behind e-government also deserves more acknowledgements. E-government produces research questions that can keep academics busy for a long time.

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Chapter 38
Assessing Adequacy of Leisure and Recreation Facilities in KFUPM Campus:
A Futuristic Need-Gap Perspective

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ABSTRACT

Leisure and recreation facilities are strongly intertwined due to their mutual dependencies. Thus, they build up invisible networks. Leisure and recreation facilities are one of the imperative components for socio-cultural, psychological, and economic development. In the spectrum of sustainable development, it is not possible to initiate development process without strategically planning for leisure and recreation activities. KFUPM was developed with specific leisure and recreation facilities for its community members. This paper examines their adequacy and possible set of actions to minimize the inadequacies in relation to growing and changing needs of the diversified-culture based community. Preparation of a proposed alterative (strategic) action plan to improve leisure and recreation facilities is based on conducting an internal assessment of current and forecasting amenities, and the need-gap analysis. The proposed action plan covers the estimated cost and urgency level for each of the alternative leisure and recreation improvement options. KFUPM must be committed to embracing the vision and strategies presented by this study, and allocate resources to implement strategic plans for improving leisure and recreation facilities that foster productivity and help shape systems for human resource development.

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INTRODUCTION

Leisure and recreation activities are one of the critical dimensions that determine quality of life (Cushman & Alan, 1990). There are common leisure and recreation facilities through which people spends time, and develop skills and competencies as well. Traditionally, leisure and recreation activities are given low priority against the support and assistance provided for socio-cultural and economic development (Kaiser, Godschalk, & Chapin, 1995; Kraus, 1966). Therefore, many development initiatives are only limited to sporadic recreation and leisure choices. When other opportunities are offered, they often involve taking group of people to large public settings (e.g., community centres, shopping malls, theatres, restaurants, etc.) while very little support is offered for individual participation in community settings that offer greater opportunities for social connections and relationships (Nelson, 2004; Pigram, 1983).

In order to assist people to get involved in leisure and recreation activities, one must be aware of the available and possible opportunities within confinement of the community (Centre on Human Policy, 1990; Centre for Urban Affairs and Policy Research, 1988). This awareness includes the following information,

(1) Use of various neighbourhood and community places (i.e., who uses them, when, for what purposes);
(2) Local organizations and associations (e.g., where and when do they meet, what does it mean to be a member, etc.); and
(3) Where people go and what they do who are of various ages, genders, racial/ethnic groups, religious affiliations, share similar interests, etc.

Such information can be gathered through a wide range of scientific means, such as observation of people and surrounding settings, through spending time in the neighbourhood, reading community newspapers, bulletin boards, and directories, and talking to a variety of people (e.g., key informants) who know something about the neighbourhood and the community (Amaratunga & Sarshar, 2000; Alexander, 1996).

The University, as a campus town and a community, provides required amenities and services to its residents (e.g., faculties, students, staffs, etc.), such as housing, health, transportation, leisure and recreation, safety and security, etc. Leisure and recreation facilities, including public space, parks, green areas, playground, sport facilities, and community space for social interaction, etc. constitute an important part of daily lives of the campus residents (Cushman & Laidler, 1990). Likewise, KFUPM (King Fahd University of Petroleum and Minerals of Saudi Arabia) campus town have been designed by taking into account the daily needs for leisure and recreation facilities. The campus is a host of people from wide range of socio-cultural and ethnic backgrounds, and ongoing planning and development efforts by the university administration are to accommodate their diversified needs. In this campus town, though there is an established set of leisure and recreation facilities, it is a strategic task to evaluate them against the increasing demand and adequacy of those facilities. A research project is carried out to evaluate KFUPM's current leisure and recreation facilities with the goal of identifying improvement needs and suggesting alternative and improved actions. This paper, however, is the outcome of that project.

DEFINITIONS: LEISURE AND RECREATION

Leisure

According to Australian Council for Health (1980), leisure is a state of mind, which ordinarily is characterized by un-obligated time and willing

optimism. It can involve extensive activity or no activity. The key ingredient is an attitude, which fosters a peaceful and productive co-existence with the elements in one's environment.

Leisure is also considered primarily as a condition, sometimes referred to as a state of being, an attitude of mind or a quality of experience. It is distinguished by the individual's perceived freedom to act and distinguished from conditions imposed by necessity. It is assumed to be pleasurable and, although it may appeal because of certain anticipated benefits, it is intrinsically motivated: it is an end in itself and valuable for its own sake (Cushman & Laidler, 1990).

Recreation

Kraus (1966) defines recreation as an activity or experience, usually chosen voluntarily by the participant, either because of the immediate satisfaction to be derived from it, or because he perceives some personal or social values to be achieved by it. It is carried on in leisure time, and has no work connotations, such as study for promotion in a job. It is usually enjoyable and when it is carried on as part of organised or community services, it is designed to meet constructive and socially worthwhile goals of the individual participant, the group and society at large. Other researchers like Pigram (1983) views recreation primarily for pleasure and he defines

"...recreation is considered to be activity voluntarily undertaken, primarily for pleasure and satisfaction, during leisure time" (p. 3).

Recreation is also an act or experience, selected by the individual during his leisure time, to meet a personal want or desire, primarily for his own satisfaction (Yukic, 1970).

Generally, leisure and recreation activities are seen synonymously and complementary to each other. Also, sport events are considered as an integrated part of leisure and recreation domain. However, the above definitions imply that leisure and recreation are strongly connected to each other where, strategically, one could not be thought of without the presence of other one.

OBJECTIVES

The following objectives constitute the focus of this paper,

- Identification of current leisure and recreation facilities in KFUPM campus
- Assessment of these facilities by taking user's opinions and perspectives
- Examine and design alternative improvement options against the inadequacy of existing leisure and recreation facilities.

LITERATURE REVIEW

University, as the highest educational institution, is aimed at developing physical environment to facilitate the education mission. In the learning paradigm, physical planning and development encompasses a sheer part to satisfy the learning objectives (Nelson, 2004; Kaiser, Godschalk, & Chapin, 1995). Physical facilities include leisure and recreation facilities that are generally recognized and accepted as important components in the higher education system (Brignall & Ballantine, 1996; Varco, 1996). For physical facilities to support the educational mission of any institution there are five tenets, which they must satisfy (Kaiser & Klein, 2006; Kincaid, 1993),

- Institutions must have adequate facilities referring to both the availability of different facilities and to the adequate provision of each facility and infrastructure to meet the demand for it. Facilities need to be adequately provided to meet the needs of all the members of the institutional society.

- Facilities should be provided at a quality level that meets established education facilities standards. Facilities should meet health, safety, access and other code requirements.
- Facilities and infrastructure should be provided and configured in a flexible way to accommodate growth and change.
- Physical facilities should overall be well integrated together and configured to create an environment that is conducive to learning. The environment must serve both as a context for learning, as well as be a part of the learning process, by enabling both curricular and extra-curricular activities and interactions, and endowing a sense of 'place identity' and belonging.
- Finally, institutions need to establish efficient and effective systems for maintenance to prolong the life of facilities and support their optimal use.

The following are the key standards that can be used for judging leisure and recreation facilities in an institutional setting (Nelson, 2004; Poinsatte & Toor, 2001):

- *Adequacy (capacity) of physical facilities and infrastructure,* particularly taking into account the growth of the university with time, and the wide variety of needs and interest that have to be catered for.
- *Quality of facilities* in terms of meeting established codes and standards for educational facilities, such as those of safety, health, and access for the physically impaired.
- *Expendability and flexibility in configuration* – is it flexible to accommodate change.
- *Ability to support the mission of the university in terms of teaching and learning* – are facilities designed and configured to support the activities, interaction and socialization needs of the members of the university community.
- *Planning and management* – the facilities have to be well managed and maintained to prolong their life and enable optimal return on investment.

RESEARCH METHODOLOGY

This section presents the methodology of the project in two parts; the first part reviews the project tasks and the second part reviews the approach to the execution of the project task. A total 650 self-administered questionnaires are distributed among the KFUPM community members including officials of concerned Departments (e.g., KFUPM Master Plan Committee, Projects Department and Financial Department) at KFUPM. Though delayed a bit, but the response rate is very good.

Project Tasks

To facilitate the achievement of the project objectives, the project has been divided into four defined tasks to address the objectives outlined. The tasks are as follows.

Task 1. Survey and documentation of currently available leisure and recreation facilities used by all segments of the University community including faculty, staff, students and their dependants. These include identification and documentation of,

1. Existing children playgrounds
2. Existing sport and recreation facilities on and off campus
3. All students' leisure and recreation facilities
4. Any other social interaction, leisure and recreation facilities used by the university community

Task 2. Assessment of the available leisure and recreations facilities to identify the needs for improvement,

1. Assessment of the existing leisure and recreation facilities in terms of need, availability and quality, and taking into consideration any other criteria arising from the standard practices.
2. Establishment of the need for improvement of available facilities and for new facilities to satisfy the requirements of all segments of the University community

Task 3. Based on the result of task 2, synthesis and develop alternative improvement plans for campus leisure, recreation and sport facilities in a way that address needs of all age ranges of the university community. These include,

1. Identification of the various alternative courses of action for improving facilities to satisfy all the members of the community
2. Evaluation of the implementation potential and impact of the various alternatives
3. Development of alternatives for integrated leisure and recreation facilities improvement plans that address the needs of the community.

Task 4. Choose the most appropriate integrated alternative improvement plan and develop an action plan for implementation. These are,

1. Comparison of the alternative integrated improvement plans and selection of the most appropriate for implementation
2. Refinement and making detail of the leisure and recreation facilities improvement plan
3. Proposal for an action plan for the implementation of the chosen and refined alternatives

Execution Approach

A variety of techniques and approaches have been adopted to address the project tasks as follows,

1. Collection of information and documentary materials on existing leisure and recreation facilities;
2. Collection and analysis of all related surveys, measures and indicators conducted at KFUPM in the last five years on leisure and recreation facilities and activities;
3. Review of interaction, leisure and recreation facilities from published materials to establish global standards in terms of what is provided, quantity and appropriate configuration;
4. Comparison of KFUPM's leisure and recreation facilities with global standards in terms of what is available, quantity and configuration to identify gaps and areas for improvement;
5. Conduct a structured consultation sessions with the KFUPM Master Plan Committee, Projects Department and Financial Department to identify both constraints and opportunities of the developed alternative improvement options;
6. Funds to be allocated for improvement of the existing support services and the provision of needed future services and amenities;
7. Available physical spaces for the needed support services;
8. Develop and design alternative improvement options based on the outcome of studies and consultations; and
9. Develop an action plan for the selected viable alternatives to improve leisure and recreation facilities on KFUPM campus

Table 1. Availability of leisure and recreation facilities at KFUPM campus

Facilities	Current Available Facilities
Children play ground	Play areas in faculty housing
Sport facilities	The University stadium Football and play courts in student dorms Football and play courts in faculty housing
Recreation facilities	Community centre Student recreation centre
Jogging trails	Informal jogging trails in academic area and faculty housing
Social gathering and interaction areas	None

FINDINGS OF THE STUDY

Major Leisure and Recreation Facilities in KFUPM Campus

Since the establishment, KFUPM keeps its ongoing efforts to make community life more lively and enjoyable by developing standard leisure and recreation facilities. Yet, some of the required facilities are absent or inadequate compared to the aggregated demands. Table 1 gives a synopsis on the leisure and recreation facilities available at the campus community.

Recreation facilities are also tied with formal and informal events take place during the year round academic session (Sanoff et al., 2001). Therefore, the university arrange a host of regular sport events during different times that are,

1. Recreational sport; 2. Play by the children; 3. The annual 5 km run (popularly known as Rector's cup); 4. The 2 km Walk; and v. Inter-collegiate games

Spatial Dimension of Current Leisure and Recreation Facilities at KFUPM Campus

As this study is concerned about future needs of the KFUPM community members, it is imperative to identify leisure and recreation facilities on the space with their existing coverage and capacitates. This paper finds the following inventory of current campus leisure and recreation facilities along with the spaces allocated to each of these amenities, as presented in Tables 2 and 3.

Assessment of Current Leisure and Recreation Facilities: User's Perspectives

Assessment of Parks and Green Areas

Adequacy of parks and green areas are assessed by taking users' opinions through questionnaire survey. Around 28 percent respondents mention that KFUPM parks and recreational facilities satisfy their needs, while 42 percent are dissatisfied and 30 percent remained neutral. 84 percent of the respondents would like to use the recreational park at least once a week if it is available in the university campus while less than 3 percent respond to use it less than once in a month or never.

Table 2. Inventory of current campus leisure and recreation facilities at KFUPM campus

Location	Facilities
Building 11	Consists of one handball court, 3 basket ball courts, 3 volley ball courts, taekwando room, judo room, 4 squash court, 2 table tennis room, a recreation swimming pool, 10 badminton courts, lockers and bathrooms for student to change.
Building 36 & 33	Consist of a football pitch, athletic tracks, physical education office with training rooms, physiotherapy room, stores, lockers and bathrooms for student to change. Consists of indoor swimming pool,4 squash courts, weight lifting room, circle training room, 5 lawn tennis courts, 3 table tennis courts, 1 handball court,3 five aside football courts, 4 volley ball courts, 4 basket ball courts, 4 badminton courts, 2 FIFA standard football pitches one with light and the other without light.

Table 3. Current spaces allocated for leisure and recreation facilities at KFUPM campus

Name of the buildings		Area (Sq. m.)	Total Area (Sq. m.)
BLDG 09 (Academic Building)			
	Plateau Level	696.00	
	Mezzanine Level	109.28	
	Second Floor Level	1172.00	1977.28
BLDG 39 (Physical Education Centre)			
	Lower Floor	1894.00	
	Upper Floor	146.00	
	Tennis court	3415.00	
	Volley Ball	2149.37	
	Practice Area	372.16	
	Foot Ball	10670.38	
	Six A Side Soccer	2488.50	
	Hand Ball	1679.75	22815.26
BLDG 29 (Families Recreation Centre)			
	Ground Floor	4750.00	
	First Floor Plan	608.00	5358.00
	Swimming Pool	3405.20	
	Playing Court	3603.32	
Sport facilities in Farooq Court		700	
Sport facilities in Ferdaws Court		861	8569.52

A large number of suggestions are received on the desired recreational features in a future park that are important for future planning and development. Those features are, 77 percent respondent wants grass areas; 64 percent from swings, slides, climbing frames, etc.; 63 percent want to have a café; 62 percent want a lake and/or water features; 59 percent is for picnic and BBQ areas; and 57 percent would like to have another restaurant in KFUPM campus.

Assessment of Children's Play Ground

More than 90 percent respondents state that the parks and play areas are very important for their children. This is not only for their daily amenities but also for their healthy mental upbringing. However, a large portion of the campus residents (i.e., 52 percent) are not satisfied with existing provision for parks and play grounds.

Assessment of Sport Facilities

The respondents are satisfied with the play grounds in different residential neighbourhoods and central stadium having regular opening hours for different sports and adequate accessories facilities including gym, swimming pool, etc. In the beginning, the stadium had only one entrance causing problem for people's movement during different events (e.g., sports and graduation ceremony, etc.) Later, with the introduction of another gate, the circulation problem is solved during the rush hours.

Assessment of Recreation Facilities

The Faculty Recreation Centre

There is one recreation centre known as 'KFUPM community centre', which is designed for faculties and staffs and their family members. Assessment of the usages of community centre is based on a survey of 650 persons.

A total 186 (74 percent) male and 176 female (adults) (79 percent) use the community centre on regular basis. These figures indicate their high degree of interest in community centre as one of the most important amenities within the campus. This is also one of the most enjoyable and gathering (social) places after their homes reflecting in the fact that nearly 79 percent male and 74 percent female children use the community centre on daily basis.

Quantitative Assessment of the Community Centre

For quantitative assessment of KFUPM community centre, some criteria are designed beforehand. Results of this assessment are illustrated below,

- 53 percent respondents state that they are satisfied with the Community Centre facilities, while 27 percent are not satisfied.
- 67 percent are satisfied with regard to the opening hours of the Community Centre, while 14 percent disagreed.
- 60 percent of the users of the Centre are satisfied with the services and facilities offered by the Centre, and 21 percent have rates it as poor
- An overwhelming number of respondents (85 percent) state that the community centre should provide services and facilities with a view to different age-cohorts and gender. Likewise, 69 percent of the people state that the community centre should offer more recreation, educational and sport program, while 31 percent did not mention anything on the sufficiency as they do not provide any specific suggestion for improvement
- When asked which are the programs/services community centre should offer, most requested provision are: trips and sightseeing visits to historic and important places (61 percent), language courses (55 percent), fitness and weight-reducing programs (52 percent), computer and technology classes (49 percent), summer programs (48 percent), Islamic studies (45 percent), arts and cultural programs (44 percent).
- Around 57 percent of the respondents are interested in hiring rooms and services of the community centre to hold private parties, weddings, etc., while 44 percent are not interested in making use of these facilities.
- Similarly, 57 percent desire to borrow items, such as carpets, tables, chairs, lighting, etc. from the centre for holding private parties at their houses, while 43 percent did not express any interest
- Respondents who state that they never use the community centre are asked the reasons for it. 60 percent opine that they have no interest, while 55 percent say it does not provide required services and facilities or they do not know enough about the Community Centre. Likewise, less than 50 percent respondent mention that there is neither adequate nor updated information on what is available at the community centre, which makes them unaware about its potential use.
- More than 83 percent respondents express that library service at the centre is very important and around 66 percent of them use library frequently (at least more than 10 times a year). However, 23 percent respond that they go to library once or twice in a year. But most of the library users

(69 percent) recommend for more books. Among them 49 percent wants more children's books, 47 percent want more magazines and around 35 percent want more best sellers, newspapers, educational toys and internet computers.

Qualitative Assessment of the Community Centre

A large number of respondents would like to have better swimming pool facilities at the community centre and they would like the swimming pool to be available all-day and later in the evening, especially in the summer. In particular, many respondents raise concern about its closing hours in the early-afternoon. Moreover, a fair number of comments were made regarding problems faced by some users of the ladies pool, particularly the attitude of the staff. Moreover, many residents ask the pool areas and changing rooms to be renovated and new poolside furniture to replace old and damaged items.

The library collection of children's books and contemporary adult fiction, especially literary works and bestsellers, should be expanded. In addition, there is a demand for more newspapers and magazines. The possibility of providing educational toys on loan should be investigated as a significant number of residents would like this service. Many respondents commented on the poor state of many facilities and equipments, including many broken or damaged exercise items, and the bowling alley. Various respondents suggested that the cafeteria should be improved both in terms of quality, selection of food and the décor. A number of residents express a strong need for the provision of Arabic classes and some pointed out the benefits of it for expatriates, not just to speak Arabic but also to understand the local culture and Islam. Some respondents state that charges made for borrowing items, such as balls, should be discontinued as it creates a wrong impression. Finally, many respondents congratulated the University on giving them a chance to express their opinions about level of satisfaction with the community centre and recreational facilities through this study (Figure 1).

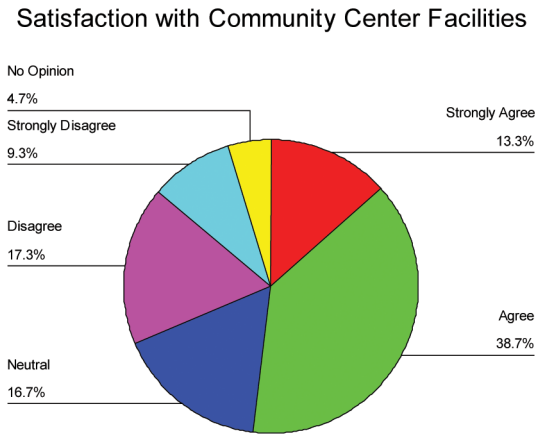
Assessment of the Student Recreation Centre

There is no particular community or recreation centre for the students, but there are mostly all required facilities, such as gymnasium, swimming pool, stadium, play grounds, cafeteria, etc. in different places of the university. 90 percent of the respondents are satisfied about these facilities, but they raise the questions about maintenance, which, in many ways, is poor. For instance, once any equipment is out of function, it takes long time to make it re-operational, even some times it remains non-operational for 2-3 years as if they are abandoned.

Assessment of Jogging Trails

Within KFUPM there is long network of jogging trails for the university residents. Many people including women and children use this network for every day walk as a daily exercise, especially

Figure 1. Residents' responses on the degree of satisfaction of community centre in catering their family needs



at night time when the weather is comfortable. 85 percent of the respondents say their experience of walk in different KFUPM neighborhoods is not very pleasant as often small pieces of glasses, canes, bottles, papers, etc. are found here and there along the jogging trail. This is due to the fact that there are no trash boxes along the long trail. While walking, therefore, most of the joggers are bound to throw juice packs, cans, papers, glasses, etc. in and around the trail.

WHAT IS LEARNT FROM THE FINDINGS?

On the basis of quantitative and qualitative survey results, there are three important areas where the community centre should pay more attention for efficient use of these facilities that are in the list of high demand and more frequently used by the community members. These are:

Community Centre Swimming Pool

The findings suggest that existing operating times of the swimming pool need to be extended in order to serve the community members better. The swimming pool requires better maintenance especially in relation to flooring (it needs replacement and repainted) in order to overcome avoidable injury to users and also to improve the aesthetics of the pool. The users of swimming pool should be requested not to indulge in smoking, eating and drinking near the pool as this will spoil the atmosphere and create problems for other users. In addition, children under the age of 12 should not be allowed to use the pools unattended. Control of children at the swimming pool is the responsibility of respective parents and it is essential to keep specific timings for regular swimmers, both in the morning and in the evening, for a period of 2 hours when no children will be allowed in the pools. However, children above 12 years of age can be allowed as they do not pose any nuisance or problems to other users. Finally, the ladies should respect the dress code imposed by the University.

Cafeteria at the Community Centre

After taking over the management of the cafeteria by KFUPM Food Services Department, the quality of food served has deteriorated considerably. There is no variety of items available and limited menu is offered. In addition, the cafeteria is not open in the morning, meaning refreshments are not available to the member who comes in the morning. Therefore, the respondents strongly feel that the catering services at the cafeteria should be handed over to private operators so as to provide better quality food and to cater for different tastes and requirements of the users. This will attract a large number of people visiting the centre and also provide a more varied and extensive menu to the users.

Community Centre Library

This paper affirms community centre library is well used by the community members. But there is a lack of new books both for children and adults. The existing collection of books should be thoroughly revamped and a large number of new books should be added to the collection. In particular, new literary works by leading authors should be purchased and it should be taken as an ongoing process. On this view, the librarian should be invited to a meeting of the committee in order to get more information about the existing collections and the need for new additions. Moreover, faculty members from the English Language centre should be contacted to get specific information on suitable books in English to be purchased for the centre library and the Islamic & Arabic Department faculty members for adding more literary works in Arabic including religious texts as well as story books and other works. Not only that, the KFUPM School Principal could be contacted to obtain his feedback on the purchase of books

meant for children in both Arabic and English. The library should have an eclectic, international and contemporary book collection.

Since the community centre library functions directly under the control of the KFUPM Main Library, the Dean of Library Affairs could play a vital role in providing the centre library with a better collection of books and journals.

Scenario of Leisure and Recreational Facilities Against Built Structures and Human Resource Development

An internal assessment of current leisure and recreation facilities has been conducted with respect to adequacy and future needs. All related surveys, measures and indicators conducted at KFUPM with regard to recreation and leisure services have been thoroughly investigated and analyzed. Moreover, in order to compensate for the unavailable information the authors has conducted personal interviews with KFUPM key personnel at all levels of management related to the following recreation and leisure facilities. The results of these surveys are portrayed in Tables 4 and 5 along with insights on 'what could be done' against the inadequacies.

COPING WITH THE FUTURE NEEDS: NEED-GAP ANALYSIS

Extrapolating KFUPM Population for 2010

Planning facilities for an area requires study, analysis, and forecasting of its population. This can be achieved by analyzing the nature and rates of past changes in the area's population, together with a careful appraisal of the probable effects of more influential factors to provide valuable clues about the size of future population. Planners use several approaches for forecasting future population (Guo, 2002; Tolley, 1997). Forecasting student population at KFUPM can be done by 'trend extrapolation'. This approach examines trends and

Table 4. Status of leisure and recreation facilities against 'built structures' in KFUPM campus

Current Problems	What could be done?
Need to have a couple of tennis courts (perhaps, close to Ferdaws/ Nakheel courts) outside community Centre.	
Lack of recreational facilities for teenage kids and girls as most facilities in community centre are for boys as such including girls in those plans is necessity	
Need to equip community centre with a modern look	
Need to provide shading in the shallow side of the pool to avoid children getting sunstroke, especially during hot and humid summer months.	
Need to install at least one more toys area on the right hand side of Nuzha Residential area	Introduce additional play areas including games, toys, etc., for the children.
Need for new books especially for children in community centre library.	
Need for proper fencing of children of playground close to the main road in Ferdaws court. Additional playgrounds with grasses should be provided in Ferdaws court where more than 60 percent of the KFUPM community members reside. By creating additional playgrounds for children far away from the main roads, small children can play care-free.	Install hedges instead of fences around the play areas where games and toys have been recently commissioned. Introduce appropriate playground in Ferdaws court
Need for women sport centre which will benefit them both physically and mentally. They will have the option to spend their leisure time by playing different sorts of sports.	

Table 5. Status of leisure and recreation facilities against 'human resource development'

Current Problems	What could be done?
Need for ladies activity group to be listed under the community centre heading. It would be better if there is a separate link under community centre where ladies can access directly.	
The need to improving the community centre and the services, to make it more attractive to kids, youth, and families by organizing activities such as for the weekends, summer programs, etc. that are appealing to the community.	
Need for KFUPM swimming instructors to use the pool facilities to teach children swimming lessons with affordable charges and adhere to community centre's rules and regulations.	Draw up suitable programs to be conducted in the community centre for the current academic year by contacting the Physical Education teachers at KFUPM school as well as by meeting with children living on campus to seek their views. The committee also recommends paying suitable amount to the physical education teachers from the schools for their efforts in designing suitable programs for the children and also for their supervisory work for implementing such programs.
Need to stop restriction of certain staffs and their families to get access to the community centre.	Allow access to the community centre by the University employees (together with their dependents) with Grade #10 and above, irrespective of whether they live on Campus or outside of the Campus.
Need to abolish (SR 2) fees per game introduced at the recreation centre, considering children that will like to play different games. It will be too much for a child's budget if he wants to play three or four games a day during the vacation.	
Need for more sport and kids channels on TV.	Some new sport channels, which are available free of charge, should be included in the sport channel package of the University.
Need for a coach to give continuous training courses for children in the recreation centre or in building 10 or others.	

extends them into the future. According to Guo (2002) extrapolation may be based on judgment, visually fitting lines to the data on graph paper, or by mathematical formulas. Trend extrapolation is one of the simplest means of extrapolating past trends in population size by graph. For this forecast, the geometric or exponential change model is applied. This model assumes that the amount of population growth over a time is proportional to the size of the population at the beginning of the period. The rate of growth remains the same for each period and the absolute addition to population gets bigger and bigger with each passing period because the rate is applied to a bigger and bigger population. In this geometric or exponential model the rate is constant, whereas in the linear model it is the amount of growth that is constant for each period.

The form of geometrical model is:

$$P_{t+n} = P_t (1 + r)^n$$

where P_{t+n} = projected population size in a future year, n is the units of time beyond base year t, r = is the rate of growth per unit of time.

By converting the geometric model to an equivalent logarithmic form:

$$\text{Log } P_{t+n} = \text{Log } [P_t * (1 + r)^n]$$

$$= \text{Log } P_t + n\text{Log } (1 + r)$$

Relating logarithmic form to general linear equation form

$y = a + bx$

Then

$y = \text{Log } P_{t+n}$

$a = \text{Log } P_t$

$n = x$

b = constant (we can obtain b by plotting *log P* against *time*)

Extrapolating 2010 Enrollment of KFUPM Undergraduate Students

The population of KFUPM undergraduate students during the period of 2001-2006 is shown in Table 6 while the plot of logarithmic project population (log P) against units of time (n) for KFUPM undergraduate students is illustrated in Figure 2.

$\text{Log } P_t = 3.735279$ (log of 5436)

b = 0.0066 from the above graph

Substituting this value in to the geometrical model

$\text{Log } P_{2010} = \text{Log } P_t + n\text{Log } (1 + r)$

$= 3.735279 + n\ 0.0066$

Therefore

$\text{Log } (1 + r) = 0.0066$

$1 + r = 10^{0.0066}$ if $10^{0.0066} = 1.015313$

Then

$1 + r = 1.015313$

$r = 1.015313 - 1 = 0.015313$ is the rate of increase in population of KFUPM undergraduate enrolment

The forecasted population can be obtained by putting in the above rate of population growth in the following formula: $P_{t+n} = P_t (1 + r)^n$

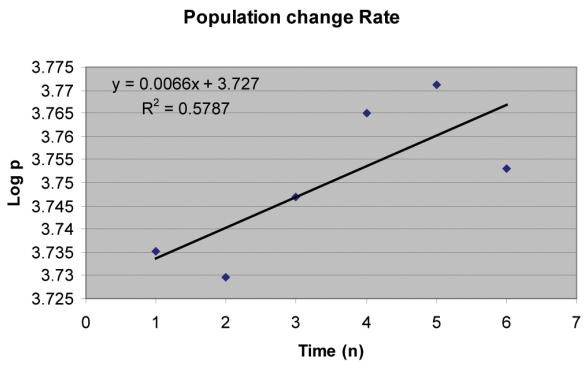
$P_{2010} = 5436 * (1+0.015313)^{10} = 6328.181$

Hence, the forecasted population of undergraduate student enrolment at KFUPM by 2010, if all conditions remain the same, will be 6328 students.

Table 6. Population of KFUPM undergraduate students during the period 2001-2006

Year	Interval = n	Population = P	log P
2001	1	5436	3.735279
2002	2	5366	3.729651
2003	3	5585	3.747023
2004	4	5823	3.765147
2005	5	5906	3.771293
2006	6	5664	3.753123

Figure 2. Plot of logarithmic project population (log P) against units of time (n) for KFUPM undergraduate students



Extrapolating 2010 Enrollment of KFUPM Graduate Students

The population of KFUPM graduate students during the period of 2001-2006 is shown in Table 7 while the plot of logarithmic project population (log P) against units of time (n) for KFUPM graduate students is illustrated in Figure 3.

$\text{Log } P_t = 2.357935$ (log of 228)

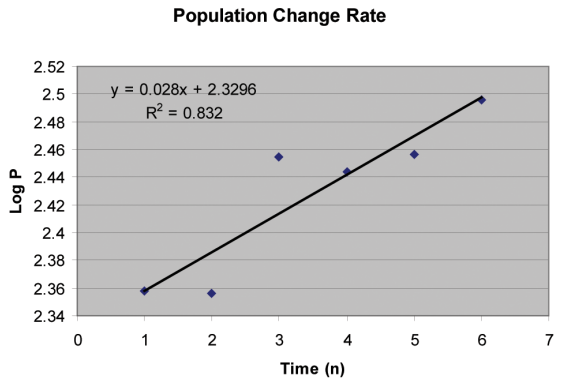
$b = 0.028$ *from the graph* Figure 11 ($y = 0.028x + 2.3296$)

Substituting this value in to the geometrical model

Table 7. Population of KFUPM graduate students during the period 2001-2006

Year	Interval = n	Population = P	log P
2001	1	228	2.357935
2002	2	227	2.356026
2003	3	285	2.454845
2004	4	278	2.444045
2005	5	286	2.456366
2006	6	313	2.495544

Figure 3. Plot of logarithmic project population (log P) against units of time (n) for KFUPM undergraduate students



$\text{Log } P_{2010} = \text{Log } P_t + n\text{Log}(1 + r)$

$= 2.3579 + n\ 0.028$

Therefore

$\text{Log}(1 + r) = 0.028$

$1 + r = 10^{0.028}$ if $10^{0.028} = 1.066596$

Then

$1 + r = 1.066596$

$r = 1.066596 - 1 = 0.066596$ is the rate of increase in population of enrolled graduate in KFUPM

The forecasted population can be obtained by putting in the above rate of population growth in the following formula: $P_{t+n} = P_t (1 + r)^n$

$P_{2010} = 228*(1+0.066596)^{10} = 463.3768$

Hence, the forecasted population of graduate student enrolment at KFUPM by 2010 if all conditions remain the same will be 463 students.

Extrapolating 2010 Enrollment of KFUPM Part-Time Graduate Students

The population of KFUPM part-time graduate students during the period of 2001-2006 is shown in Table 8 while the plot of logarithmic project population (log P) against units of time (n) for KFUPM part-time graduate students is illustrated in Figure 4.

$\text{Log } P_t = 2.390935$ (log of 246)

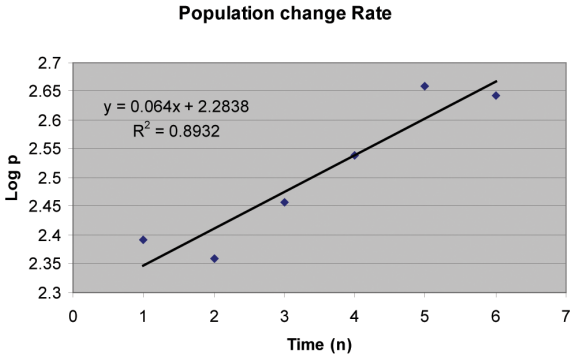
$b = 0.064$ *from the graph fig 1.4*

Substituting this value in to the geometrical model

Table 8. Population of KFUPM part-time graduate students during the period 2001-2006

Year	Interval = n	Population = P	log P
2001	1	246	2.390935
2002	2	229	2.359835
2003	3	286	2.456366
2004	4	345	2.537819
2005	5	456	2.658965
2006	6	440	2.643453

Figure 4. Plot of logarithmic project population (log P) against units of time (n) for KFUPM part-time graduate students



$\text{Log } P_{2010} = \text{Log } P_t + n\text{Log}(1 + r)$

$= 2.390935 + n\ 0.064$

Therefore

$\text{Log}(1 + r) = 0.064$

$1 + r = 10^{0.064}$ if $10^{0.064} = 1.158777$

Then

$1 + r = 1.158777$

$r = 1.158777 - 1 = 0.158777$ is the rate of increase in population of enrolled Part time graduate in KFUPM

The forecasted population can be obtained by putting in the above rate of population growth in the following formula: $P_{t+n} = P_t (1 + r)^n$

$P_{2010} = 246 * (1+0.158777)^{10} = 1073.826$

Hence, if all conditions remain the same, the forecasted population of part-time graduate student enrolment at KFUPM by 2010 will be 1074 students.

Extrapolating 2010 Enrollment of KFUPM Faculty and Staff

The population of KFUPM faculty and staff during the period of 2001-2005 is shown in Table 9 while the plot of logarithmic project population (log P) against units of time (n) for KFUPM faculty and staff is illustrated in Figure 5.

$\text{Log } P_{2005} = 3.345178$ (log of 2214)

$b = 0.0067$ *from the graph fig. 1.5*

Substituting this value in to the geometrical model

$\text{Log } P_{2010} = \text{Log } P_t + n\text{Log}(1 + r)$

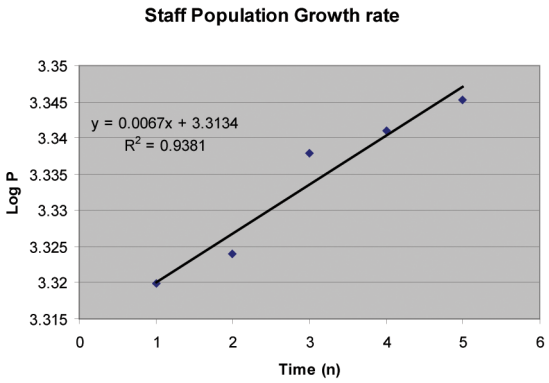
$= 3.345178 + n\ 0.0067$

Therefore,

Table 9. Population of KFUPM faculty and staff during the period 2001-2005

Year	Inter-val = n	Total Number of staff Population Per Year	log P
2001	1	2089	3.319938
2002	2	2109	3.324077
2003	3	2177	3.337858
2004	4	2193	3.341039
2005	5	2214	3.345178

Figure 5. Plot of logarithmic project population (log P) against units of time (n) for KFUPM faculty and staff



Log (1 + r) = 0.0067

$1 + r = 10^{0.0067}$ if $10^{0.0067} = 1.015547$

Then

$1 + r = 1.158777$

$r = 1.158777 - 1 = 0.015547$ is the rate of increase in population of staff and faculty in KFUPM

The forecasted population can be obtained by putting in the above rate of population growth in the following formula: $P_{t+n} = P_t (1 + r)^n$

$P_{2010} = 2214 * (1+0.015547)^5 = 2391.541$

Hence, the forecasted population of faculty and staff members at KFUPM by 2010 if all conditions remain the same will be 2392 staff and faculty.

FORECASTING LEISURE AND RECREATION FACILITIES

The purpose of this analysis is to determine the sufficiency of existing spaces allocated to various leisure and recreation services at KFUPM in order to identify the needs and gaps. Multiplying the extrapolated population and the appropriate LOS (level of service requirements) can obtain the projected needs for each of the amenities and services. A summary of extrapolated population for all KFUPM work forces by 2010 is shown in Table 10.

Table 10. Summary of extrapolated population for all KFUPM work forces by 2010

SN	Type	Extrapolated Population
1	Graduate Students (GS)	435
2	Undergraduate Students (US)	6328
3	Part-Time Graduate Students (PTGS)	1074
4	Faculty and Staff (F/S)	2392

Projected needs of KFUPM recreation spaces

The most applicable guideline was found in University Space Planning (Bareither & Schillinger, 1996). They introduced a method to calculate the needs for recreation space separately from instructional activity. They assume that 12.1 net ASF of recreation space should be provided for each undergraduate student and the same amount of space be made available for 25 percent of the graduate students, since they do not normally participate as intensively in recreation; also 12.1 ASF per person should be made available for 15 percent of the academic and non-academic staff.

- Recreation Spaces for Faculty/Staff
- Projected Recreation Spaces for faculty and staff = [15 percent SSOFF CAMPUS + RF/S] * 12.1 ASF Where 15 percent SSOFF CAMPUS = Staff Staying off Campus, and RF/S = Resident Faculty/ Staff on campus
- Projected total staff population by 2010 = 2392

- In the year 2005, Resident Faculty/Staff on campus is equal to 891 while total Faculty/ Staff population is equal to 2214

Therefore,

- When the faculty and staff population will be 2392 in 2010; Faculty/Staff on campus is expected to be equal to 2392 * 891/2214 = 963
- For recreation space planning = 963 * 4 = 3852 where 4 is the average family size over the entire on campus residents
- Staff staying off campus = Projected total staff population - Projected Staff on campus = 2392 – 963 = 1429
  15 percent SSOFF CAMPUS = 0.15*1429 =214
- Projected Recreation Space for faculty/ staff = [214 + 3852] * 12.1 ASF per person = 46198.6 GSF equal to 4570.5 M2 (Square Meters)
- Recreation Spaces for Students
- Projected Recreation Space for students = [TUG + TGS + 15 percent PTGS] * 12.1 ASF
- Projected Recreation Space for students = [6328+ 435 + 161] * 12.1 ASF per Person = 83780 GSF equal to 7783.2 M2 (Square Meters)
- Projected needs of KFUPM sport spaces
- Sport Spaces for Faculty/Staff
- Projected Sport Spaces for faculty and staff = [214 + 3852] * 4.9175 ASF = 19994.5 GSF equal to 1857.4 M2 (Square Meters)
- Student Athletic Outdoor space
- Projected Sport Spaces for students = [6328 + 435 + 161] * 4.9175 ASF = 34049 GSF equal to 3163.1 M2 (Square Meters)

Spatial Gap in Leisure and Recreation Facilities

A summary of space needs and gap for KFUPM leisure and recreation facilities are shown in Table 11.

It is seen that until 2010 space for student's leisure and recreation facilities will lack by 5805.9 sq. m. which should be provided in an urgent basis (see appendix for actions need to be taken by KFUPM administration and their corresponding costs).

PONDERING ALTERNATIVE IMPROVEMENT OPTIONS: A THOUGHT PROVOKE

Leisure and recreation facilities provide an avenue to develop healthy and social individuals as well as a strong community that has strong interactions among its component members. This paper suggests that the sport facilities available on campus for faculty, staff and students are adequate in terms of facilities and quantity. The quality, however, of these services requires improvement in regular

Table 11. Need-gap analysis of KFUPM leisure, recreation and sport facilities

Services	Students			Faculty & Staff		
	Current Space [m^2]	Projected Space [m^2]	Deficiency [m^2]	Current Space [m^2]	Projected Space [m^2]	Deficiency [m^2]
Leisure & Recreation	1,977.3	7,783.2	*- 5805.9*	5358	4570.5*	Non
	22,815.3	3,163.1	Non	8569.5	1857.4*	Non

* Leisure, recreation and sport facilities for faculty and staff do not lack enough space but they extremely lack quality, organization, management and immense of unused and underutilized spaces

and proper maintenance (*preventive maintenance approach*). The recreation facilities for students, on the other hand, require major provision and improvement and seem to be lacking in both quantity and quality.

Some catering services and educational materials, sport newspapers and magazines and internet or TV stations outlets should be provided in these services and facilities. A new system of operation and management of the sport facilities should be introduced to allow maximum utilization of the services. Based on the qualitative assessment of current leisure, recreation and sport facilities following areas of improvement have been chalked out which need immediate attention and strategic planning for physical development,

1. There is need to upgrade facilities in the community centre to make it a central focus of leisure and recreation for the campus residents from both social and cultural point of views. The centre should be designed and equipped not only to serve kids, young and middle age peoples, but also to old aged members. Their needs should be considered and integrated in strategic plan and design;
2. There is a need for extended and well equipped walking and jogging trails in both student and faculty areas;
3. There is a significant lack of social areas for time-to-time interaction in the campus and being socialized and have some refreshing talks in order to get relief from hectic and stressful daily life. Within the campus some open space should be designed with greeneries, shading, barbeque facility and the like so the community would be able to spend quality time outside home;
4. There are very minimal park-like outdoor spaces in the academic area where faculties and students can get together during the break hours;
5. There is need for active-park in the student and faculty areas, including prospects of coffee shops, fast food restaurants, shaded sitting arrangements, etc. in such parks, which will provide good platform for interaction and social activities;
6. From the community centre initiatives should be taken to arrange educational trips and sight-seeing visits to historic and important places in Saudi Arabia. This will broaden the horizon of knowledge and experience; and
7. There are prospects of introducing yearly inter-collegiate student competition in ways that brings the whole community together during the mid-semester break.

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APPENDIX

Table A1. Action plan for the selected viable alternatives for improving the leisure and recreation facilities at KFUPM

Service	Facility based improvements	Estimated cost of provision	Urgency level	Time Frame	HRD Based Improvements	Estimated cost of provision	Urgency level	Time Frame
Leisure and Recreation	Students recreation facilities need to be improved Extra 6000 sq. m. needed space for students More open space with greeneries and shades needs to be designed and developed for the community residents Needs for extended and well equipped (e.g., waste bin, shaded sitting arrangements, etc.) walking and jogging trails	40,000,000 SR	Somewhat urgent	2010-2011	Appoint training staff on hospitality, leisure and recreation business. Appoint trained professional for management and maintenance of open spaces and arrange different recreational events there for the community residents of different gender and age groups	350,000 SR per year	Urgent	2009-2010
Sport	Improve in quality is needed i.e. proper and regular maintenance, self-educational programs, local cafeteria, etc.	-	Urgent	2009-2010	Introduce new system or review existing system of operation, maintenance and management for improved services Appoint sport facilities coordinator responsible for the above functions	60,000 per year	Urgent	2009-2010

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Chapter 39
Promoting Success in the Introduction of Health Information Systems

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ABSTRACT

The significant number of publications describing unsuccessful cases in the introduction of health information systems makes it advisable to analyze the factors that may be contributing to such failures. However, the very notion of success is not equally assumed in all publications. Based in a literature review, the authors argue that the introduction of systems must be based in an eclectic combination of knowledge fields, adopting methodologies that strengthen the role of organizational culture and human resources in this project, as a whole. On the other hand, the authors argue that the introduction of systems should be oriented by a previously defined matrix of factors, against which the success can be measured.

1. INTRODUCTION

The success behind the Introduction of Information Systems (IIS) can be as important as the system itself. Notwithstanding its qualities, if a system is not successfully introduced it will not achieve its primary goal: enhancing the performance of a company. On the contrary, it may contribute to the degradation of operations and become a risk factor in the business field.

Several reports of unsuccessful introduction of information systems cases in the health field (Ash, Marc, & Enrico, 2004; Avison & Young, 2007; Balka, 2003; Heeks, 2006), as well as our personal knowledge of a few cases, led us to the investigation and identification of the factors that should be explored in order to promote the success of IIS in this area. This analysis will contribute to

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a wider investigation where we intend to develop a change management methodology for the introduction of health information systems.

Current organizational context is extremely dynamic, so the performance, the success and the very survival of organizations depend on their capacity to adapt themselves or even to take the lead in change. On the other hand, information systems assume a significant role in supporting the organizations business processes. This reality raises several questions. Will the organizations successfully rise up to this challenge? How effective will their answers be? Have the existent theories and models revealed themselves effective for the Introduction of Information Systems in organizations? If so, can they be improved? These are some of the questions that frame this investigation.

In this investigation, the term "Introduction of Systems" does not refer only to the entry of the system but also, in a wider sense, to the complete development of an information system, with all tangible and intangible effects associated with the information system introduction or change.

In the following sections we analyze different areas that frame the development of these systems and different risk factors associated with the IIS, we highlight the role of change management in the promotion of success in information systems and the importance of human resource management in this process, we identify some of the references that should be considered in the promotion of successful IIS, we discuss the criteria that should be observed when measuring success and, finally, we list a few conclusions.

2. THE NATURE OF SYSTEMS DEVELOPMENT

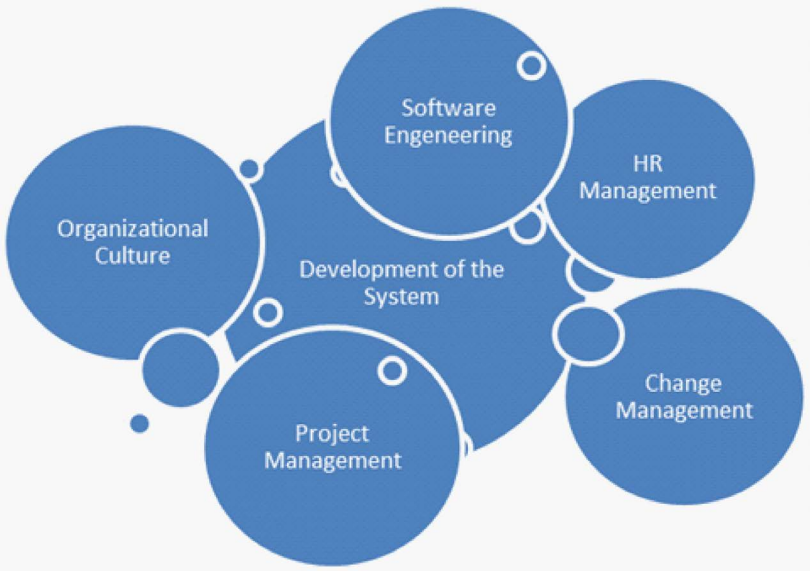
The available literature reports several unsuccessful cases in the introduction of health information systems (Avison & Young, 2007; Day, 2007; Heeks, 2006). This lack of success is mainly explained by a development process lag between the final organization and the organization for which the system was developed. This lag stems primarily from social and human questions that do not receive the appropriate consideration (Brooke & Maguire, 1998).

The development of systems is generally approached as a technological question. However, the body of literature reveals another perspective, according to which information systems should be primarily regarded as social systems (Kukafka, 2003; Ryan, 2010). The influence of this interpretative perspective in practice has been growing. This work intends to follow and deepen this perspective. If information systems are more than a decision-making support tool and if the projects go beyond the applications of the system development cycle described in manuals, then technicians need to understand a whole new set of questions, mainly social and organizational questions.

Figure 1 depicts a set of fields, without assuming an exhaustive character, and reveals that the development of systems, even in a relatively static situation, is a complex area. But considering that most organizations work in dynamic environments, the degree of complexity is significantly higher.

Methodologies for the development of information systems are mainly focused in a subset of organizational problems. Stuart Maguire (2000) proposes a higher alignment between technologies and the business area of the organizations where these technologies are being introduced. The author underlines the distinction between a simple implementation, with a more technological nature, and the introduction of a system with a higher social inclination, where all organizational process-induced changes are taken into consideration. In the present article, as was previously mentioned, we will pursue the latter perspective. Historically, Information System developers tried to reduce the complexity of this organizational

Figure 1. Areas that influence system development



change, mainly focusing in the technical questions that the process involved.

The development of systems is a complex process, with numerous opportunities for things to take the wrong turn (Agrawal, 2010; Yeo, 2002). Methodologies are necessary in order to control the complexity of the process, conferring discipline to the information system development process (Maguire, 2000).

The adoption of generally accepted methodologies in the development of systems does not guarantee the successful implementation of information systems. Traditional methodologies still have weaknesses and fields in need of improvement (Koh & Maguire, 2009; Laudon & Laudon, 2010).

3. RISK FACTORS IN THE INTRODUCTION OF SYSTEMS

Many information systems are introduced believing in a premise of immediate success. This assumption leads to the neglect of risk management measures that could minimize the consequences of possible failures. Organizations seek a successful system implementation while performing their normal business activity. However, new systems are not introduced from zero, they are introduced in organizations that hold a certain degree of complexity and in that sense they imply risks that should be analyzed a priori, so that a business continuity plan can be prepared.

Business impact analysis should identify revenue loss; customer loss; business credibility loss; and the capacity for recovery. The organization should consider all the options that could minimize part of the risk attached to the introduction of a new system. Organizations should be prepared to absorb the effects of an unsuccessful system introduction in their business. Risk planning should involve the identification of risk factors, the evaluation of business impacts and the provision of a business continuity plan. However, it would be wrong to assume that predicting a risk guarantees its control. Some authors consider that a successful system introduction is as important as the system itself (Kolltveit, Hennestad, & Grønhaug, 2007; Kwon & Zmud, 1987).

The introduction of systems should be based in methodologies that fit each situation. One of the downsides of adopting an external IIS support methodology is the time spent in human resource training and full comprehension of the system, and the methodology can ultimately not be appropriate to the organizational culture. Some authors describe risk management as the ability to foresee what might go wrong in a project (Hoffer, George, & Valacich, 2004). According to these authors, big projects hold higher risks than small projects. One other factor that should be considered in risk analysis is the definition of the requirements. A system where requirement compliance is easy and highly structured is less risky than a system with confusing, poorly structured and subjective requisites. The maturity of the technology supporting the project can equally condition the risk. The development of a system based in a mature technology is less risky than one based in a recent, non-standardized technology. The involvement of potential users in the system development process contributes to decrease the risk of failure.

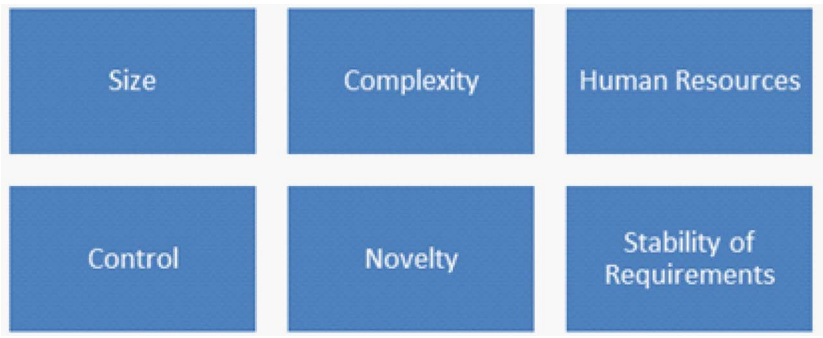
The specific business area and organizational culture of each organization should be equally and deeply analyzed, so that the adoption of measures and methodologies fits that reality. The introduction of health systems has been the object of several case studies that can be used as a reference for future interventions (Ash, Chin, Sittig, & Dykstra, 2005; Phansalkar, Weir, Morris, & Warner, 2008; Waring & Wainwright, 2002).

Ward and Peppard (2002) identified six general categories (Figure 2) that frame possible risks faced by a project. The magnitude of the impact from the risks in each category depends on the nature of the developed/implemented system.

Groundbreaking approaches are considered necessary by several authors for the implementation of health Information Systems. There are several unsuccessful cases in the introduction of new systems, but very few of them are actually thoroughly studied in order to establish what went wrong. The few cases that are subjected to post-implementation audits are analyzed through a technological point of view only, when significant problems are essentially organizational and political (Waring & Wainwright, 2002). Most problems stem from insufficiencies in the new system modeling, from cultural conflicts between departments and from the interaction between internal or external project teams.

The introduction of information systems is based in the analysis of requirements that are afterwards translated into an agreement between the client and the system supplier entity. However, those requirements remain stagnated in time while the environment and the needs of the client organization evolve. The initial premise of an information system project should be the likelihood of change (Maguire, 2004). In this sense, methodologies should offer the necessary flexibility to accommodate possible changes. If there is one thing certain in the development of

Figure 2. Risk categories (adapted from Ward & Peppard, 2002)



systems is that changes will be necessary. Whether these changes refer to a line of code or a complete system remodeling is a question of scale.

Contemplating these perspectives while introducing the systems can contribute to the process enhancement. But in all likelihood, this will remain an inaccurate science.

4. CHANGE MANAGEMENT

The line of thought concerning change management in the introduction of technologies is based in planned approaches (Teixeira & Rocha, 2009), following Kurt Lewin's works (1951). In practice, however, this assumes a more reactive character than the one initially planned. This reactive character plays a preponderant role in what are known as the emerging change management methodologies (Cameron & Green, 2004). Generally, and despite being planned according to different stages, changes are influenced by internal and external organizational dynamics. Uncertainty and ever-changing organizational rules ultimately condition the outlined change plan and imply substantial adjustments that favor the discrepancy between the predicted plan and change operationalization.

One of the significant influences in the effectiveness of the change process is the interdependent relationship established between three dimensions (Orlikowski & Hofman, 1997): technology, organizational context (culture, structure, roles and responsibilities), and the adopted change model. The ideal interaction between these three dimensions (Figure 3) should be compatible, or at least not contradictory.

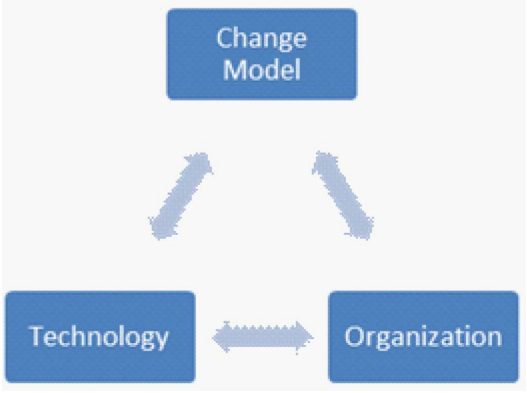
Let us consider the relationship between the change model and the adopted technology. If the technology is closed and does not allow any customization from users, the adopted change model will be relatively stiff and traditional. Similarly, if the technology is dominated and its impacts well understood, a traditionally planned change implementation will be advisable. However, if the technology is new and the experience with it very small, or if it is opened and customizable for users, a model with a higher improvisation and adaptation capacity, that offers the necessary flexibility to the organization during the adaptation and learning process, is advisable.

The relationship between the change model and the organizational context is equally significant. A flexible change model will likely be inadequate in organizations with an extremely stiff and/or bureaucratic structure. But it will possibly be advisable in organizations with a more informal character or a more cooperative culture.

Finally, lets us focus on the relationship between the technology and the organizational context. The adoption of a certain technology should suit and adapt itself to the model and the organizational structure, in order to enhance the success of the organization. Thus, there should be a strong alignment in the relationship between the adopted technology and the organizational structure, so that the technology does not become a barrier to organizational processes and so that the organization can fully enjoy the technology it intends to adopt.

Despite de developments observed in Software Engineering and Project Management in the last few decades, resistance to change is still identified as one of the main causes in unsuccessful

Figure 3. Alignment between change model, technology and organization



information system projects (Calvo-Manzano et al., 2010). Resistance to change is a natural human resource trait in every organizational environment. It is therefore necessary for any change process to be based in good practices, contributing to an improved success index in these projects.

5. THE ROLE OF HUMAN RESOURCE MANAGEMENT

The development of information systems was, for several decades, considered a discipline with a technological nature Information system professionals developed systems, partially helped by users, based in project management methodologies and other technical tools. The high failure rate observed in the development of certain systems questioned the technological focus of the discipline (Kukafka, 2003; Maguire, 2007).

The impact of information systems is growing, inside and outside organizational boundaries. It is therefore important that people responsible for the introduction of systems hold communication and leadership skills, as well as management skills, in order to render these processes easier (Ryan, 2010).

According to Maguire (Maguire, 2007), despite the existence of an abundant literature concerning Human Resource Management and Information Systems, almost no studies integrate both areas.

The introduction of systems directly impacts individual responsibility and business process organization. It should therefore be preceded by an evaluation of training necessities, as well as a training plan that minimizes the impact of the transition. The execution of the training plan, and the subsequent entry of the new system, should be followed and monitored to ensure the necessary flexibility to face unexpected changes.

Information systems assume a preponderant role in organizations, helping them achieve their goals. For this reason, systems should be integrated in the organizational culture while supporting business processes (Laudon & Laudon, 2010; Luftman, Lewis, & Oldach, 1993; Wang, Archer, & Per, 2008). Otherwise, the organization may be facing a technological success and an organizational failure at the same time.

The development and the introduction of systems usually depends on different groups, from users, managers, marketers, to information system technicians and project teams, and all of them are working towards a common goal. Historically, many of the factors that contribute to the unsuccessful introduction of systems relate to human resource allocation (Abdelhamid & Madnick, 1990; Chen, Law, & Yang, 2009) or to the coordination of different groups inside the organization (Avison & Young, 2007; Day, 2007). We believe that this area would substantially benefit from the improvement of human resource management skills (Crawford & Nahmias, 2010).

6. REFERENCES TO BE CONSIDERED

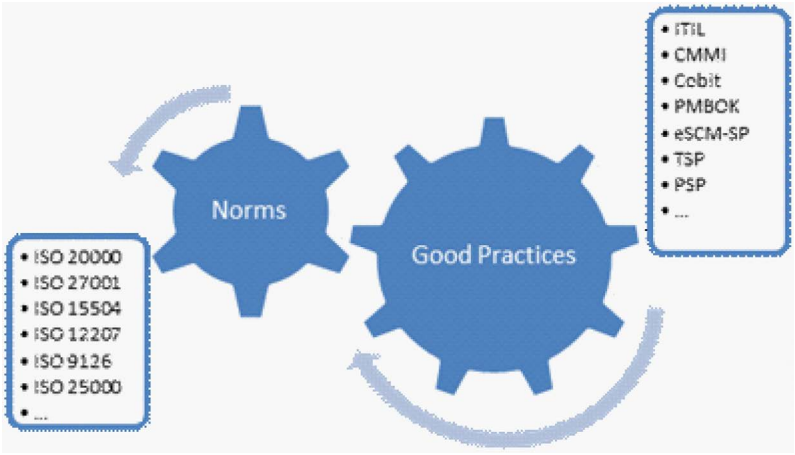
Independently of the adopted options, organizations are expected to deliver the best answers to the challenges of changes, imposed by developments in information technologies, globalization or increased demands from their clients (Sims, 2002).

There is still a lot to be learned from practices and from the habit of introducing systems in organizations, considering both the upsides, improving them whenever possible, and the downsides, minimizing them (Teixeira, 2009).

Our bibliography offers many references for good practices in managing technological services (Cartlidge et al., 2007; Menken, Blokdijk, & Malone, 2009; Van Grembergen, 2009; Ward, Aggarwal, Buco, Olsson, & Weinberger, 2007). These references include public tools and norms as well as organizational and individual property knowledge (Figure 4).

Good practices are successful practices inside the industry that are formalized afterwards. How-

Figure 4. Good practices references associated to technological service management



ever, they should not be perceived as stagnated fields, but rather fields that are enriched on a daily basis with new case studies, successful testimonies and failure reports. One of the problems identified in literature and related to the adoption of methodological references is that, although they sometimes complete or complement each other, their application is usually done in an isolated manner, which leads to the loss of their complementarity potential (Kukafka, 2003).

The hospital environment constitutes a good example of what is intended in terms of different team and different skill management, and common goal prosecution. Although it is seemingly a rigorously controlled environment, this is an environment where knowledge is constantly changing, where unpredictability reigns and where the consequences of error can be fatal.

7. EVALUATION OF SUCCESS

The evaluation of success is generally a subject whose definition is prone to confusion and controversy. The health field, and particularly the health system and technology evaluation, follows a generic rule (Ammenwerth, Gräber, Herrmann, Bürkle, & König, 2003). We know that good system development, management and implementation practices tend to increase the success of its introduction. However, the measurement of this success requires the a priori identification of the factors against which it will be measured. The approaches traditionally associated with project management based their measurements in time, costs and quantity, and all of these factors are easy to measure.

Considering the conceptual nature of success when dealing with information systems, measurement factors are not consensual and they change according to different cases. The explanation lies in the strategic nature of these factors, and these factors can also be a product of adopted implementation methods (Ojiako & Greenwood, 2007). It should be noted that the introduction of systems is only beneficial when it implies changes in the nature of the work itself or in the behavior of the people inside the organization.

Behavioral sciences have increased the value attached to the notion of success, and to the factors that can promote this success in the introduction of systems (Kukafka, 2003). The criteria for the measurement of success differ according to the different points of view through which they can be analyzed. In 1992, the model developed by DeLone and McLean, updated in 2003 (Delone & McLean, 2003), offered the first systematization of the measuring categories for the evaluation

of success in information systems. But this approach did not include the notion that different stakeholders could legitimately hold different success measurements and perceptions concerning the same system. This was added by Seldon, Staples, Patnayakuni, and Bowtell (1999) in his appreciation of the DeLone model.

The health field congregates different and well defined professional groups, whose perceptions of success evaluation in information systems can significantly vary (Connell & Young, 2007), according to the evaluation parameters of each group.

In addition to the generic models and tools for the evaluation of success in information systems, the available publications also propose specific tools and models for the health field (Kushniruk, 2002; Ojiako & Greenwood, 2007; Talmon et al., 2009; Topacan, Basoglu, & Daim, 2008; Yusof, Kuljis, Papazafeiropoulou, & Stergioulas, 2008). Each proposal is based in different evaluation parameters. Sometimes these parameters, divided in categories and subcategories, approach the same problem but they end up adding another perspective to the evaluation: the methodological perspective, whose results can be different for the same evaluation.

The diversity of perspectives concerning the success in the introduction of health systems brings some authors to contend that success, in that context, is a definition matter (Talmon et al., 2009). A definition whose criteria should be defined a priori, based on a multidimensional model.

8. CONCLUSION

There are no guarantees of success in the IIS; there are, however, tools and methodologies that enhance its probability.

The technological perspective that is traditionally associated to the development of systems does not satisfy the demands of modern organizations anymore. The complexity, dynamism and uncertainty attached to health organizations render the consideration of non-technological factors mandatory in the introduction of systems. The methodologies applied in the development of systems must be enhanced, conferring a higher synergy between internal capacities, external relationships, organizational culture and human resources. The development of systems can mainly be performed with little to no intervention from final users, but the success of its introduction depends on the participation of those who will benefit from it.

Risk management is a critical factor for success in the introduction of systems. Identifying potential risks is essential, and the adopted methodologies should include a degree of flexibility that is necessary to manage all the variables involved, in other words, a successful change management.

Change management should promote an alignment between the change model, the technology and the organization. Human resources play an essential role in this alignment, occupying the main link between all three factors. The management of technological services counts with a wide range of methodological references, and managers must base their practices in these references in order to guarantee a successful introduction of systems.

Success is a goal, but there is no agreement in its definition, however. We believe that the introduction of systems must be based in a previously defined matrix of factors, and success should be measured against those factors. This way, the entire process of change management in the introduction of systems should be oriented according to those factors.

Organizations need to incorporate guidelines from several sources and fields of knowledge, in order to minimize the risk associated to IIS. We can thus conclude that the IIS should be sustained by an eclectic combination of knowledge fields, and not by a single technological perspective of the problem.

The process behind the development of systems includes a series of circumstances that can condition their future success. A universal checklist,

contemplating all the success factors involved in the life cycle of information systems, is virtually impossible, considering the diversity of available alternatives. However, we believe that the introduction of systems is the most critical point in the development cycle, and we will continue to focus our investigation on this stage in order to propose a change management methodology for the introduction of health information systems.

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Chapter 40
Work Practices to Curb Attrition in the Indian Hi-Tech Software Development Industry:
A Structurational Analysis

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ABSTRACT

Whilst collaborative knowledge work is gaining momentum across national borders, there are a number of issues associated with management of human resources creating this knowledge. This is especially relevant where IT professionals learn to apply present and prior work contexts together over ICT tools. But the tenure of IT professionals is often limited, leading to loss of specialist skills and continuity of knowledge flow. Indian firms have recognised the importance of human capital as a vital knowledge resource and are making efforts to reduce attrition. This paper sheds light on how hi-tech software firms overcome the challenges associated with the high attrition of IT professionals, and provides new insights on emerging practices for retaining and motivating the agents. Findings reveal that agents have the power to bring about transformation in organisational practices. New organisational routines for retaining professionals have been implemented to motivate professionals and capture contextual knowledge into project repositories. This reduces dependency of IT firms on individuals. The study illustrates empirically the dualism between IT professionals and organisational work structures for enabling each other in knowledge industries.

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INTRODUCTION

The 'flat' world concept has emerged for global knowledge work, in which developing and developed economies are collaborating together for knowledge creation (Friedman, 2006). While collaborative knowledge work gains momentum across national borders, there are a number of issues associated with management of human resources who create this knowledge. This is especially relevant in software development, where IT professionals learn to apply present and prior work contexts together, over ICT tools, to create new knowledge and develop interrelated software artefacts (Hinds & Weisband, 2003). Over time, these professionals mature as they gain appreciation of the project needs and their local work contexts. However, IT professionals have been known to have the highest employee turnover rates (Garcia-Crespo, Colomo-Palacios, & Miguel-Gomez, 2008). When experienced IT professionals leave projects mid-way, the projects are handed over to new individuals who lack the contextual knowledge for making shared decisions. Clients are cautioned about collaborating via off-shoring of software development projects, to firms who have very high employee turnover. Specifically, clients are cautioned about software firms in India, which are known for high staff turnover (Dibbern, Winkler, & Heinz, 2008). Farrell (2006) recommends to western countries that although India is a hot spot as a software development location with its skilled pool of IT professionals, the choice of outsourcing destination must be expanded to other less "overheated labour markets" (p. 92).

Indian software exporters presently lead the global outsourcing market (Friedman 2006; Kearney 2004; Moore & Martorelli, 2004), especially in software development (Eppinger & Chitkara, 2006), but the problem of attrition cannot be any longer ignored. There are many negative perceptions associated with staff turnover in IT firms. Research shows that attrition rates in Indian IT facilities have jumped to 25–30% in 2004 (Moore & Martorelli, 2004) and this trend continues to rise. This means that the tenure of IT professionals is often limited, leading to loss of specialist skills and continuity of knowledge flow when professionals frequently leave the organisation. This often leads to project overruns and delayed deliveries.

To maintain position as a leader in the software industry, Indian firms have recognised the importance of human capital as a vital knowledge resource and are making efforts to reduce attrition. In this paper, we examine five hi-tech firms to answer the research question: *how do hi-tech Indian software organisations manage IT professionals to realise a satisfied work-force and reduce the impact of staff turnover on their global work commitments?* The paper utilises Giddens structuration theory to analyse the dualism of recursive interaction between IT professionals (agents) and organisational work practices (structures) for answering the research question. Structuration theory (ST) has been widely used in knowledge management studies in different application domains (Jones & Karsten, 2008).

The next section reviews prior theory on how IT professionals are motivated in emerging hi-tech software firms. Giddens structuration theory characterised as a 'hermeneutically informed social theory' (Loyal, 2003, p. 29) has been explained next in the context of this study. Findings from empirical case studies of five hi-tech Indian software organisations are then presented. An analysis of how the organisational work space is influenced by agents (IT professionals and management), is conducted next using the structurational lens. This study sheds light on how hi-tech software organisations (agencies) overcome the challenges associated with the high attrition of IT professionals (agents), and provides new insights on emerging practices (structures) for retaining and motivating the agents. The paper concludes with discussion, implications and future research directions.

THEORETICAL BACKGROUND

Since knowledge is innately human, organisational culture theories have dominated the knowledge-based concepts to identify individual (personal) and collective (shared) domains, resulting in two dimensions of knowledge, namely tacit and explicit knowledge (Baskerville & Dulipovici, 2006). Most of the operational knowledge in organisations exists at the tacit level, which is embedded in personal skills of agents who execute them without "conscious awareness". Explicit knowledge is "rule based when the knowledge is codified into rules, instructions, specifications, standards, methodologies, classification systems, formulas, and so on" (Choo, 2006, p. 141).

Leornardi and Bailey (2008) define another aspect of knowledge in software development called implicit knowledge, which lies between explicit and tacit knowledge. This is with the assertion that work done by IT professionals in software development tends towards tacit and implicit knowledge, in which individual's creative ideas can be codified and transferred through ICT tools. However, realisation of the codified knowledge embedded in technology artefacts requires ability of knowledgeable users who have the necessary occupational knowledge and judgement to interpret the implicit knowledge. IT professionals at distributed sites translate and transform the implicit knowledge, into their local work processes (Leornardi & Bailey, 2008). In the event of an IT developer's inability to interpret meaningful information from codified artefacts, the software providers more often than not, understand this limitation, but these concerns are not voiced to the customer (Miller & Voas, 2008). This puts the software providers at cross-roads between maintaining customer release dates and motivating IT teams to extract meaningful information and implement it in the next product deliverable.

Given the important role of shared knowledge in developing software artefacts, the role of individuals authoring these artefacts cannot be underestimated. The artefacts are partitioned into many functional modules requiring in-depth occupational knowledge, which are then combined to produce the end product. Finally, both function-specific and cross-functional knowledge is combined to integrate modules and produce work artefacts. But, if these individuals who have contributed to the artefacts leave the organisation, the new members in the project often lack the contextual knowledge to correctly interpret the implicit knowledge embedded in these artefacts. Thus, it is in the organisations interest to retain competent staff, upgrade technical competencies and set a path of creating commitment towards the organisation. Further, to reduce the impact of staff turnover on project deliverables, organisations endeavour to reduce their dependence on individuals. This is achieved by resorting to different kinds of formalised computer-based knowledge management systems (KMS), which are used for establishing backups, creating templates, setting programming preferences and associated documentation, reviewing code and testing standards, and preparing maintenance screen layouts (Cullen, 2002; Sahay, 2003). The KMS synthesise knowledge at three levels: syntactic (repositories containing clear readily available fact-based explicit knowledge in shared databases), semantic (translation of work practices into standard methods and procedures) and pragmatic (transformation of tacit and experimental knowledge into maps and models) (Carlile, 2002). Mason (2003) reinforces the KMS approach and explains these levels and their span of control: (1) the syntactic level spans language boundaries enabling explicit information exchange, (2) the semantic level spans hierarchal boundaries as procedures and standards are laid from executives to managers to development teams, and (3) the pragmatic level spans cultural boundaries to enable a corporate culture that supports collective knowledge sharing and learning. Thus, researchers are advised to adopt a culturally sensitive approach when evaluating knowledge management practices in software pro-

duction firms, as a corporate culture of autonomy, creativity and tolerance towards mistakes enables knowledge sharing (Furner et al., 2009).

The challenges faced in software development are embedded in use of collaborative technology tools, definition of work-based interactions and most importantly management of social ties at individual, team and organisational levels (Kotlarsky, Oshri, & Willcocks, 2007). To encourage individuals (IT professionals) to share artefacts (documents, instructions, examples and expert advice) for reusing and repurposing knowledge, organisations focus on performance objectives that pass through the entire life cycle of knowledge creation in developing technological solutions (Salisbury, 2008). This reduces the impact of staff turnover, as distributed knowledge is transformed into workflow processes, such as design documents, quality plans and process metrics which define best practices, and are stored in organisational repositories.

Software organisations resort to different kinds of formalised computer-based knowledge management systems to recognise individual knowledge contributions to fit team member's achievements with organisational goals. These practices include rewards for behaviour-based, performance-based, schedule-based and collaborative clan-based performances (Gosain, Gopal & Darcy, 2005). To motivate individuals to share their work habits and develop shared perceptions, management mandates certain kinds of behaviour for nourishing a collaborative culture; applaud individual and team achievements by rewarding performances, such as awards for knowledge sharing and value addition; and encourage goal-based outcomes for conforming to quality and schedules (Gosain et al., 2005; Sakthivel, 2005). Agresti (2008) suggests that software community needs to define appropriate practices to elevate IT professionals and recognise them as IT specialists. Career paths must be established and care taken to ensure that professionals feel valued for their contributions. Reward structures to emphasise recognition of the individual and team contribution help in developing collaborative work, building collective knowledge and sharing knowledge assets among employees (Hertel, 2004; Ravichandran & Rai, 2000; Sakthivel, 2005). Sakthivel (2005) warns that "an inappropriate reward structure may kill motivation and contribution" and advises that managers "need to act as mentors, exhibit empathy, be sensitive without being aggressive, build relationships with trust, and provide detailed and regular communication with team members" (p. 311).

Livari and Huisman (2007) have observed that organisations which define more standards and formalisations as a means of imposing security, order and routinisation tend to have a more hierarchal cultural orientation. To investigate what work structures are developed by organisations to retain and upgrade staff competencies, this paper discusses structuration theory next to describe the interactions between agency, agents and structures.

STRUCTURATION THEORY

Structuration theory (ST) has been widely used in management research to understand the relationship between social structures and human agency. Giddens (1984, p. 25) defines social structure as "rules and resources, organised as properties of social systems", while human agency refers to human agents (individuals, groups and organisations) living in society. Giddens asserts that structure and agency share a dual relationship, where social structure is not independent of agency, nor is agency independent of structure. Agents continuously reflect on their practices and, with time, their actions influence social structures, while at the same time social structures also influence an individual's beliefs and perceptions. Hence both individual and collective values feed into each other as social sciences is "irretrievably hermeneutic" (Giddens, 1984, p. 345), that is, reliant on interpretation and social settings (Jones &

Karsten, 2008). The inter-relationship between institutional level dynamics and human agency is an important feature of the current globalisation process involving software development where methodologies are taken from one situation to another, adjusted, re-defined and then re-exported (Sahay, Nicholson, & Krishna, 2003).

Although ST proposes mutually constitutive duality between individuals and society, it has an underlying emphasis on individualism with individuals being described as rational, active and autonomous agents (Loyal, 2003). The agents reflexively define new social norms via structures of signification, domination and legitimation. The structures of signification communicate and inform agents and shape perceptions, the structures of domination convey further information on power and control, and the structures of legitimation bring in acceptance of re-defined social norms and behaviours. Following on with these three structures, a context where individual actors as "members of globalised and high-tech organisations" are considered, who "interpret creativity as a key resource for their membership" Sahay et al. (2003, p. 91). Further Sahay et al. explained these structures as follows: (1) Signification structures inform about a person's role (i.e., membership signifies that the person is a knowledge worker), (2) domination structures convey information of the power this person holds (i.e., members interpret creativity as a key resource for the membership, and based upon the member's expertise, the member holds a position of some power and authority), and (3) legitimation structures re-define permitted standards, transgression of which may invoke sanctions (i.e., members draw upon these resources to create new rules or reinforce existing rules, such as members identify informal dress codes and prefer to work late at night). The new rules are soon accepted as the norm in the organisation, having a high degree of collective uniformity, but may again be transformed over time as agents identify new modalities to challenge existing information, powers and norms to signify new behaviours and patterns (Jones & Karsten, 2008).

Thus, ST does not posit a deterministic approach to syntactic (language), semantic (hierarchal) and pragmatic (cultural) boundary objects, as they are re-defined by agents (or IT professionals in the context of this study). Agents identify signification, domination and legitimation structures based upon existing practice. They link meanings in situated circumstances to transform behaviours and structures that come as a result. Recent research on practitioner perspectives indicate that structuration theory is "one of the most influential…theoretical paradigms influencing IS research in the last decade or more", and is the "theoretical lens of choice for most scholars" (Poole & DeSanctis, 2004, p. 207). However, ST should be used as a second theory to support the chosen research approach rather than as a unique theory in its own right to gain understanding of a social phenomenon (Gregson, 1989). ST allows researchers to disseminate and interpret 'real-life' experiences in different contexts. This study utilises ST to provide an analytical frame to understand how hi-tech software organisations leverage knowledge capabilities from IT professionals and reduce the impact of staff turnover.

METHODOLOGICAL DESIGN

Structuration theory rejects both positivism and strong interpretivism by adopting methodological pluralism or post-positivist research methods as a means of inquiry for social research (Jones & Karsten, 2008; Loyal, 2003). This study's research design is oriented towards a naturalistic inquiry to describe the perspectives of agents (IT professionals and senior management of IT firms) in diverse organisational settings to reveal "socially constructed reality" of different groups (Denzin & Lincoln, 2003, p. 13). The organisational settings create a flow of everyday social practices as agents identify actions to be taken within a certain

social context, and these actions are continuously reflected upon under changing social contexts (Giddens, 1984).

We should see social life, not just as society out there or just the product of the individual here, but as a series of ongoing activities and practices that people carry on, which at the same time reproduce larger institutions……Society only has form, and that form only has effects on people, in so far as structure is produced and reproduced in what people do (Giddens & Pierson, 1998, pp.76-77).

A case study research strategy is well suited to capture the knowledge of practitioners, document the experiences of practice and to develop theories from practice (Benbasat, Goldstein, & Mead, 2002). Here a multi-case study strategy has been employed with ideographic methods to gain understanding of changing work practices and attitudes within five organisational contexts.

The theoretical background has provided a foundation for measuring the practitioner knowledge. Empirical evidence of different organisational contexts are aligned with theoretical knowledge to provide a dynamic view of evolving work practices, in which agents are capable of transforming structures with their actions.

RESEARCH SETTING

There have been many recent studies in relation to software development projects in India (Dibbern et al., 2008; Leornardi & Bailey, 2008), which highlight the problems with offshoring projects to Indian firms. These studies have offered valuable insights from the client's perspective, on issues pertaining to software application development activities such as knowledge absorptive capacity, cross-cultural differences, and staff attrition amongst others. This study uses a multi-case strategy focusing on software development firms to gain insights on how some of these issues are perceived and managed by the software provider firms and IT professionals.

Five hi-tech Indian software providers are chosen as the setting for this study. Of these, two firms (L1 and L2) are large, while the remaining three (M1, M2 and M3) are medium-sized. Participants spanned vertical levels and functional groupings, including chief executive officers (CEO), chief technology officers (CTO); chief operations officers (COO); vice-presidents (VP), project managers; developers responsible for ongoing projects; and employees from quality assurance and human resource departments.

A brief overview of these firms is as follows:

- L1 is a large IT firm with software development centres in India, China and Poland. It has over 4100 employees, with 1500 employees in India. L1 has expertise in key verticals of manufacturing, retail, logistics, financial services, telecom utilities, education media and entertainment.
- L2 is a subsidiary of a major business conglomerate group in India since 1945, with software development centres in India and Thailand. It has about 1500 employees, with 900 in India. L2 has expertise in product design, analysis and production engineering, product life cycle management and enterprise resource planning systems.
- M1 is a medium-sized IT firm with approximately 200 employees in India since 1997. They offer Web enabled application integration solutions for finance, media, insurance and retail industry, and have recently completed a large project for a major computer manufacturer in Canada and the United States, by linking their 8,000 retail offices across North America.
- M2 is a medium-sized IT firm with about 100 employees in India since 1999. M2 specialises in broadband, telecom, health and the retail sector, and has undertaken

software development projects for several Fortune 500 companies.

- M3 is a medium-sized IT firm with 90 employees in India since 1995. The capabilities of M3 include revenue optimisation solutions for airlines, automotive rental, freight transportation and hotel companies worldwide. M3 has also completed many projects for large hotel groups, casinos and budget sector groups in United States and Europe.

DATA COLLECTION AND ANALYSIS

Given the exploratory nature of our research, many open-ended interviews were conducted to allow participants to provide their perspective and control responses and yet have the space to introduce and reflect on issues that they perceive as relevant (Mishler, 1986). Using existing body of knowledge from published literature, seven contextual categories were identified and questions associated within each category were included. The exact number of interviews conducted is not confirmed, as sometimes the whole day was spent at the interview sites. The interviews also involved casual conversation with many IT professionals when they explained their working processes. The data collection was done over a period of two months with each site visited three to four times.

The first question posed to senior management was the approximate percentage of staff turnover in the last two years. It is realised that it may be difficult for any member of management to give an exact number, as this number could be subject to interviewee bias or be clouded in human error from retrospective thinking. However, the purpose of this question was to get an idea on staff attrition rates, and compare with available literature. The average attrition rates as reported by study participants was 27%, which falls in accordance with Forrester Research findings of attrition rates between 25–30% in Indian software organisations

Table 1. Staff Attrition Figures

Case	Attrition in last two years
L1	25%
L2	15%
M1	25%
M2	30 – 40%
M3	30 – 40%
Average	27%

(Moore & Martorelli 2004). Table 1 details the percentage rates as specified by the respondents.

Based upon reviews of academic research addressing knowledge management theories and organisational practices for managing human capital, questions (Table 2) were posed to senior management and software developers in the selected five organisations. The interview data collected at each site was analysed immediately after every visit. The interview responses have been grouped into seven contextual categories: (1) Company vision aligned with professional career paths, (2) IT infrastructure, (3) Leadership management and employee participation, (4) Assessment and tracking of employee efficiency, (5) Innovative, learning and risk-taking environment, (6) Training in soft skills and technical competencies, and (7) Community and team building exercises.

Table 2 lists the seven identified contextual categories and the associated questions asked to respondents within each category.

The interview data reinforced the hermeneutic or ever-evolving nature of organisational structures in which agents influence organisational practices and transform work structures. Next, the interview responses have been synthesised into the identified contexts to communicate emerging work styles in IT industry and the results are presented.

Table 2. Contextual Categories and Related Interview Questions

Context	Main questions	Sources
Company vision aligned with professional career paths	Are long term organisational goals communicated across to all employees? Do employees feel they have career progression paths?	(Colomo-Palacios et al., 2010; Galinec, 2010)
IT infrastructure (standardisation and policy)	Does IT infrastructure assist IT professionals to work on their projects? How do the processes deployed assist or hamper software development activities?	(Cullen, 2002; Livari & Huisman, 2007; Sahay, 2003)
Leadership management and employee participation	Are organisational strategies communicated to development teams regularly? Are management teams collaborative or is the work culture bureaucratic and hierarchal?	(Agerfalk & Fitzergerald, 2006; Rajamani, 2007)
Assessment and tracking of employee efficiency	Are reward systems aligned to achieving goals regularly? Are performance measurement metrics in place?	(Gosain et al., 2005; Sakthivel, 2005; Salisbury, 2008)
Innovative, learning and risk-taking environment	Does the organisational culture support independent, bold decision making? Do inter-departmental groups discuss/ brain storm on projects regularly?	(Furner et al., 2009; O'Sullivan & Dooley, 2010)
Training in soft skills and technical competencies	What is the attitude of management towards IT certifications? Are there any training and professional development programs?	(Agresti, 2008; Galinec, 2010)
Community and team building activities	Are there any team building activities? Does management encourage informal sessions with senior colleagues, teams, family members, etc.?	(Rajeswari & Anantharaman, 2003)

Company Vision Aligned with Professional Career

Software development is a knowledge intensive activity where shared team experiences and individual capabilities interact in an IT-enabled environment to meet organisational goals. Professionals who work towards achieving organisational goals also aspire to achieve their own personal goals. Thus, realisation of organisational goals is based on the commitment and expectation from both management and knowledge workers leading to a *"win-win situation"*. This situation complicates when software providers deal with offshore clients, and only a few team members may have visited client sites to possess detailed occupational knowledge regarding the project requirements. Hence, to ensure staff remains committed to achieving goals, the business plans and future road maps are aligned with individual's professional plans.

Study findings reveal that in the two large organisations (L1 and L2), organisational plans are communicated to IT professionals formally down the line. Job descriptions for each individual are reviewed when new projects are allocated detailing the list of projects in which the professionals are involved. The work schedules describe the activities and project deadlines. This has brought in a feeling of engagement within the individuals as each of them has a specific role to play. The professionals feel valued and recognised for contributing to the organisational growth. A monthly departmental meeting is the norm in both L1 and L2 in addition to weekly/daily project meetings, in which the department head presents an overview of the key milestones achieved by the company and the future directions. The medium-sized organisations, due to their non-deterministic nature of software development with fewer but very demanding customers, could not afford to fail in their delivery commitments. The vice president of M2 explained that they could *"no longer take*

risks of project delays, as [their] *business contracts are short and fixed with financial penalty clauses"*. This meant that if IT professionals left projects mid-way, they "*can get into a soup"*. Although they do not have formal meetings describing business plans, these organisations keep IT professionals involved by informally updating them about future project plans.

Interview responses from development teams suggest that in the past IT professionals had many hierarchal levels within each grade and progression was time bound and slow. But now, if the organisational goals are achieved, they often *"speed – tracked"* up the career chain. Hence, the more projects handled successfully meant faster transition upwards in professional careers. The management of all five organisations expressed that they had linked career progressions with time and project performance, and this approach benefited both individuals and the organisations. Knowledge professionals have the need to be recognised sooner than later and these changed practices regarding career progression has motivated them to become more involved in project completion.

IT Infrastructure

Software development teams have to work under tight schedules with fragmented project knowledge distributed at provider and client sites. Additionally, client requirements too are continually changing, which implies that teams have to keep track of project changes to measure scope and effort needed for meeting deadlines. To meet these challenges organisations have created a foundation of common code of practices with defined interfaces to assist integration of the flow of changes into the software deliverable. Good knowledge management strategies involving group-ware tools connected to a centralised project repository are used with standards established for making changes. The configuration is clearly defined along with control practices with easy to use templates which allow for re-use opportunities of the design artefacts.

Most organisations emphasised the need for centralised project portfolios enabled by organisation's network for managing the ever-evolving information, which reduced their *"dependence on an individual's memory capabilities"*. The two large organisations have many international certifications which emphasise strict adherence to standardisation practices. One senior manager explained the importance of such documentation *"If it can't be documented, it cannot be transferred. We need to explain our actions."*

The three medium-sized organisations have realised how vulnerable they are to employee turnover and have recently established new work standards, and are in the process of enforcing discipline for adherence to these standards. These companies have found that documentation of standards brings a *"sense of ownership"* amongst developers, with the possibility to add relevant experiences to their knowledge capital. Moreover, it also introduced a *"sense of knowing the next correct step as it is listed in the document checklist"*. One senior manager of medium-sized provider commented:

If you develop a system which is person dependent then you are not managing. So focus has now shifted to HR management, and this is not something to be taken for granted anymore. Software industry has now moved to this gear. So if a person leaves an organisation, we may have a problem for five to eight days but it is not a catastrophe so that everything comes to a halt. But there is a delay. Now we have planned our work for 18% attrition and we try to structure our processes so that a process would be executed independent of that person. Our available internal systems have standardised processes, and we build in buffers within our development work so that the target dates are not missed. Our policies are not shock proof but they help us to recover fast from such

shocks. This is important, and this is what I call project management.

The developers too have acceptance of these standard policies, as is evident by a remark made by one developer: "*The documentation is essential for the company – so we have to do it. We don't mind it… the good and the not so good go together."*

Leadership Management and Employee Participation

Software development organisations face challenging code-driven tasks involving different software platforms and architectural designs. These tasks involve making informed decisions by IT professionals, who need to be motivated to lead the software design and development with confidence. All five organisations confirmed the importance of identifying leaders with the right disposition to interact amicably, achieve results and whom the development teams could trust. One manager of medium-sized software firm commented: *"We are wary of having loners who don't share their work with others"*.

Each organisation has designated software leaders based on their area of expertise. One of the large organisations explained their induction programme in which junior developers who have recently joined the organisation participate in a half-day weekly programme with senior developers. In this programme, the senior developers share their past project experiences. This enables direct interaction between new recruits and senior teams, leading to closeness and early collaboration and building of trust. The management expressed that such programmes reinforced a culture of sharing and participation, and made leaders more accessible to junior developers. Details of how organisational strategies are disintegrated at departmental and individual level and later re-assimilated by cross-functional teams at different phases in the software life cycle are shared.

Assessment and Tracking of Employee Efficiency

Employees are an important resource who can have both, either a positive or a negative impact in an organisational context. For them to have a positive impact, they must be motivated. Accordingly organisations have defined measures to motivate and assess their employee's performance. L2 has implemented SEI's People – CMM, and are at the highest level (i.e., level 5), which implies that a culture of workforce excellence is continually established at an individual, team and organisational level for improving worker satisfaction, overall talent and professional competency of the firm (Curtis et al., 2007). L2 has identified performance metrics through (1) timely completion of tasks and (2) lower re-work rate and higher first-time pass rates in knowledge areas.

The other organisations though not formally certified have also undertaken measures to assess and track employee efficiency. The assessment and tracking is considered necessary to keep staff committed to project deadlines, and by aligning rewards and incentives based upon performance. Additionally attainment of educational/ professional qualifications, participation in knowledge groups and value addition through suggestion schemes are used to reward the IT professionals. The firms emphasise the necessity of having transparency in employee evaluation to encourage individual employees with appropriate rewards on achievement. This according to most respondents plays a major role in building of core organisational competencies. All the five organisations have performance awards such as having a variable component in their salary packet based upon assessments.

One senior manager of a medium-sized organisation commented:

Suppose he [the developer] gets Rs.100 as salary. The Rs.70 is fixed and Rs.30 is based on certain performance parameters which we have defined.

We have a very transparent system, and so he can see his performance himself. This is a computer-based system which we have developed ourselves and if he does more than 100% then we give him that additional amount also. So sometimes people here get as high as 120%, though generally a maximum a person draws is about 90%. This is of course confidential and only goes into the payroll.

Innovative and Risk-Taking Environment

All case studies highlighted the requirement for encouraging innovation and creating a risk-taking environment. However the risks should be *"calculated and informed after discussing pros and cons"*. Both large organisations have specific knowledge groups known as Pre-Development Group in L1 and Knowledge-Next in L2. IT professionals are encouraged to join these groups, which tested many software designs before defining it as a module or artefact in their standard knowledge libraries. Developers interact on blogging forums and post questions, solutions, executable files, and software code. An environment of friendly banter is created where ideas are shared and feasibility of implementation of ideas are discussed.

The medium-sized organisations are also found to encourage their teams to be creative and provide freedom to take risks; however they did not offer much on how this environment was achieved, other than maintaining a collaborative and open organisational culture.

Training in Soft Skills and Technical Competencies

Training in both soft skills and technical competencies has been considered essential by all the five organisations. Besides training IT professionals on the organisation's blueprint which outlines processes such as test plans, coding practices, and preparation of documentation in software design and implementation, these organisations emphasised that soft skills such as communication, presentations and team building also play a major role. The large organisations have formed academic alliances with a recognised tertiary sector and offer post graduate diploma/ certificate courses to their employees.

The medium-sized organisations encouraged IT professionals to upgrade their skill-sets through professional courses, which on completion would add to their performance metrics. One medium-sized firm (M3) has contracted training sessions in soft skills to local consultants who provide in-house training on the non-technical skill-sets. Interactive training sessions are held with voice recording of presentations and discussions on non-technical issues. These recorded conversations are then played back to the groups, and the group analyses the tone, accent, pronunciations and such like. The project manager commented *"The programmers quite enjoy when they can themselves see the difference"*.

Community and Team Building Activities

All organisations agreed that community and team building activities foster a friendly and collaborative environment. Each organisation has organised some such activity. One large organisation (L1) stated that it promotes the *"Five F"* culture, that is, *"Fast, Focused, Friendly, Flexible and Fun"*, with many 5F posters displayed in the office premises. The *"Five F"* culture included weekly *"Pizza and Coke Meetings"* where senior management and development teams have informal discussions. The other large company (L2) has recently opened facilities within their office premises to include a swimming pool, gym with health instructors, badminton courts and other such club facilities to encourage their in-house staff enjoy late working hours with their development teams. These facilities are also available to employee family members at nominal charges.

The medium-sized organisations have organised activities such as *"Friends and Family Day"* in which employees and their families are either entertained inside the premises or taken out for some social event by the management. Other team building activities include playing friendly cricket matches between developers, and inviting employees and their families to some local organised event, such as local orchestra with food catering. In these events, employees and families intermingle, fostering a greater *"sense of knowing and belonging rather than just doing a job at some company"*.

DISCUSSION

The study findings have revealed how software providers (agencies) cope with management of their human knowledge assets or IT professionals (agents). Staff attrition has a huge impact on organisational structures and processes as new teams are formed when some individuals leave and others join the organisation. The new staff has to be trained, while the leaving staff's expertise has to be retained in some form in the organisational knowledge repository. Staff turnover is an unavoidable part of knowledge-based agencies, and organisations have institutionalised structures to minimise this impact. They are taking steps to bring an environment of collaboration and are motivating IT professionals to share their tacit and implicit knowledge portfolios, which can then be standardised into documented processes in the organisational repositories.

Agents have changed structures of signification, domination and legitimation, as agencies have identified social meanings to the attitudes of their knowledge workers in their efforts to control staff turnover. New work structures are emerging in organisational environments as providers believe that these structures will result in a satisfied, content and committed workforce, which eventually leads to low staff attrition.

Using interpretive schemes, this study has affirmed the significance of human capital in knowledge-based industry and explained how social agents are producing and reproducing new work structures in the software industry. The ongoing production and reproduction leads to routinisation of social structures – signification, domination and legitimation – based upon ontological security which underpins agents and agencies (Jones & Karsten, 2008). Agencies have realised the significance of human capital and identified work practices to be secure from staff attrition as they legitimise new structures (rules and resources or standards) due to the dominant role of IT professionals. Similarly, agents have realised the significance of the knowledge they impart to software projects and based upon this knowledge capital, they hold positions of power which brings in a sense of security for negotiating existing work structures, as new organisational practices are being legitimised into routines.

Empirical data findings have revealed the following structural routines based on the interaction between agents and agency:

1. Company vision has been aligned with IT professionals aspirations, as software firms have changed career progression paths from being slow and time bound to being performance-based.
2. IT infrastructure and policies have been changed to enable common code of practices through standards placed in project repositories. These standardisations help organisations to recover quickly from staff turnover.
3. IT firms have designated leaders based upon their specialists and interpersonal skills. These leaders interact with junior developers and help to bring in a collaborative work place environment.
4. Performance awards have been implemented to reward professionals on their achievements.

5. Knowledge groups have been established in large companies to enable learning and bring in an innovative and creative environment.
6. Both technical and social skills are considered necessary for bringing in a sharing and collaborative environment. This is done through professional development and also through personality improvement programmes.
7. Finally organisations have brought in an overlap of professional and personal relationships, by involving the employees families into their social circles. This has produced a sense of belonging to the organisation.

The findings show that agents and agency are not independent of each other, and sheds light on how hi-tech software organisations (agencies) overcome the challenges associated with the high attrition of IT professionals (agents). New organisational structures are evolving in knowledge-based industries as IT professionals and software firms interact on a more level ground to support of each other.

CONCLUSION

This study has examined an area of significant concern to the current Indian hi-tech industry. By providing real-life practical experiences, the study has given new insights on emerging practices (structures) for retaining and motivating the agents. Findings reveal that agents are not passive, but have the power to bring about transformation in organisational practices. New organisational routines for retaining professionals have been implemented to motivate professionals and capture contextual knowledge into project repositories. This assists to counter attrition, and at the same time reduce dependency of IT firms on individuals. The study illustrates empirically that the dualism between IT professionals and organisational work structures enable each other in knowledge industries.

The study has applied knowledge management theories and structuration theory in the IT industry to analyse social and knowledge structures as organisations review and re-define their practices to retain and motivate their work force. Current work practices have been described within real world settings through different practitioners' experiences on how the dynamic knowledge structures are evolving for managing attrition in the knowledge industry. More research studies are needed to investigate the operational aspects of the knowledge structures in other national and industry contexts.

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Chapter 41
Outsourcing in Knowledge-Based Service Firms

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ABSTRACT

This paper reports on empirical work recently conducted on outsourcing among knowledge-based and other service firms in Iceland. The results show that knowledge-based firms outsource on a larger scale and more human resource functions than other service firms. However, they do not have a more strategic vision towards outsourcing, nor do they outsource more low knowledge-based activities than other firms. The study gives support to the resource-based view of the firm, and is in line with former studies of knowledge-based firms. The firms in the survey tend to keep their core competencies and employees in-house, and at the same time they outsource other functions that they consider non-core, such as peripheral and administrative tasks, or IT that requires technical specialization. The more innovative firms rely on outsourcing from best in class suppliers regarding training and counselling. The contribution of this study to the theory of outsourcing is that the non-routine tacit knowledge base related to firms' core competencies is not limited to knowledge-based firms, but to a large portion of service firms as well.

INTRODUCTION

The economies of developed countries are becoming more service-based and knowledge-based (Parkhe, 2007; Targowski, 2009). With the growing number of knowledge-based firms, their rising share of total value added from services (Bettencourt, Ostrom, Brown, & Roundtree, 2002), and their fast growth within the European economy (Miles, 2005) makes them into an important subject of analysis and empirical investigation.

Along with the rising share of services and knowledge in the economy, some organizational restructuring has been taking place, such as

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networking and supply chain change manifested in outsourcing and offshoring. Outsourcing has grown rapidly among public and private organizations in recent years (Bryson, 2007; Di Gregorio, Musteen, & Thomas, 2009; Kadabadse & Kadabadse, 2002). In all cases, outsourcing always requires third party involvement (Jagersma & van Gorp, 2007). Outsourcing is defined here as allocating or reallocating a firm's internal activities and services to outside providers.

Very few empirical studies have been conducted on outsourcing in knowledge-based firms (KBFs). In order to fill the gap, this paper reports on recently conducted empirical work on outsourcing among service knowledge-based firms, as well as other service firms, in Iceland. More precisely, the paper analyses the strategies for outsourcing, the human resource impact, and outsourcing of core and periphery functions.

KBFs provide services to customers or other firms, and in most cases they produce an intangible output. By and large, the involvement of the customer is vital, and tacit knowledge is central to the activities of many knowledge-based firms. Currie, Michell, and Abanishe (2008, p. 96) state for instance: "Most knowledge of the type that gives competitive advantage to firms is not explicit, but tacit, since it resides in the minds of individuals, and is gained through the acquisition of skill and experience. It is this type of knowledge that is usually associated with the core capabilities of organisations". Given these characteristics of KBFs, how does outsourcing affect such firms? Can it contribute to their competitive advantage or does outsourcing weaken their core competencies? In the paper we set out to answer the following research questions: Does a theoretically oriented classification of KBFs reveal more differences in outsourcing than an empirical classification according to knowledge intensity? Do KBFs differ from other firms in the: 1) amount, 2) reasons, 3) kind of activities, and 4) benefit from outsourcing.

With reference to the theoretical perspective of the resource-based view of the firm, we assume that KBFs outsource more than other firms in order to enhance their competitive advantage; that they outsource more low knowledge-based activities, such as peripheral and administrative tasks than other firms; that they outsource fewer human resource functions than other firms, as tacit knowledge is central to many such firms. The consequence of this would be that KBFs realize more benefits out of outsourcing.

It is hoped that this study will assist managers in making a sound strategy for outsourcing, as well as setting the initial steps in building a theory of outsourcing in KBFs.

As very few firms in the survey (3%) offshored their service activities, the focus of the paper will concentrate on outsourcing.

The next section of the paper deals with theoretical debates on outsourcing. Then the research method and some information on the characteristics of KBFs and other firms in the survey are presented. We present the results on strategies and motives for outsourcing, as well as the actual benefits realized due to outsourcing. The paper ends by discussion and conclusions.

THEORETICAL FRAMEWORK

There is no consensus on the definition of KBFs. Moreover, the concepts of knowledge-based firms, knowledge intensive firms, and knowledge intensive business services (KIBS) are used more or less interchangeably. In many instances the term is either undefined or is defined indirectly, often by providing a brief list of examples (von Nordenflycht, 2010). KBFs are often defined as those firms that are staffed by a large proportion of highly qualified staff (Lee, 1999; Werr & Stjernberg, 2003). Others define KBFs as firms that "create and define problems, develop and apply new knowledge to solve the problems, and then further develop new knowledge through the action of problem solving" (Nonaka, Toyama, & Konno, 2002, p. 41). Still other researchers define KBFs

as firms struggling with ambiguity (Alvesson, 1993), while Blacker (1995) limit KBFs to those firms that are preoccupied with unfamiliar issues. Muller and Doloreax (2009, p. 65) define KIBS as "services firms that are characterised by high knowledge intensity and services to other firms and organisations, services that are predominantly non-routine". Common to most of these definitions are, thus, "the capability to solve complex problems through creative and innovative solutions" (Alvesson, 1993, p. 1000) by using highly qualified staff, either due to intensive training or university education.

A comprehensive classification of KBFs is given by von Nordenflycht (2010) where he presents a theory of the distinctive characteristics of professional service firms and their organizational implications. He identifies three distinctive characteristics of such firms: knowledge intensity, low capital intensity and a professional workforce. Knowledge intensity implies that the firm relies on an intellectually skilled workforce among frontline workers, while low capacity intensity mean that the operation of firms does not involve a significant amount of nonhuman assets, such as factory and equipment. He uses the term professionalization aside from knowledge intensity, namely self-regulation (strong control over the practice of the occupation) and ideology, e. g. ethical codes.

From these characteristics, von Nordenflycht classifies KBFs into four categories. The first one is the *classical professional firms,* like law and accounting firms, that meet all the three characteristics; high proportion of knowledge intensive staff, low capital investment in the firms, and professional workforce. *Professional campuses,* as hospitals, meet two of these criteria – knowledge intensity and professionalism – but they require an extensive capital investment. *Neo-professional firms,* such as consultant and advertisement firms, also meet two of these criteria – knowledge intensity and low capital intensity – while they do not involve professionalism. Finally, *Technology developers,* like biotech firms and research labs, only have knowledge intensity, as they hire scientists and engineers that do not belong to traditional professional groups and such operation demands high capital intensity.

From our standpoint, it is an interesting question whether the various types of KBFs, as defined by von Nordenflycht (2010), indicate differing needs for outsourcing? From these observations we hypothesise the following:

Hypothesis 1: Traditional professional firms with a professional workforce tend to keep services in-house, while neo-professional firms are more inclined to outsource such activities.

Hypothesis 2: High investment intensity increases outsourcing, as such investments force firms to concentrate on core competencies for economic reasons.

HUMAN RESOURCES AND TACIT KNOWLEDGE

KBFs are complex, unstructured and highly customized in order to meet customers' unique needs. Knowledge staffs apply theoretical and analytical knowledge to their jobs, and in many cases they use non-routine tacit knowledge, as well as being involved in innovation and customization (Lee, 1999; Muller & Doloreux, 2009; Murray, Kotabe, & Westjohn, 2009).

The resource-based view of the firm claims that resources that are thought to be rare, valuable, and difficult to imitate are essential to the firm's success and are regarded as core competencies (Klaas, 2008; Lee, 1999). The human resources are often considered to play a critical role in developing a substantial competitive advantage of firms, and knowledge staff is often considered to contribute to the competitive advantage of KBFs. According to the core and periphery theory, the core activities of human resource management

(HRM) include top-level strategy, HR policies, employee relations, and line management responsibilities, e.g. appraisal and discipline, while other activities are considered peripheral. Strategic parts of HR should, therefore, remain in-house, while administrative and transactional functions should be outsourced (Shen, 2005). In reality, HRM outsourcing has grown in the past decades (Klaas, 2008; Galanaki & Papalexandris, 2007). Surveys show that recruitment and selection; pay and benefits; workforce reduction; training and development; legal issues; and retirement plans are the functions that are most often outsourced (Schlosser, Templer, & Ghanam, 2006; Shen, 2005; Quinn, 1999). This list indicates that outsourcing can cover any aspect of HRM, and there seems to be no absolute boundary between "core" and "periphery" issues.

From these observations we make the following hypothesis:

Hypothesis 3: Given the non-routine tacit knowledge base of KBFs, strategic parts of HRM are kept in-house.

OUTSOURCING IN KNOWLEDGE-BASED FIRMS

Given the rapid growth of outsourcing, some benefits from the process are expected by both private and public organizations. The outsourcing literature identifies three major categories for outsourcing, i.e. cost, strategy, and politics. Cost reduction, with regard to both direct and indirect costs, is one of the most cited rationales for outsourcing. This includes labour costs, transport, travel and other costs. The most prominent strategic reasons for outsourcing involve allowing the organizations to better focus on their core competencies, while others include gaining access to unique resources, knowledge and capabilities possessed by other firms (Kremic, Tukel, & Rom, 2006; Di Gregorio et al., 2009; Quinn, 1999; Parkhe, 2007; Vietor & Veytsman, 2005).

KBFs provide services to customers or other firms. In most cases, they produce an intangible output, rather than a tangible product. Another characteristic of such services is that consumption and production happen simultaneously, and the customer is highly involved in the production of services, which is not the case in manufacturing. Finally services tend to be more labour and knowledge intensive than manufacturing firms (Daft, 2007; Targowski, 2009). All these aspects, and, in particular, the different involvement of the customer, is highly relevant to the motives and realisation of outsourcing in service firms. In some services, for instance, the co-location of customers and service providers is quite important; the outsourcing potential is, therefore, limited (Bettencourt et al., 2002; Murray et al., 2009).

Lee (1999) presents a typology of the HRM policies of KBFs founded on a resource-based explanation. He argues that KBFs tend to outsource their non-core processes in order to concentrate on the building of their capabilities in their core competencies. From his theoretical analysis he put forward the proposition that KBFs will outsource only those work activities, or HR requirements, that focus on narrow, explicit knowledge. Other work activities will be kept in-house. Moreover, Lee argues that KBFs will focus on training and development activities for work activities or HR requirements that require broad, explicit knowledge; that they will focus on informal, group-oriented activities for work activities or HR requirements that require narrow, tacit knowledge; and that KBFs will focus on research and development activities for work activities or HR requirements that require broad, tacit knowledge.

Currie, Michell, and Abansihe (2008) conclude from their case study of knowledge process outsourcing in financial services that most firms tend to outsource only activities with more defined inputs and outputs. Also, that the more knowledge intensive forms or work is kept in-

house. However, they found that some high-end financial services, such as financial analytics, portfolio valuation, risk assessment etc. were outsourced, but in quite a different manner by various actors. Thus, many large organisations established branches of their operation in low-cost countries to carry out knowledge work, while pure play KPOs (start-up firms), are involved in securing and managing the customers in developed countries, whose processes will be handed over to the offshore service centres. Existing Business Process outsourcers have extended their services into the specialized market of knowledge process outsourcing, whereas professional knowledge taskers provide products and services to specific professional and functional groups, which requires them to become niche-market players, such as in health-care. Finally, knowledge builders focus on the low end of the knowledge process, such as seeking and gathering information and providing analysis of this information.

Murray et al. (2009) present a theoretical framework for a global sourcing strategy relating to knowledge-intensive business services. They propose that the more variation in the services' standards or nature, the higher the inseparability of production and consumption, and the more tacit the activity of knowledge-intensive firms, the more they tend to rely on onshore insourcing, that is to keep services in-house. However, Murray et al. (2009) propose that the more innovative the sourcing firms, the more they rely on outsourcing from best-in-class suppliers worldwide.

From these observations we put forward the following hypothesis:

Hypothesis 4: KBFs will only outsource activities of a narrow, explicit nature.

RESEARCH METHODS

A descriptive and analytical research design was selected, as the main objective was to reveal the application of outsourcing within Icelandic service firms. The research was conducted in February and March 2009 in the form of telephone interviews. The method of using telephone interviews was presumed to be the best way to obtain answers from hardworking managers, or their deputies. It has to be kept in mind that the survey was conducted during an economic crisis which may have impacted the results in several ways.

The sample list was received from the Internal Revenue Directorate in Iceland. The method of selecting firms was a stratified random sample. The selection criteria were size of firm, industry, and location within Iceland (50% in the capital area, the remainder throughout Iceland). The initial sample consisted of 539 firms, classified as service firms according to economic activity classification (Icelandic version of NACE[1]), and with five employees or more. 55 companies were out of business, leaving 484 firms in the final sample. Out of the final sample, 57 were unreachable, 21 refused to answer the questionnaire and 9 firms did not fit the selection criteria of this survey. In total, 397 managers, or their deputies, participated in the survey. That gives a response rate of 82%, which is quite high and provides a good representation of the population.

The research instrument consisted of a questionnaire that was designed by the researchers, after interviewing ten managers and specialists on the subject in Iceland (Edvardsson & Sigurdardottir, 2009), and taking note of literature reviews, especially Kadabadse and Kadabadse (2002). Background variables were used from a previous questionnaire design by the authors (Edvardsson, 2006). The questionnaire was piloted in four companies and some minor revisions made, particularly relating to concept clarity and whether more options were needed when answering the questions.

The questionnaire was made up of 25 questions. It began with the following definition of outsourcing: "the purchase of components, specific services or expertise from entities outside own company".

The first question asked whether the firm had outsourced some service activities in the past five years. The next questions dealt with whether the firm has an outsourcing strategy, what kind of activities have been outsourced, the location of outsourcing, the motives for outsourcing, the choice of the suppliers for outsourcing, whether the outsourced activities are considered as core or supporting functions, whether outsourcing has affected human resources or lowered cost. These questions were of nominal scale character. The managers were then asked about their opinions on eight propositions regarding their experience on a five-point Likert-scale, rating the propositions with one of the five arguments: strongly agree, agree, undecided, disagree or strongly disagree.

The questionnaire also included background variables like size, location, corporate profit, managers' education, gender and age. In the questions on age, number of employees, and turnover, the respondents refers to the actual number that was written in the Access-database by the interviewees responsible for the data collection.

Descriptive statistics were used to describe the sample, and a Chi-square test was used to compare groups. Differences between groups were taken as statistically significant with a p-value of <0.05. Because data are not normally distributed, the nonparametric Kruskal-Wallis test was carried out to identify significant differences between groups for mean values, with a p-value of <0.05 taken as statistically significant. As a post-hoc test, the Mann-Whitney U test was carried out, using a Bonferoni correction, meaning a reduced p-value of <0.017, taken as statistically significant when comparing 3 groups, and a p-value of <0.008, taken as statistically significant when comparing 4 groups (Field, 2005). If a p-value was less than 0.001 it is reported as <0.001, otherwise the exact value is reported. Data were analyzed using the Statistical Package for the Social Sciences (SPSS 17.0).

Two definitions of KBFs, on the one hand that by von Nordenflycht (2010), and, on the other hand, a definition based on knowledge intensity, are used simultaneously throughout all analysis in order to clarify the research question as to whether the first definition reveals more differences in outsourcing than the latter.

RESULTS

Characteristics of Knowledge-Based Firms

In 2005, 79% of firms in Iceland were micro firms with less than 10 employees, while 20.6% of the firms were SMEs (10-249) (Statistics Iceland, 2008). The firms in the survey are in general larger than the average firms in Iceland, with an average number of employees of 41.4[2]. With regard to the size of the firms in the survey, 53.9% had fewer than 10 employees, 32.9% had 10-49 employees and 13.2% had 50 or more employees. The annual turnover was €5.5 million. This falls within the European Commission's (2005) definition of the turnover of a small firm.

Male managers in the survey were 73.8% and females 26.2%, compared to 81% male and 19% female managers in Icelandic firms in general (Statistics Iceland, 2009). Their education was as follows: 58.4% had university degrees, 33% had completed secondary education, and 8.6% had primary education. The respondents' average age was 48.4 years, and they had worked, on average, 11.6 years in the company.

Of the responding firms, 73.2% were private companies, 11.9% were co-operatives and 14.9% had other organizational forms.

It is shown in Table 1 that the greatest numbers of firms responding to the survey were firms in wholesale, retail trade, and repairs, followed by real estate and business activities. Very few firms in public administration and education participated in the survey. The table also shows the average percentage of university educated staff in each NACE category. The lowest number of university

educated staff was in wholesale and retail trade, but the highest in hi-tech- and knowledge intensive firms. The NACE classification was later sorted by the authors into two different groupings. The first is based on von Nordenflycht's (2010) classification of KBFs as can be seen in Table 2. The second grouping is based only on knowledge intensity measured as a proportion of university educated staff of total staff, as most definitions of KBFs include highly qualified staff, usually of professional status, with university education (Table 2). The motive was to compare a theoretical model with empirical observations.

Table 2 reveals that about half of the firms in the survey are classified as non-knowledge-based firms (they belong to wholesale, retail trade, repairs; hotels and restaurants; and transport and communication). Neo-professional firms (real estate and business activities; financial intermediation) are about third of all firms, while professional firms, technology developers, and professional campuses are less than a fifth of all firms (public administration, education, health services,

Table 1. Classification of firms in the survey according to Icelandic classification of NACE

	Number	**%**	**Average % of university educated staff**
Wholesale, retail trade, repairs	109	27.5%	10.8%
Hotels, restaurants	46	11.6%	22.3%
Transport, communication	33	8.3%	11.9%
Financial intermediation	33	8.3%	44.7%
Real estate & business activities	89	22.5%	51.5%
Public administration	2	0.5%	38.2%
Education	6	1.5%	42.6%
Health services, social work	20	5.1%	48.7%
Hi-tech- and knowledge intensive*	35	8.8%	53.1%
Other services	23	5.8%	48.6%

Note: * This category was added by the research team, and deviates for the Icelandic classification of NACE.

Table 2. Classification of responding firms according to von Nordenflycht's classification, and knowledge intensity (the ratio of university educated staff as a proportion of total staff)

	Number of firms	**Proportion**
Non-knowledge-based firms	188	50.4%
Neo-professional firms	122	32.7%
Classical professional firms	28	7.5%
Technology developers	35	9.4%
Proportion of university educated staff		
≤25%	206	54.8%
25-50%	69	18.4%
>50%	101	26.9%

Note: Other services in Table 1 have been omitted in this and forthcoming tables, as it is impossible to figure out what kind of firms are in that category.

social work).[3] Given the small number of responding firms belonging to professional firms and professional campuses, they were merged into one group, classical professional firms. Technology developers overlap to a large extent with hi-tech- and knowledge intensive firms, although there could be some minor differences.

Table 2 shows also that a little more than half of the responding firms have less than 25% of their staff with university education; while about a fourth have more than half of their employees with university education.

There is a marked difference regarding the education of managers in the firms. More than seven out of ten managers in knowledge-based firms have a university education; while this is the case for four out of ten managers in other firms (Table 3). The difference is significant ($\chi^2(6)=46.6$, $p<0.001$). The higher the ratio of university educated staff, the higher the proportion of managers with a university education. The difference is significant ($\chi^2(4)101$, $p<0.001$).

Table 4 shows that non-knowledge firms in the survey are oldest (26.1 years of age on average), while technology developers are the youngest (13.2 years of age on average). The difference is significant ($H(3)=11.23$, $p=0.011$).

Table 3. Education of managers and knowledge classification of firms

	Primary education	**Secondary education**	**University education**	**p-value[a]**
Non-knowledge firms	16.2%	42.7%	41.1%	<0.001
Neo-professional firms	1.6%	25.4%	73.0%	
Professional firms	3.6%	25.0%	71.4%	
Technology developers	2.9%	20.0%	77.1%	
≤25%	15.2%	50.5%	34.3%	<0.001
25-50%	2.9%	17.6%	79.4%	
>50%	.0%	10.9%	89.1%	

[a] Chi-square test.

Table 4. Mean age of firms and knowledge classification of firms

	Mean	**Std. Deviation**	**N**	**p-value[a]**
Non-knowledge firms	26.15[A]	23.57	182	0.011
Neo-professional firms	23.16[B]	20.23	111	
Professional firms	22.83	19.19	24	
Technology developers	13.22 [AB]	11.99	32	
≤25%	24.67	22.68	195	0.059
25-50%	25.92	21.77	64	
>50%	19.54	18.05	95	

[a] Kruskal Wallis Test using Mann Whitney U test with reduced p-value as post hoc test.

[A] post-hoc, significant difference between technology developers and non-knowledge firms, [B] post-hoc, significant between technology developers and neo-professional firms.

Table 5 shows that technology developers have the highest average number of employees 54.5, followed by non-knowledge firms (48.7), while professional firms had 26.9 and neo-professional firms have the lowest average number of staff 24.6. The difference is significant on a Kruskal Wallis test ($H(3)=8.69$, $p=0.034$). A more limited size difference is noted between firms when they are classified according to the education of their employees.

To summarize: About half of the firms in the survey are not knowledge-based firms. More managers in the knowledge-based firms have university education, and knowledge-based firms – especially technology developers - are younger than other firms. Professional- and neo-professional firms are smaller than other firms in the survey.

AMOUNT AND REASONS FOR OUTSOURCING

Amount of Outsourcing

Outsourcing is quite common among the firms that participated in the survey. In all, 79.8% of the companies reported that they had been involved in outsourcing in the past five years.

Knowledge-based firms tend to outsource more than other firms, and the difference is significant ($\chi^2(3)=11.84$, $p=0.008$). Almost all professional firms outsource some service activities, and the vast majority of neo-professional firm and technological developers. Even non-knowledge-based firm outsource on a large scale (Table 6). A similar pattern is present regarding the relationship between outsourcing and knowledge intensity. The higher the intensity, the more activities are outsourced. The difference is significant ($\chi^2(2)=11$, $p=0.004$). These findings do not support Hypothesis 1 and 2.

Reasons for Outsourcing

Only 23.5% of the managers in the survey reported that their companies had made a strategic plan for outsourcing. Those who did have a strategy, aimed first and foremost at simplifying the operation (48.6%), cost reduction (41.7%), gaining access to expert knowledge (31.9%) and core competencies (25%). For the rest of the analysis, the authors will only focus on those firms that outsource activities.

No difference was found between KBFs and other firms as to whether they had accepted a strategy for outsourcing or not. Technology developers seemed to have an accepted strategy more often

Table 5. Average number of employees and knowledge classification of firms

	Mean	**Std. Deviation**	**N**	**p-value[a]**
Non-knowledge firms	48.72	138.03	186	0.034
Neo-professional firms	24.64	54.43	121	
Professional firms	26.94	48.22	27	
Technology developers	54.57	132.69	35	
≤25%	32.57	91.96	206	0.063
25-50%	26.37	91.54	69	
>50%	23.59	53.89	101	

[a] Kruskal Wallis Test using Mann Whitney U test with reduced p-value as post hoc test. Post-hoc test did not show any significant differences between groups.

Table 6. Proportion of firms outsourcing and knowledge classification of firms

	Yes	No	p-value[a]
Non-knowledge firms	73.4%	26.6%	0.008
Neo-professional firms	82.8%	17.2%	
Professional firms	96.4%	3.6%	
Technology developers	88.6%	11.4%	
≤25%	73.3%	26.7%	0.004
25-50%	85.5%	14.5%	
>50%	88.1%	11.9%	

[a] Chi-square test.

than other firms. Nor was any relationship noted between knowledge intensity of firms and strategy.

The outsourced activities are regarded as non-core functions in general. The responding managers classified outsourcing as supporting functions in 63.5% of cases, as core competencies in 15.9% of cases, and as a mixture of core and support functions in 20.6% of cases.

No difference was found between outsourcing of core/peripheral functions and knowledge classification of firms.

Another way to look at strategic outsourcing is to analyse the reasons given for adopting it. The most common cited reason given by managers in the survey was that they outsourced to simplify the operation of the firm (42.6%); to increase expert knowledge (36.9%); to reduce cost (34.7%), while only 3.8% mentioned minimizing risks.

The research team then grouped these outsourced motives into two categories. On the one hand are motives related to lowering cost (cost reduction, reducing investments, and minimizing risk), and strategic aspects of outsourcing (reducing labour turnover, increasing external expertise, focusing on core competencies, increasing service to customers, and simplifying the operation of the firm), on the other hand. When this classification is used, 77.3% of the managers give strategic related reasons for choosing outsourcing, while 38.5% mention cost related reasons. As multiple answers were allowed in the original question, the total percentages exceed 100%.

No significant difference was found between knowledge classifications of firms and whether they outsource for cost or strategic reasons. However, technology developers outsource more for cost related reasons than other firms, and professional firms more for strategic reasons.

Kind of Activities Outsourced

When the outsourced activities of the firms in the survey were analysed, 48.3% of the firms were found to have outsourced information technology. Accounting had been outsourced by 45.7% of the firms, followed by security services (37.5%), cleaning (33.1%) and wages and salaries (17.4%). Very few firms in Iceland had outsourced education and training (1.9%) or HRM (0.3%).

The outsourced activities were later classified by the authors into four groups: Administrative tasks (accounting, wages and salaries, finance, back office processing, and call centres); peripheral tasks (cleaning, security services, canteen, and transportation); IT and information processing (information technology, and telecommunication services); and HRM (human resource management, training, consulting). Table 7 reveals that half of the responding firms outsource administrative and peripheral tasks, as well as IT and information processing, while few outsource HRM activities.

The only difference between the outsourcing of these activities and knowledge classification of firms is that technology developers and non-

Table 7. Outsourcing of services divided into four categories. Multiple answers allowed.

Administrative tasks	51.4%
Peripheral	51.4%
IT and information processing	48.6%
HRM	15.8%

knowledge firms outsource more peripheral tasks than other firms ($\chi^2(3)=7.87$, $p=0.049$). This is shown in Table 8. Also, the higher the proportion of university educated staff, the more firms outsource peripheral tasks. Knowledge-based firms, especially technology developers, seem to outsource more HRM-functions than other firms ($\chi^2(3)=8.70$, $p=0.034$). Again, the higher the education of staff in the firms, the more they tend to outsource HRM-tasks. These findings do not support Hypothesis 4. KBFs seem not to outsource more activities of a narrow, explicit nature than other firms.

HRM

The majority of the managers, 86.4%, reported that outsourcing had no or insignificant impact on employment, while 8.2% had lain off staff and 6.3% had transferred staff to suppliers. These findings support Hypothesis 3; KBFs tend to keep strategic parts of HRM in-house. It is worth noting that that many of the responding firms have outsourced from the beginning; hence, changes in employment have been quite limited. The managers of professional firms most often report that outsourcing has had no significant impact on the human resources, while fewest managers in the category of technology developers chose that alternative. The latter are, however, more likely to lay off staff, and transfer staff to suppliers. The difference is not significant. Only very limited differences were noticed when firms were classified by knowledge intensity of their employees.

Realized Benefit of Outsourcing

The managers were asked specifically whether outsourcing had led to cost reductions, given the central status of cost reduction in the debate on outsourcing. Cost had actually been reduced in 48.6% of the firms in the survey, while 51.4% of firms claimed that cost had not been reduced as a consequence of outsourcing. A probable explanation is that the firms are looking more at strategic aspects, such as reduced labour turnover or improved customer services, as already noted. Table 11 shows that managers of technology developers claim, more often than managers of other firms, that cost has actually been reduced. The difference is significant ($\chi^2(3)=10.1$, $p=0.018$). No difference was found between classification of firms according to knowledge intensity and cost reduction (Table 9).

When the firms reporting reduced cost are analysed further by statistical analysis, we see an

Table 8. Proportion of firms that outsource peripheral and HRM tasks

	Peripheral	**IT**	**HMR**	**Administrative tasks**
Non-knowledge firms	55.8%	47.1%	8.7%	50.0%
Neo-professional firms	39.6%	53.5%	16.8%	48.5%
Professional firms	40.7%	37.0%	22.2%	40.7%
Technology developers	58.1%	54.8%	25.8%	71.0%
p-value[a]	0.049	0.396	0.034	0.094
<25%	47.0%	43.7%	9.3%	46.4%
25 -50%	39.0%	50.8%	13.6%	50.8%
>50%	64.0%	50.6%	24.7%	61.8%
p-value[a]	0.006	0.483	0.005	0.068

[a] Chi-square test.

Table 11. Mean score for managers on different statements regarding their experience of outsourcing and knowledge classification of firms

	Non-know	**Neo-prof.**	**Prof.**	**Tech.**	**p-value[a]**
Improved service quality	2.53	2.44	2.63	2.47	.713
Reduced cost	3.05	3.32	3.07	2.84	.131
Increased expertise	2.53	2.58	2.65	2.90	.409
Reduced risk	2.59	2.51	2.44	2.42	.725
Improved service to customers	2.60[A]	2.28[C]	2.80 [C]	2.43	.003
Focus on core competencies	2.41[B]	2.36	2.70[D]	2.00 [B D]	.002
Cost discipline/control	2.72	2.85	3.00	2.70	.363
Value added has increased	2.88[A]	2.53	2.93	2.58	.005
	<25%	25 -50%	>50%	p-value[a]	
Improved service quality	2.53	2.46	2.47	.614	
Reduced cost	3.12	3.29	3.17	.697	
Increased expertise	2.57	2.73	2.50	.475	
Reduced risk	2.61	2.48	2.51	.699	
Improved service to customers	2.56	2.37	2.48	.099	
Focus on core competencies	2.40	2.51	2.26	.192	
Cost discipline/control	2.82	2.78	2.88	.850	
Value added has increased	2.84[E]	2.83	2.53 [E]	.041	

[a] Kruskal Wallis Test using Mann Whitney U test with reduced p-value as post hoc test.
[A] significant difference between non-knowledge firms and neo-professional firms,
[B] significant difference between non-knowledge firms and technology developers.
[C] significant difference between neo-professional firms and professional firms,
[D] significant difference between professional firms and technology developers,
[E] significant difference between <25% and >50%.

Table 9. Realized cost reduction and knowledge classification of firms

	Cost reduction	**p-value[a]**
Non-knowledge firms	48.9%	0.018
Neo-professional firms	42.0%	
Professional firms	44.4%	
Technology developers	74.2%	
<25%	53.0%	0.389
25 -50%	55.9%	
>50%	45.5%	

[a] Chi-square test.

interesting pattern. More cost reduction related to peripheral tasks has been achieved in non-knowledge firms than in other firms. The difference is significant (Table 10). No difference was found between cost reduction and the knowledge intensity of firms (the proportion of university educated staff).

The managers were asked to state how strongly they agreed or disagreed with the following statements regarding their experience of outsourcing: The quality of services has improved; expert knowledge has increased; cost has been reduced; risk has decreased; more focus on core competencies; and value added has increased. According to 64.1% of the managers, the focus on core

Table 10. Cost reduction related to areas of outsourcing and knowledge classification of firms

	Peripheral	**IT**	**HMR**	**Administrative tasks**
Non-knowledge firms	39.4%	28.8%	4.5%	36.4%
Neo-professional firms	14.3%	21.4%	0.0%	31.0%
Professional firms	8.3%	25.0%	16.7%	33.3%
Technology developers	26.1%	13.0%	4.3%	39.1%
p-value[a]	0.014	0.473	(0.909)[b]	0.224
<25%	34.3%	21.4%	1.4%	32.9%
25 -50%	19.2%	15.4%	11.5%	38.5%
>50%	22.9%	25.0%	2.1%	31.3%
p-value[a]	0.224	0.63	(0.045)[b]	0.815

[a] Chi-square test.

[b] Expected frequency to low for a valid Chi-square test.

competencies has increased, and more than half report that expertise has increased, as well as services to customers and service quality, and risk has been reduced. Like in previous analysis, only 35% mentioned reduced cost.

A median was also calculated from the answers on a fivefold Likert-scale, from strongly agree to strongly disagree. A mean close to 1 indicates that the managers strongly agree with the statements, while a mean close to 5 indicates that they strongly disagree with the statement. An analysis of the experience of managers revealed that managers report a rather positive experience of outsourcing, as in most cases the mean scores are below 3. On two statements the managers of neo-professional firms are more positive than manages of other firms. The difference is significant (Table 11). These statements are: Improved services to customers, and value added has increased. The managers of technology developers are more positive to the statement: focus on core competencies has increased. As can be seen from Table 11, classification of firms according to knowledge intensity does not reveal much difference regarding managers' experiences of outsourcing, except that value added has increased.

DISCUSSION AND CONCLUSION

The thrust of this article has been to analyse the extent, strategy and effects of outsourcing among KBFs and other service firms in Iceland, as well as to compare the explanatory value of theoretically orientated classification of knowledge-based firms by von Nordenflycht (2010) to an empirical concept based on knowledge intensity (the proportion of university educated staff to total staff). The result of the paper shows that the theoretical classification has more explanatory value than the empirical concept, and more nuances. The theoretical classification often gave a U-shaped pattern where non-knowledge firms and technology developers showed a similar pattern and neo- and classical professional firms another pattern. The empirical observation showed a more linear pattern in most cases. The former classification did find differences regarding age and size of firms and the realized benefit of outsourcing, whereas the latter did not.

Regarding the amount, reasons and kinds of activities outsourced, our results show that KBFs outsource on a larger scale, and they do not have a more strategic vision towards outsourcing than other firms, nor do they outsource more low

knowledge-based activities. The reasons for outsourcing were more related to strategic aspects, such as a focus on core competencies, increased external expertise, and improved customer service, rather than lowering cost. That is congruent with former research in the area (Di Gregorio et al., 2009; Kremic et al., 2006; Quinn, 1999). The most common functions to be outsourced are administrative and peripheral tasks, as well as information technology, but there was no difference in that respect between KBFs and other firms, apart from the fact that the former outsource more HRM functions Outsourcing only had an insignificant effect on employment. Almost nine managers out of ten report that outsourcing had very little impact on human resources in their firms, and less than 15% had laid off staff, or transferred staff to suppliers. These findings do not give support to Hypothesis 1, 2, and 4.

The realized benefit of outsourcing was manifested in cost being reduced in the case of 48.6% of firms in the survey, the greatest saving occurring among technology developers. Non-knowledge firms reduced cost more than other firms relating to peripheral tasks.

Technology developers seem be the most involved with outsourcing. Such firms outsource most peripheral tasks, HRM functions; realize the most cost reduction, and the managers of such firms report the most positive experience of outsourcing in regard to increased focus on core competencies. This is in line with much of KBFs literature (Lee, 1999; Currie et al., 2008; Murray et al., 2008), and corresponds most closely to the resource-base view of the firm model. Their special position among firms may be a point in case: Such firms deal with complex and innovative knowledge and they have high capital intensity. Both of these facts lead them to concentrate on core competencies by outsourcing non-core functions, and HRM functions – primary training and counselling. The latter emphasis is because they need more external expertise than other firms. This gives support to the proposition by Murray et al. (2009) that the more innovative the firms, the more they rely on outsourcing from best-in class suppliers.

There was very limited difference regarding the outsourcing pattern of classical professional and neo-professional firms in the survey. It seems, then, that professionalism does not block outsourcing, nor does the direct contact of neo-professional firms with the most recent business trends, through consulting and advertisement, encourage outsourcing. Hypothesis 2 was not confirmed, as already noted.

This research was carried out in only one country, and is based on a telephone survey. Its results should, therefore, be interpreted with care. Future research should be characterised by a more varied research design, such as case studies and interviews, as well as cross-cultural comparison. At the same time, a fuller understanding of the outsourcing pattern of knowledge-based firms would be possible, and the theory of the knowledge-based firm could benefit from such a design.

In conclusion, this study gives support to both a resource based view of the firm, as well as the outcomes of earlier studies of KBFs (Currie et al., 2008; Murray et al., 2009; Lee, 1999). The firms in the survey tend to keep their core competencies and employees in-house, whereas they outsource other functions that they consider non-core, such as peripheral and administrative tasks, or IT that needs some technical specialization. The more innovative firms rely more on outsourcing from best-in class suppliers regarding training and counselling. The contribution of this study to the theory of outsourcing is that the non-routine tacit knowledge base related to firms' core competencies is not limited to KBFs, but applies to a large portion of service firms as well.

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ENDNOTES

[1] NACE Code is a pan-European classification system which groups organisations accord-

ing to their business activities. It assigns a unique 5 or 6 digit code to each industry sector.

[2] One firm was an outlier with 5000 employees and being much larger than rest of the firms in the survey, it was omitted from the analysis. If the outlier had been included, the average number of employees would have been 54.

[3] All these services have a high porportion of university educated personnel, that are considered as professionals (doctors, nurses, teachers, etc.). The only deviation from the model is that health services demand extensive capital investment.

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Chapter 42
Investment in Transaction-Specific Assets and Opportunistic Behavior in a Chinese Supply Chain

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ABSTRACT

This chapter addresses the relationship between a supplier and the manufacturers that it serves, from the perspective of transaction cost economics theory (TCE). TCE deals with relationships between organizations, such as customers, manufacturers and suppliers. It states that investment in transaction-specific assets opens the door for opportunistic behavior by an organization's partners. Interpreted from the perspective of a supplier, the supplier's investments in transaction-specific assets, such as dedicated plant and equipment, workforce with transaction-specific skills and the development of transaction-specific relationships, will lead to opportunistic behavior on the part of the manufacturers that they serve, providing an environment where behaviors intentionally designed to take advantage of the supplier will flourish. Because the supplier will not be able to redeploy those investments to a different manufacturer if the relationship is discontinued, manufacturers will be motivated to capitalize on this vulnerability by employing behaviors such as seeking unfair price concessions, sharing proprietary information with competitors or other unethical behaviors. This study advances the application of TCE to the context of supply chain management by breaking investments in transaction-specific assets into investments in transaction-specific tangible assets, such as plant and equipment, and transaction-specific intangible assets, such as relationships and the development of human resources, and examining their impact on opportunistic behavior separately. These relationships are examined using a survey of 230 suppliers in the household appliances industry in China. Hierarchical regression analysis revealed that there was a positive relationship between suppliers' investment in transaction-specific tangible assets and opportunistic behavior by the manufacturers that they serve, but that there was a negative relationship between suppliers' investments in transaction specific intangible assets and opportunistic behavior by their manufacturers. The moderating role of contracts and relational norms was also examined.

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INTRODUCTION

What leads a manufacturer to intentionally engage in behaviors that take advantage of its suppliers? Although there is a substantial body of theoretical and empirical literature related to the benefits of supplier integration, anecdotal examples of manufacturers and suppliers that engage in behavior that is less than supportive of their partners are not unusual. Such behavior, which is known as opportunistic behavior, may include overt behaviors such as lying, cheating and demanding unfair price concessions, as well as more subtle behaviors, such as threatening to withdraw business, establishing the potential for legal action and sharing secrets with competitors.

The existence of opportunistic behavior in a supply chain presents a paradox. On the one hand, as effective supply chain design and management grows in importance in the global economy, the importance of supply chain integration has grown correspondingly (Jap, 1999; Bowersox, Closs & Stank, 1999). There is extensive literature supporting the role that supply chain integration plays in achieving competitive advantage (Bowersox & Morash, 1989; Lee & Billington, 1992; Morris & Calantone, 1991) and enhancing performance (Ahmad & Schroeder, 2001; Frohlich & Westbrook, 2001; Johnson, 1999; Narasimhan & Jayaram, 1998; Stank, Keller & Closs, 2001, Zhao, Nie, Huo, & Yeung, 2006). On the other hand, however, the very steps that a supplier takes to establish supplier integration may set the stage for opportunistic behavior by the manufacturers that it serves. According to transaction cost economics (TCE) theory, investments in transaction-specific assets create a transaction cost imbalance, which will be opportunistically exploited to benefit the partner organization. In a supply chain, this imbalance can be weighted towards either the customer or the supplier. In this chapter, we examine the situation where a supplier has made investments in transaction-specific assets, such as tooling or dedicated human resources, that are specific to a particular manufacturer. TCE predicts that the manufacturer will capitalize on its knowledge that these investments would be difficult to redeploy to a different manufacturer if the relationship were to end, engaging in opportunistic behavior to benefit itself.

Prior research has examined the effectiveness of contracts and relational norms in safeguarding against opportunistic behavior (e.g., Achrol & Gundlach, 1999; Jap & Ganesan, 2000). An effective contract prescribes appropriate behaviors for supply chain partners, as well as routines for the distribution of outcomes. Relationship norms provide a set of mutual expectations and understandings between supply chain partners, built upon a foundation of trust and the encouragement of long term cooperative behavior. Although such mechanisms are expected to moderate the positive relationship between investments in transaction-specific assets and opportunistic behavior, the previous empirical research on this relationship is quite inconsistent. For example, Achrol and Gundlach (1999) found that contracts did not limit the opportunistic behavior resulting from a partner's investments in transaction-specific assets, while relational norms did. However, Jap and Ganesan (2000)'s study showed that neither contracts nor relational norms had any effect. Thus, there is no clear conclusion about the role that contracts and relational norms play in safeguarding against the opportunistic behavior associated with investments in transaction-specific assets.

Part of the reason for the apparently contradictory results is that transaction-specific assets vary in their tangibility. For example, investment in plant, equipment and tooling dedicated to serve a specific customer is visible, and it is relatively easy to evaluate the value of the investment because the assets are physical and tangible in nature. In contrast, investments in time, the development of human resources to help better understand a supply chain partner's needs and customized processes to meet the customer's needs are much more difficult to value and fully account for (Nielson,

1996; Perks & Easton, 2000) because the assets are intangible in nature. Thus, relationship between investments in transaction-specific assets and opportunistic behavior may be influenced by the tangibility of the transaction-specific asset investments. Because previous research has generally ignored the tangibility dimension, it has neglected the effect of transaction-specific asset tangibility on opportunistic behavior.

To address these challenges, this chapter draws upon transaction cost economics theory to study the effect of a supplier's investments in transaction-specific assets on opportunistic behavior by the manufacturers it serves. It divides transaction-specific investments into investments in tangible and intangible assets, according to the nature of the specific investment, exploring their individual effects on the opportunistic behavior of manufacturers, as well as addressing the moderating effect of contracts and relational norms on these relationships.

BACKGROUND

Transaction-Specific Assets

Transaction cost economics theory (TCE) views the relationship between organizations, such as a manufacturer and a supplier, in terms of the cost of conducting the exchange. Originally developed by Coase (1937) and expanded by Williamson (1975, 1985, 1991), TCE describes how organizations seek efficiency by minimizing the sum of their production and transactions costs (Joshi & Stump, 1999a) through optimal allocation of producing in house versus buying from a trade partner (Heide, 1994). It posits that there are key managerial tendencies that must be considered. Most prominent of these is opportunism; that is, given the opportunity, a manager, and hence his organization, will export any transaction cost imbalance between organizations for his own organization's benefit. Described as "self-seeking with guile" (Williamson, 1985, p. 47), opportunism can include lying and cheating, as well as more subtle forms of deceit such as violating implicit agreements (Rindfleisch & Heide, 1997). Opportunistic behavior can be initiated by any member of a supply chain, depending on the direction of the transaction cost imbalance. In this chapter, we focus solely on opportunistic behavior by manufacturers toward their suppliers.

According to TCE, the two factors that determine whether there is an imbalance in transactions costs are asset specificity and environmental uncertainty (Joshi & Stump, 1999a). We focus on asset specificity, which is defined as the extent to which asset investments are specific to a transaction. A transaction-specific investment is one which cannot be easily redeployed to a different manufacturer. For example, a supplier to Dell might build a facility within a few miles of a Dell manufacturing plant. A supplier to General Motors might invest in expensive tooling that is specific to the needs of a GM plant. In each case, the supplier has made an investment in transaction-specific assets. These assets are unique to the customer and would be difficult or impossible to redeploy to a different customer if the relationship ended. Investments in transaction-specific assets play an important role in supply chain integration, because they help to achieve effective and efficient flows of products, services, information, money and decisions (Zhao et al 2008), demonstrate partners' intentions of maintaining the supply chain relationship for the long term (Anderson & Weitz, 1992) and have the potential to bring substantial benefits for both supply chain partners (Ghosh & John, 1999; Rokkan, Heide & Wathne, 2003).

However, because investments in transaction-specific assets cannot be easily redeployed to contexts beyond the specific relationship, a supplier which makes such investments becomes vulnerable to opportunistic behavior by manufacturers (Heide & John, 1988; Heide & Stump, 1995; Achrol & Gundlach, 1999; Sheng, Brown, Nicholson & Poppo, 2006; Gundlach, Achrol

& Mentzer, 1995). The presence of transaction-specific assets indicates an imbalance, which TCE predicts will be unscrupulously exported by manufacturers to serve their own self interest (Rindfleisch & Heide, 1997).

The conceptual literature on TCE categorizes transaction-specific assets in several ways. Lohita, Brooks and Krapfel (1994) summarized 76 previous research studies, finding that some focused on transaction-specific human assets, while others identified transaction-specific physical assets. Nielson (1996) concluded that investments in transaction-specific assets are generally divided into two or three categories. Grover and Malhotra (2003) pointed out that much of the operations and supply chain management research focused on transaction-specific human assets and paid little attention to other types of transaction-specific assets, such as physical assets or brand name assets. Figure 1 summarizes the categories used in related studies. The three-category typologies tend to break transaction-specific investments into physical assets, human assets and procedural assets. Physical assets refer to investments in plant and equipment that are geared to a given supply chain partner. In contrast, human assets include investments that are tailored towards learning how to do business with a particular supply chain partner, such as recruitment and training to meet the needs of a specific manufacturer. Procedural assets are processes or services that are specialized to the requirements of a particular partner, embedded in the way the firm performs its day-to-day business functions (Jackson, 1985).

The research which classifies transaction-specific investments into two categories tends to merge procedural and human assets. This is reasonable, since both are more difficult to value than physical assets and because it is human resources that perform procedures. For example, Subramani and Venkatraman (2003) argued that transaction-specific investments are comprised of tangible and intangible assets. Tangible assets include physical assets, such as plant, equipment and tooling, and site specificity, while intangible assets include dedicated human assets, business routines and processes that are specialized for a given supply chain partner. Nielson (1996) divided investments in transaction-specific assets into investments into hard or soft assets. Hard assets are relatively more concrete and tangible investments which are material or physical in nature, such as modification of products, specific equipment and location of a facility. Soft assets are investments in human assets, procedural and temporal assets, such as the time invested in developing a relationship. Brown, Dev and Lee (2000) found that partners made investments in tools, equipment and procedures, as well as training employees to use equipment that is specialized for a given partner. Artz and Brush (2000) noted that transaction-specific investments in OEM-supplier relationships were primarily composed of human, physical and temporal assets. Rokkan, Heide and Wathne (2003) described investments in transaction-specific assets as including physical assets, systems, procedures and human assets.

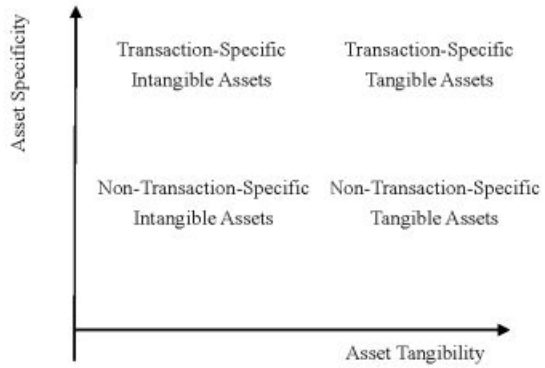
Figure 1. Typologies of transaction-specific assets

Reference	Tangible Assets				Intangible Assets				
	Durable Assets	Physical Assets	Fixed Assets	Tangible Assets	Human Assets	Procedures	Temporal Assets	Social Capital	Intangible Assets
Jackson (1985)	•				•	•			
Heide & John (1988)		•			•	•			
Artz & Brush (2000)		•			•		•		
Blumberg (2001)		•			•			•	
Corsten & Kumar (2005)		•			•	•			
Anderson (1985)			•		•				
Spekman & Strauss (1986)	•				•				
Nielson (1996)				•					•
Subramani & Venkatraman (2003)				•					•

Current research suggests the importance of both types of transaction-specific investments to supply chain relationships. For example, Anderson and Weitz (1992) indicated that firms invest in human assets, site specificity and other resources to support supply chain relationships. Based on the literature, we divide transaction-specific investments by suppliers into tangible and intangible asset investments. Tangible assets are defined as physical assets, such as modification of products, special plant and equipment or location, while intangible assets include investments in human assets, procedures and temporal assets.

Figure 2 graphically describes the scope of this chapter. The vertical axis describes the level of asset specificity of a supplier's investments. The higher the level on the vertical axis, the more specific the investment is to the needs of a particular manufacturer and the more difficult it will be to redeploy that investment to a different manufacturer if the relationship is terminated. The horizontal axis represents the degree of tangibility of the investment. Investments which are farther to the right are more physical and tangible, making them easier to value. Investments which are farther to the left are more intangible and focused on knowledge and the development of human resources and procedures. At the lower left of Figure 2 are non-transaction-specific investments in training and procedures, such as investment in TQM and JIT. Such investments would be easy to deploy to a different manufacturer and may, in fact, be a selling point for the suppliers. At the bottom right are non-transaction-specific investments in physical assets, such as the building of a state-of-the-art manufacturing facility, which would be easy to use to meet the needs of a variety of manufacturers. In contrast, investments in the upper right quadrant would be difficult to redeploy, such as investments in expensive tooling which can only be used to make parts for GM and which could not be redeployed if GM were to withdraw its business. Similarly, investments in the upper left quadrant, such as investments in GM-specific

Figure 2. Tangibility and specificity of asset investments



training that would be difficult to redeploy if the relationship with GM were to come to an end.

Although the conceptual literature divides investments in transaction specific assets into several categories, the empirical literature tends to operationalize investments in transaction specific assets as a unidimensional construct, examining only the vertical axis in Figure 2. By ignoring the tangibility dimension, the effects of investments in tangible and intangible assets become commingled, making them difficult to explain. Examination of both asset specificity and asset tangibility may provide an explanation for the inconsistencies in the prior empirical literature.

Opportunistic Behavior

Investment in transaction-specific assets creates an environment where opportunistic behavior will flourish, due to the vulnerability that a supplier creates through its transaction-specific investments, according to TCE. Opportunistic behavior is defined as "self-interest seeking with guile" (Williamson, 1975, p.6), with guile described as "lying, stealing, cheating, and calculated efforts to mislead, distort, disguise, obfuscate, or otherwise confuse" (Williamson, 1985, p.47). What sets opportunistic behavior apart from the standard economic assumption

of self-interest-seeking behavior is that it violates explicit or implicit contracts (Achrol & Gundlach, 1999), reflected in such behaviors as offering proprietary information to competitors, not adhering to promises or reducing efforts in joint tasks (Blumberg, 2001; Provan & Skinner, 1989). These behaviors seek self-interest through the manufacturer's calculated efforts to mislead and confuse its suppliers (Dahlstorm & Nygaard, 1999).

Consider, for example, the case of OneSupp, an organization that worked diligently to be selected as a supplier for Medical Products Company (MPC), a leading manufacturer of implantable medical devices (both disguised names of actual companies). In order to produce the unique parts that MPC demanded, OneSupp invested in expensive tooling that could only be used to make parts for MPC and developed a proprietary material, as well as developing workforce and design engineers who were dedicated to producing MPC's parts. Eventually, it established a small satellite operation that was less than two miles from MPC's factory, so that it could supply parts just-in-time to MPC's assembly line. Thus, OneSupp made investments in both transaction-specific tangible assets (tooling and location of its operation) and intangible assets (selection and training of workforce and engineers). This relationship was quite successful initially. Over time, however, MPC began to extract annual and painful price concessions from OneSupp. In addition, it shared some of OneSupp's proprietary material and process developments with OneSupp's competitors, in hopes of developing alternative suppliers in order to extract further price concessions from OneSupp. Because OneSupp had made substantial investments that were specific to its relationship with MPC, there was little that it could do to combat these moves.

Relationship between Investments in Transaction-Specific *Tangible* Assets and Opportunistic Behavior

Examining the tangibility of asset investments expands upon the foundation provided by TCE, which focuses on the dimension of asset specificity. Transaction-specific investments in tangible assets (the northeast quadrant in Figure 2) are geared to a specific supply chain relationship and cannot be easily redeployed to other relationships (Nielson, 1996; Heide & John, 1988). If the relationship were to be terminated, the value of these assets would be largely lost, and the supplier would suffer greatly. Because the supplier expects to offset the costs of its transaction-specific investments in tangible assets through a long-term relationship with the manufacturer, the supplier's dependence on the manufacturer increases with its transaction-specific investments in tangible assets. As a result, the manufacturer is more likely to shirk its obligations and exploit the supplier, in the absence of appropriate safeguarding mechanisms (Achrol & Gundlach, 1999; Rokkan, et al., 2003), according to TCE. For example, the manufacturer may force contract renegotiation by threatening termination of the relationship, for its own benefit. Thus,

H_{1a}: *Greater supplier tangible asset specificity will be associated with more opportunistic behavior by the manufacturer.*

Relationship between Investments in Transaction-Specific *Intangible* Assets and Opportunistic Behavior

Transaction-specific investments in intangible assets by suppliers (the northwest corner of Figure 2) include investments in dedicated human assets, training, time for developing the relationship, procedures and other difficult to value assets (Nielson, 1996). Although we hypothesized that transaction-specific investments in tangible assets would lead to greater opportunistic behavior by the

manufacturer, we expect the opposite relationship for transaction-specific investments in intangible assets. We propose that the more that a supplier invests in intangible assets that are specific to a supply chain relationship, the less likely the manufacturer will be to engage in opportunistic behavior, for several reasons.

First, the development of transaction-specific intangible assets requires a substantial amount of time (Weiss & Kurland, 1997), for example, the time it takes for the supplier's employees to learn the nuances of dealing with the manufacturer's requirements and modifying its procedures to satisfy these requirements. As they are developed, these procedures become embedded in the supplier's employees and day-to-day routines (Simon, 1996; Zack, 1999), making it difficult for the manufacturer to directly observe and account for their value (Nielson, 1996). Because their value is less obvious, the manufacturer will be less tempted to take advantage of the supplier's investment to engage in opportunistic behavior. Thus, it is more difficult for a manufacturer to exploit transaction-specific intangible asset investments.

Second, in order for the supplier to learn the manufacturer's requirements and modify its own procedures, it must engage in frequent downstream communication with the manufacturer, in order to understand the manufacturer's needs (Subramani & Venkatraman, 2003). Because the supplier has developed an understanding of the manufacturer's behavior and intentions, it has a better basis for monitoring the manufacturer's activities, making it more difficult for the manufacturer to engage in behaviors that take advantage of the supplier. Third, as the supplier works to master the knowledge that is specific to the relationship, the manufacturer becomes better acquainted with the supplier, increasing its upstream communication and interaction with the supplier. As the manufacturer becomes familiar with the supplier's intention to maintain the supply chain relationship, it may relate to the effort that the supplier has made to develop and improve the relationship and develop a better understanding of the supplier's sincerity and capability, laying the foundation for trust. As the manufacturer's trust in the supplier increases, it becomes more likely to cooperate with the supplier (Nielson, 1996). This reduces the possibility of the manufacturer engaging in behavior which would endanger the relationship.

Fourth, in order to effectively train employees and modify procedures, the supplier needs the manufacturer's help so that it can tailor its investment in intangible assets to best realize both partners' goals. Thus, the manufacturer must also invest some time and resources during this process. If the relationship ends, the manufacturer would need to find another supplier and invest more time into helping it learn the manufacturer's requirements and practices. Thus, there are also transaction costs for the manufacturer associated with terminating the relationship. In other words, the manufacturer makes reciprocal investments into the relationship. Artz (1999) argued that the party making reciprocal investments will make efforts to maintain the exchange relationship. Thus, considering the potential loss from terminating the supply chain relationship, the manufacturer will reduce its opportunistic behavior when the supplier invests intangible assets into the supply chain relationship. Therefore, we put forward the following hypothesis,

H_{1b}: *Greater transaction specific intangible asset specificity by a supplier will be associated with less opportunistic behavior by the manufacturer.*

Moderating Effect of Contracts

The literature suggests that the relationship between investments in transaction-specific assets and opportunistic behavior is moderated by mechanisms used to safeguard against opportunistic behavior, such as contracts. Contracts explicitly prescribe roles and obligations, determine the content of the exchange and the division of outcomes, and specify penalties for violation

of contractual specifications (Poppo & Zenger, 2002; Jap & Ganesan, 2000; Dyer, 1997; Cannon, Achrol & Gundlach, 2000). Wuyts and Geyksens (2005) pointed out that "sufficiently elaborate and carefully constructed contracts serve as a form of quasi-integration and establish a vertical inter-firm authority relation that can subsequently guide behavior." Thus, contracts are hypothesized to play a critical role in supply chain relationships (Antia & Frazier, 2001).

However, previous empirical findings on the moderating role of contracts have been mixed. We posit that this is due to the prior empirical operationalization, which focuses only on asset specificity, without also considering asset tangibility. In the case of tangible asset investments, the supplier and manufacturer will have negotiated the supplier's investment at the beginning of supply chain relationship. Thus, before the exchange relationship even begins, the value of the transaction-specific tangible asset investment can be clearly accounted for, and the supplier can forecast its loss if the manufacturer were to engage in opportunistic behavior. Thus, we argue that the supplier can safeguard its investments in transaction-specific tangible assets by writing a detailed contract before the relationship begins. This will mitigate opportunistic behavior by the manufacturer in several ways.

First, an explicit contract prescribes appropriate behavior in the supply chain relationship, as well as each partner's roles and obligations (Achrol & Gundlach, 1999; Poppo & Zenger, 2002), for example, how to invest in and use the transaction-specific tangible assets, such as tooling and equipment. The activities of both partners are restrained, and behavior uncertainties are reduced. In the presence of an explicit contract, the costs to the manufacturer for shirking its responsibilities are known and its obligations increase. Because of this, the manufacturer is less likely to engage in opportunistic behavior.

Second, a good contract not only provides a framework for behavior, but it also determines the pattern of outcome distribution (Wuyts & Geyskens, 2005). Because the supplier and the manufacturer clearly know how the outcomes created by supplier's investment in tangible assets will be distributed, each is conscious of its own returns from the relationship. Thus, it would be difficult for a manufacturer to exploit its relationship with a supplier through an advantageous position in the supply chain relationship. Third, a well-written contract explicitly states the punishment for violating contractual agreements (Poppo & Zenger, 2002). Because of this, a manufacturer will be able to clearly consider the potential penalties as it considers escaping from its obligations or exploiting the supplier's investments in tangible assets (Jap & Ganesan, 2000). This will reduce the manufacturer's opportunistic behavior related to investment in transaction-specific tangible assets. Thus,

H_{2a}: *The more the supplier relies on contracts to govern the supply chain relationship, the weaker the relationship between its tangible asset specificity and opportunistic behavior by the manufacturer.*

In contrast, we postulate that the moderating effect of contracts on the relationship between a supplier's investment in transaction-specific intangible assets and opportunistic behavior by the manufacturer will be more complex. This relationship depends on the level of detail of the contract, as follows.

First, the process of negotiating and drafting a contract will foster a mutual understanding of the exchange activities. The contract between the supplier and manufacturer provides the foundation for their exchange and increases the transparency of the relationship (Lui & Ngo, 2004; Cannon, et al., 2000). With the contract as the guiding framework and the knowledge gained about the manufacturer's needs and requirements through the process of contract negotiation and drafting, the supplier will be able to invest more effectively

in intangible assets that benefit the manufacturer. For example, the supplier will be able to better select and train dedicated personnel to serve the manufacturer and to modify processes and procedures to better meet the manufacturer's needs and requirements. The contract also sets realistic expectations for the manufacturer and allows the manufacturer to understand the benefits of the supplier's investment in intangible assets and of its relationship with the supplier. Consequently, the manufacturer's intention to engage in opportunistic behavior will decrease. Thus, when a contract is more general and not overly relied upon, it mitigates the undesirable (positive) effects and enhances the desirable (negative) effect of investments in transaction-specific intangible asset on the opportunistic behavior of the manufacturer.

However, some contracts move beyond providing a guiding framework to specifying obligations and rights in excruciating detail. When this is the case, the use of a contract can reduce the desirable effect of the supplier's investment in transaction-specific intangible assets on the manufacturer's opportunistic behavior, in terms of decreasing the opportunistic behavior of the manufacturer. Because a very detailed contract may be perceived as intervening in decisions between the partners, it can signal distrust (Cavusgil, Deligonul & Zhang, 2004). The manufacturer may become suspicious about the supplier's motivation and intentions, as the supplier's employees try to learn about the manufacturer's situation and requirements. Furthermore, as the supplier and manufacturer overly rely on a contract, their behaviors are constrained by detailed contractual clauses. As a result, the supplier's transaction-specific intangible investment in understanding the manufacturer's needs, processes or procedures and in customizing the processes or procedures to meet their needs may not bring benefits to the manufacturer, because its potential improvement actions may be constrained or prohibited by contractual clauses. Therefore, over-reliance on very detailed contract will reduce the efficiency and effectiveness of a supplier's investment in transaction-specific intangible assets. Hence, the manufacturer may perceive the relationship with the supplier as not bringing about sufficient outcomes and become concerned about information requests from the supplier, making it more likely to engage in opportunistic behavior. Thus, we put forward the following hypothesis,

H_{2b}: *The moderating effect of contracts on the relationship between the supplier's transaction-specific intangible asset specificity and manufacturer's opportunistic behavior will be non-linear.*

Moderating Effect of Relational Norms

Some authors (e.g., Barney, 1999; Conner, 1991; Ghoshal & Moran, 1996) have criticized TCE as overemphasizing opportunistic behavior. Indeed, there are many examples of supply chain partnerships with imbalanced investments in transaction-specific assets where there is not opportunistic behavior. This may be due to the development of relational norms between the supply chain partners. Relational norms are defined as "expectations about behavior that are at least partially shared by a group of decision makers" (Heide & John, 1992). They identify a set of mutual expectations and understandings between the partners (Lusch & Brown, 1996), built upon solidarity, flexibility, information exchange, participation and other dimensions (Heide & John, 1992; Jap & Ganesan, 2000; Cannon, et al., 2000). Solidarity is the bilateral expectation that a high value is placed on the relationship and behaviors are directed toward relationship maintenance, while flexibility is the bilateral expectation of willingness to make adaptations as circumstances change. Information exchange refers to the expectation that the parties will freely and actively provide useful information to each other, and participation is the joint expectation that both parties share, make decisions and set goals regarding all aspects of the exchange.

We suggest that the positive relationship between a supplier's investment in transaction-specific tangible assets and opportunistic behavior by the manufacturer will be reduced when the supplier relies more heavily on relational norms to govern the relationship, for several reasons. First, relational norms emphasize a vision of the supplier and the manufacturer as a cohesive whole, and focus on cooperation, rather than adversarial relationships. This guides the supplier and manufacturer toward engaging in behaviors that are beneficial to the relationship and restricting behaviors that seek self-interest (Heide & John, 1992; Achrol & Gundlach, 1999). Thus, when a supplier invests in transaction-specific plant and equipment, relational norms will guide the manufacturer to focus on the total benefits and returns from the relationship, not just on its own interests. Hence, the manufacturer will engage in cooperative behavior (Joshi & Stump, 1999b), lessening the likelihood that it will resort to opportunistic behavior.

Second, relational norms induce partners to maintain a long-term relationship and understand that the long-term returns from investments in transaction-specific tangible assets surpass the short-term returns potentially associated with opportunistic behavior (Wuyts & Geyskens, 2005). The manufacturer will reflect on this as it considers exploiting the supplier's investment in transaction-specific tangible assets. Supporting this perspective, Joshi and Campbell (2003) described relational norms as restricting the partner's opportunistic behavior through emphasizing the "shadow of the future".

Third, relational norms drive the supplier and manufacturer to exchange proprietary information and make operational suggestions. Through improved communication, the supplier knows more about the manufacturer's behaviors and intentions, facilitating its monitoring of the manufacturer's activities. This limits the likelihood of the manufacturer engaging in opportunistic behavior caused by the increase in the supplier's investment in transaction-specific tangible assets. On the other hand, the supplier can influence the manufacturer's decisions by providing suggestions and advice on production and business decisions, helping the manufacturer execute its responsibilities and roles in the supply chain relationship (Jap & Ganesan, 2000). Thus,

H_{3a}: *The more the supplier relies on relational norms to govern the supply chain relationship, the weaker the relationship between its transaction-specific tangible asset specificity and opportunistic behavior by the manufacturer.*

Similarly, we argue that the more that the supplier relies on relational norms to govern the supply chain relationship, the stronger the negative relationship between its investment in transaction-specific intangible assets and opportunistic behavior by the manufacturer, for the following reasons. First, relational norms emphasize sharing of values and goals between supply chain partners (Brown, et al., 2000), encouraging them to closely coordinate their activities (Artz & Brush, 2000). When a supplier trains its employees to learn the manufacturer's requirements and modifies its business processes to adapt to the specific context, the manufacturer will realize that these are sincere efforts to realize their shared goals, and it will respond accordingly. Furthermore, the manufacturer will consider it beneficial to maintain the relationship with the supplier, in order to realize its own goals. The manufacturer will be less likely to engage in behaviors that could undermine the relationship. Therefore the increased use of relational norms will enhance the desirable (negative) effects of the supplier's investment in transaction-specific intangible assets on the manufacturer's opportunistic behavior.

Second, relational norms, such as information exchange and participation, establish a platform for communication through which the supplier

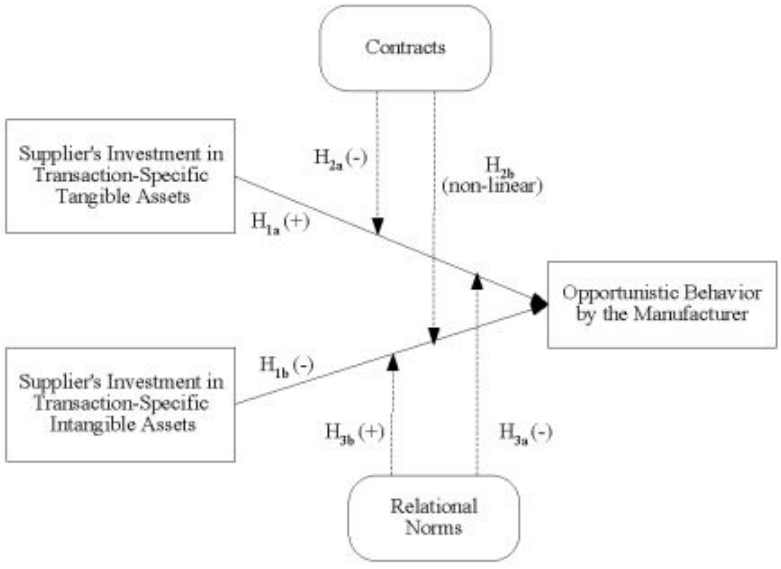
and the manufacturer learns about each other's intentions (Madhok, 1995). More frequent information exchange helps the supplier's employees to master and better satisfy the manufacturer's requirements. Frequent interaction aids the supplier in adapting to the manufacturer's organizational processes, enlarging their exchange and improving the outcomes of the relationship. As outcomes improve, the manufacturer is more likely to continue the relationship with the supplier and less likely to engage in opportunistic behaviors that could destroy the relationship. Ultimately, the increased use of relational norms enhances the desirable (negative) effect of supplier's investment in transaction-specific intangible assets on opportunistic behavior by the manufacturer.

Third, relational norms encourage the supplier and manufacturer to resolve problems and conflicts between them (Noordewier, John & Nevin, 1990; Dant & Schul, 1992). When the inevitable conflicts occur as a supplier adjusts its operations procedures and masters the manufacturer's requirements, relational norms encourage each party to think over the differences from other's perspective and make efforts to accommodate the partner or find a new solution (Gilliland & Bello, 2002). The existence of strong relational norms helps to resolve conflicts quickly, before they deteriorate into major disagreements, which helps to create a lasting relationship. Because the manufacturer intends to maintain the relationship with the supplier, it will make coordinative efforts that are helpful to the development of the relationship, rather than engaging in opportunistic behavior. Thus,

H_{3b}: *The more the supplier relies on relational norms to govern the supply chain relationship, the stronger the negative relationship between its transaction-specific intangible asset specificity and opportunistic behavior on the part of the manufacturer.*

Based on the above arguments, we put propose the conceptual model illustrated in Figure 3.

Figure 3. Conceptual model of the relationship between investments and transaction-specific assets and opportunistic behavior



METHOD

Sampling and Data Collection

We chose the Chinese household appliance industry as the population for testing our research hypotheses because it is an industry which has become marketized to a great extent since the 1980's, and it reflects the basic characteristics of supply chain relationships in China. Due to the difficulty of collecting data from suppliers, we solicited the help from a major manufacturer of household appliances, which we will call APPCOM. APPCOM has a very broad product line, which includes televisions, air conditioners, water heaters, vacuum cleaners and many other products. There are many firms competing in these markets in China, including Changhong, Chuangwei, Electrolux, Green, Haier, Hisense, Kangjia, Media, Mitsubishi, Philips, LG, Samsung, Sanyo, Sharp, Siemens, Sony, TCL, Toshiba and Zhigao. APPCOM is one of the top five manufacturers of electrical appliances and has a nationwide network of 700 suppliers. These companies serve as suppliers to many manufacturers, in addition to APPCOM, thus they provide a good cross-section of suppliers in the household appliances industry.

We randomly selected 350 suppliers from this list as our sample setting. We contacted the sales manager in each selected firm, described the objectives of the study and invited them to participate. We promised that the information that they provided would not be shared with APPCOM. All of the contacted suppliers agreed to take part in the study. We asked the sales managers to identify the best informant to complete the questionnaire, with respect the most recent main customer (the focal customer), other than APPCOM, that the supplier had dealt with. We intentionally excluded APPCOM to avoid any potential bias related to APPCOM's provision of the contact information for these suppliers. The key informant was the person in charge of the relationship with the focal customer. He/she was asked to complete the questionnaire, based on the supplier's relationship with the focal customer. Thus, the unit of analysis was the supplier-manufacturer (customer) dyad.

The first wave of questionnaires was sent to the key informants, with a return envelope and guide for completion. Follow-up telephone calls were made to remind and encourage the respondents to complete the questionnaire. After four weeks, we sent a second wave of questionnaires to those companies that had not responded. 249 completed questionnaires were received, with 19 discarded due to invalid or incomplete responses. 230 responses were used in the final analyses, representing a response rate of 65.71%.

We used several approaches to evaluate the qualifications of the key informants. First, each respondent was asked to describe how familiar he/she was with the relationship with the focal customer using a 5- point Likert scale (1=not at all, 5=very familiar). The responses had a mean of 4.29, which indicated that the respondents were knowledgeable about the relationship. Second, the respondents' job titles indicated that 81.9% were sales managers in charge of managing the relationship with the focal customer, and 18.1% were sales employees responsible for dealing with the focal customer. Third, the average length of relationship between the supplier and focal customer was 5.66 years, and the respondents had been involved in the relationship with the focal customer for an average of 3.35 years. Thus, the respondents were familiar with and knowledgeable about the relationship.

To test for non-response bias, we first compared the early and late returned questionnaires on several dimensions, including characteristics of the respondents (work experience, job title and the length of time that the respondent had been involved in the relationship), firm size and the length of relationship with the focal manufacturer. There were no statistically significant differences between early and late respondents. Second, we contacted the 50 non-responding companies by telephone and asked for their response on several

questions about firm size and the length of their relationship with the main manufacturer their firm had dealt with in its most recent selling decision. The respondents were compared with the 50 non-respondents using t-tests (Armstrong & Overton, 1977). The results indicated no significant response bias in these data. Thus, we concluded that the effect of non-response bias on the results was not significant.

Questionnaire

We developed a questionnaire based on prior research on transaction-specific investments, opportunistic behavior and control mechanisms. The items were all borrowed from past research (Sudman & Bradburn, 1982) and adapted to the context of appliance manufacturing in China. The questionnaire was originally drafted in English, then translated into Chinese by three researchers. It was then translated back into English by another two researchers and checked for consistency with the original questionnaire, in order to rule out any problems arising from idiomatic or colloquial wording (Parameswaran & Yaprak, 1987). The measurement items used for each construct are summarized in Figure 4.

Investments in Transaction-Specific Assets. Tangible asset specificity was operationalized as the extent to which the supplier invested in specialized physical resources. Intangible asset specificity was operationalized as the extent to which the supplier invested in specialized non-physical resources, including transaction-specific human resources and time spent on building the relationship and becoming accustomed to the specialized business process/procedures (Subramani & Venkatraman, 2003).

Opportunistic Behavior. The scale measuring opportunistic behavior was developed based on the study by Rokkan, et al. (2003), which described the extent to which a manufacturer engages in "self-seeking behaviors with guile" (Rokkan, et al., 2003; Wathne & Heide, 2000), such as failing to fulfill its obligations or achieve its promises, distorting information, taking advantage of "holes"

Figure 4. Means, standard deviations, and correlations

	TA	IA	OB	CO	RN	EU	SD	MD	CC	TC	DR	RI	IF
Investment in Intangible Assets (IA)	0.42**												
Opportunistic Behavior (OB)	0.22**	-0.20**											
Contracts (CO)	0.39**	0.32**	0.01										
Relational Norms (RN)	0.26**	0.55**	-0.21**	0.48**									
Environmental Uncertainty (EU)	0.09	-0.14	0.31**	0.07	-.08								
Supplier's Dependence on Manufacturer (SD)	0.22**	0.31**	0.24**	0.21**	0.25**	0.15							
Manufacturer's Dependence on Supplier (MD)	0.21**	0.30**	.144	0.19**	0.40**	0.05	0.48**						
Coordination Costs (CC)	0.21**	0.15	.516**	0.13	0.05	0.19**	0.31**	0.28**					
Transaction Costs (TC)	0.27**	-0.05	.697**	0.09	-0.13	0.37**	0.29**	0.15	0.61**				
Duration of Relationship (DR)	0.04	0.16	-.296**	0.16	0.23**	-0.07	0.02	-0.03	-0.15	-0.21**			
Duration of Respondent's Involvement (RI)	-0.10	0.13	-.302**	0.01	0.18**	-0.09	0.02	-0.05	-0.15	-0.17	0.60**		
Industry Future (IF)	0.13	0.43**	-.345**	0.28**	0.49**	-0.21**	0.24**	0.30**	0.01	-0.23**	0.25**	0.19**	
Mean	4.56	5.27	3.80	4.68	5.20	3.51	4.30	4.80	4.31	3.94	5.66	3.35	5.03
Standard Deviation	1.34	1.07	1.43	1.11	0.91	1.31	1.08	1.06	1.15	1.34	3.79	2.27	1.11

Notes: TA means investments in tangible assets. **: p<0.05; ***: p<0.01

in contracts and using unexpected events to extract concessions from the supplier.

Contracts. This scale was developed based on the studies by Jap and Ganesan (2000) and Cannon, et al. (2000). The items reflect the extent to which the supplier and the manufacturer use explicit and detailed written contracts to coordinate the supply chain relationship.

Relational Norms. Relational norms include information exchange, participation, solidarity and flexibility (Heide & John, 1992; Jap & Ganesan, 2000). In order to measure these constructs, the items reflect the extent to which each partner is willing to provide information to the other partner, provide suggestions and recommendations about the other partner's business, make efforts directed toward preserving the relationship and make good faith adjustments when facing uncertainties.

Control Variables: Because the dependent variables may be affected by factors outside the model, additional variables of less conceptual interest were included, in order to properly specify the equation. Because dependence between supply chain partners is regarded as central to understanding and explaining supply chain partners' behaviors (Adnaleeb, 1996), we included the manufacturer's dependence on the supplier and the supplier's dependence on the manufacturer. Previous studies have argued that the environmental context, such as a gloomy industry forecast, may influence partners' behavior (Joshi & Campbell, 2003; Wuyts & Geyskens, 2005), in particular, opportunistic behavior (Heide, 1994; Wuyts & Geyskens, 2005). In contrast, if the industry is perceived as having a bright future, the supplier and manufacturer may be more likely to engage in cooperative behavior. Thus, perception of both environmental uncertainty and the future of the industry were included as control variables. Exchange history may also affect the behavior of supply chain partners (Dwyer, Schurr & Oh, 1987), and the length of their interaction may influence how they coordinate their exchange (Johnson, 1999), which can further influence the potential for opportunistic behavior. Thus, relationship length and the length of time that respondents have been involved in the relationship were taken into consideration. Finally, the complexity of the exchange may affect the behavior of supply chain partners (Kim & Hsieh, 2003), thus, coordination and transaction costs were taken into consideration.

There was the potential for common method bias, since the responses measuring all of the constructs were taken from the same questionnaire. If common method bias was a serious problem, we would expect a single factor to emerge from a factor analysis or one general factor to account for most of the covariance in the independent and criterion variables (Podsakoff & Organ, 1986). Thus, we performed factor analysis on items related to the predictor variables and criterion measures. No general factor was apparent in the unrotated factor structure; therefore, no common method variance problem was detected.

Measure Validation

The measurements were subjected to several forms of reliability and validity analysis prior to testing the hypotheses. Content validity was assured by a comprehensive review of the literature and adoption of existing scales, whenever possible. Furthermore, we conducted a pretest and in-depth interviews with ten suppliers randomly chosen from APPCOM's suppliers. We administered the original questionnaire and asked for their evaluation of it, assessing the appropriateness of the terminology used, the clarity of the instructions, the response formats and the relevance of the items to supply chain practice. Based on the pilot study and the respondents' feedback, we modified the wording of scale items, directions and other survey procedures. We then pilot tested the questionnaire with 15 randomly chosen suppliers, and their feedback showed that there were no significant problems with the questionnaire.

Item-to-total correlations and exploratory factor analyses were performed to purify the

measurement items. Items with item-to-total correlations below 0.4 or high cross-loadings were dropped. Reliability estimates were computed using Cronbach's alpha. All values were above 0.7, indicating high internal consistency. The factor unidimensionality of the entire set of items was demonstrated by their high loadings on the intended factor and low loadings on the other factors and assessed using confirmatory factor analysis (CFA). Chi-square values for the model were significant for the data (χ^2=464.83, χ^2/df=2.60, p=0.000), and the other indices likewise showed a good fit (NFI=0.91, NNFI=0.93, CFI=0.94, IFI=0.94, RMSEA=0.078). Convergent validity was also measured by using CFA. The factor loadings were all significant (Bagozzi & Yi, 1988; Fornell & Lacker, 1981) and greater than 0.5, except for one item related to coordination cost, which was a control variable (see Figure 4). The average variance extracted was greater than 40% for each scale, indicating that the measurement items adequately measured the constructs.

Discriminant validity was assessed in several ways. First, we assessed whether the 95% confidence interval of the correlations between all pairs of factors included 1.0. None did, indicating good discriminant validity (Anderson & Gerbing, 1988). Second, we built a constrained CFA model, in which correlations between each of the possible pairs of the constructs were set to one. This was compared with the original unconstrained model, in which the correlations were freely estimated. All the chi-square differences were significant (O'Leary-Kelly & Vokurka, 1998), indicating discriminant validity.

ANALYSIS AND RESULTS

The analysis began with calculation of the mean, standard deviation and correlations among all constructs and variables, presented in Figures 5, 6, and 7. The hypotheses were tested using hierarchical regression, where the dependent variable was opportunistic behavior by the manufacturer. In order to mitigate the potential for multicollinearity, the independent variables were mean-centered prior to the regression analysis (Aiken & West, 1991). In the first step, the control variables were entered into the equation. As expected, the regression equation was significant. However, environmental uncertainty, suppliers' and manufacturers' dependence and duration of the relationship were not significant. Next, the main independent variables (investment in transaction-specific tangible and intangible assets) were entered into the equation, and the resulting regression equation was significant. The R^2 value increased significantly from Model 1 to Model 2, indicating significant main effects. In the third step, the moderating variable main effects (contracts, contracts squared and relational norms) were entered into the equation. Although the resulting regression equation was significant, the F-test for the change in R^2 indicated that Model 3 and Model 2 were not significantly different, thus the addition of contracts, contracts squared, and relational norms did not add to the predictive ability of Model 2. In the final step, the interaction terms were entered into the equation, and the overall model was significant. In addition, the R^2 value increased significantly from Model 3 to Model 4, indicating significant interaction effects. These results are summarized in Figure 8.

$H1_a$ and $H1_b$ addressed the relationship between a supplier's investment in transaction-specific tangible and intangible assets and opportunistic behavior by the manufacturer. The empirical findings showed that, without considering the moderating effects of contracts and relational norms, the supplier's investment in transaction-specific *tangible* assets was associated with an increase in opportunistic behavior by the manufacturer. In contrast, the supplier's investment in transaction-specific *intangible* assets was associated with a decrease in opportunistic behavior by the manufacturer. Thus, H_{1a} and H_{1b} were both supported.

H_{2a} and H_{2b} predicted that contracts would moderate the relationship between the supplier's

Figure 5. Construct measurement summary

Item	Cronbach's α	Factor Loading	AVE (%)	CR
Transaction-Specific Investment in Tangible Assets We have a significant investment in production facilities (plant) dedicated to supplying this particular customer.	.86	.78	66.31	.86
We have contractually dedicated a portion of our plant to producing product only for this customer		.79		
We have significant investments in shipping and distribution equipment tailored to supplying this customer		.87		
Transaction-Specific Investment in Intangible Assets Because of our close working relationship with this customer, it would be difficult to switch to another customer.	.73	.60	50.60	.75
Personnel from our firm have become accustomed to working with this customer.		.85		
It takes a lot of time and effort to learn the "ins and outs" of this customer's organization that we need to know to be effective.		.66		
Opportunistic Behavior This customer lies about certain things, in order to protect their interests.	.92	.83	70.11	.92
This customer sometimes promises to do things without actually doing them later.		.77		
This customer sometimes tries to breach informal agreements between our companies, to maximize their own benefit.		.90		
The customer will try to take advantage of "holes" in our contract, to further their own interests.		.88		
This customer sometimes uses unexpected events to extract concessions from our firm.		.82		
Contracts Our relationship with this customer is governed primarily by written contracts.	.71	.69	44.53	.71

Figure 6. Construct measurement summary

Item	Cronbach's α	Factor Loading	AVE (%)	CR
The only way we seem to communicate effectively with this customer is when everything is spelled out in detail.		.63		
This customer and we emphasize written contracts that include all the details of our cooperation.		.68		
Relational Norms We'll provide this customer with much important information, if needed.	.87	.62	47.94	.87
This customer and we frequently provide information that might help the other party, through conversation and written materials.		.75		
It is expected that we keep each other informed about events or changes that may affect the other party.		.73		
We generally accept this customer's suggestions about production and delivery.		.71		
We play an active role in this customer's research and development activities.		.59		
The parties expect to cope with unexpected circumstances with flexibility.		.60		
Problems that arise in the course of this relationship are treated by my firm and this customer as joint.		.74		
Environmental Uncertainty Our competitive environment is very uncertain.	.84	.57	44.75	.76
Product demand is very uncertain.		.85		
Our technology environment is very uncertain.		.80		
Our industry environment is very uncertain.		.79		
Supplier's Dependence on Manufacturer We would make a lot of effort to find a new customer, if the relationship with this customer were terminated.	.75	.57	47.44	.78
We need this customer's key technology and resources.		.53		
We would suffer greatly if we replaced this customer.		.83		
This customer has a great impact on our decisions.		.71		
Manufacturer's Dependence on Supplier This customer would make a lot of effort to find a new customer, if the relationship with us were terminated.	.80	.64	42.80	.74

Figure 7. Construct measurement summary

Item	Cronbach's α	Factor Loading	AVE (%)	CR
This customer needs our key technology and resources.		.76		
This customer would suffer greatly, if it lost our relationship.		.74		
We have a dominant position in the relationship and play a critical role.		.61		
Coordination Costs There are a lot of cooperative and coordinative costs during our exchange relationship.	.74	.37	56.60	.80
This customer and we often disagree on the issues in the exchange relationship.		.63		
It takes a long bargaining procedure to achieve agreement.		.85		
Our exchange includes complex technology and other things.		.68		
Transaction Costs There are a lot of disagreements during writing contracts.	.80	.73	57.99	.84
Contracts always need modification while being executed.		.80		
We take a lot of unnecessary time in balancing accounts with this customer.		.73		
Duration of Relationship	--		--	
How long have you had a relationship with this customer?		--		
Duration of Respondent's Involvement How long have you been involved in the relationship with this customer?	--	--	--	
Industry Future The future of the industry in which we collaborate with the customer is bright.	--	--	- -	

Notes: CR refers to composite reliability. According to the procedures outlined by Fornell and Lacker (1981), the CR or construct η is $CR_\eta=(\Sigma\lambda y_i)^2/[(\Sigma\lambda y_i)^2+(\Sigma\varepsilon_i)]$,
where λy is the standardized loading for scale item y_i, and ε_i is the measurement error for scale item y_i.

Figure 8. Multiple regression results for opportunistic behavior

	Model 1		Model 2		Model 3		Model 4	
	Standardized Coefficients	t	Standardized Coefficients	t	Standardized Coefficients	t	Standardized Coefficients	t
Control Variables Environmental Uncertainty	0.032	0.660	0.009	0.184	0.002	0.047	0.008	0.173
Supplier's Dependence on Manufacturer	0.076	1.444	0.108	2.072**	0.099	1.860	0.067	1.249
Manufacturer's Dependence on Supplier	0.050	0.971	0.062	1.220	0.060	1.142	0.054	1.031
Coordination Costs	0.164	2.852***	0.194	3.461***	0.200	3.530***	0.244	4.195***
Transactional Costs	0.473	7.688***	0.420	6.818***	0.415	6.647***	0.390	6.196***
Duration of Relationship	-0.037	-0.654	-0.040	-0.727	-0.038	-0.679	-0.035	-0.638
Duration of Respondent's Involvement	-0.128	-2.322**	-0.099	-0.834	-0.099	-1.814	-0.109	-1.996**
Industry Future	-0.233	-4.562***	-0.190	-3.695***	-0.188	-3.526***	-0.173	-3.269***
Main Effects Investment in Transaction-Specific Tangible Assets			0.131	2.622***	0.142	2.695***	0.123	2.100***
Investment in Transaction-Specific Intangible assets			-0.215	-3.965***	-0.194	-3.271***	-0.256	-3.800**
Contracts					-0.019	-0.348	-0.112	-1.743
Contracts Squared					-0.051	-1.056	-0.089	-1.636
Relational Norms					-0.024	-0.384	-0.004	-0.066
Moderating Effects Tangible Assets * Contracts							-0.096	-1.843
Intangible Assets * Contracts							0.147	2.241**
Intangible Assets* Contracts Squared							0.153	2.259**
Tangible Assets * Relational Norms							0.005	0.097
Intangible Assets * Relational Norms							-0.152	-2.537**
Adjusted R^2	.60		.61		.61		.63	
F for Adjusted R^2	37.97***		34.11***		26.12***		20.24***	
ΔR^2	--		.01		.00		.02	
F for ΔR^2	--		4.12**		.37		2.53**	

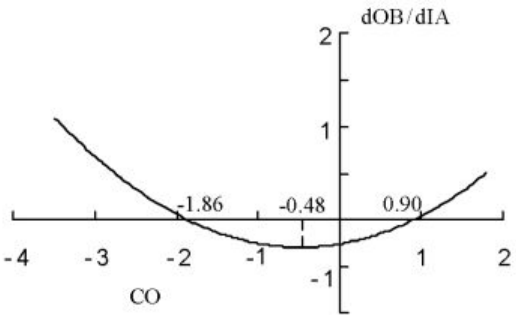
Notes: **: p<0.05; ***: p<0.01

investment in transaction-specific assets and opportunistic behavior by the manufacturer. A true moderating effect is indicated by a variable whose main effect was insignificant in Model 3, but whose interaction effect was significant in Model 4. Our empirical findings revealed that contracts did not significantly moderate the relationship between investments in *tangible* assets and opportunistic behavior by manufacturers, but did significantly moderate the relationship between investments in *intangible* transaction-specific assets and opportunistic behavior. While there was not a significant linear or nonlinear main effect for contracts in Model 3, the interaction terms for intangible assets and contracts and intangible assets and contracts squared were both statistically significant in Model 4. Thus, the use of contracts moderated opportunistic behavior by the manufacturer in the presence of the supplier's investment in transaction-specific intangible assets in a nonlinear fashion.

This relationship is illustrated in Figure 9, which plots the partial derivative of the manufacturer's opportunistic behavior against transaction-specific intangible assets over contracts. The value dOB/dIA (OB=opportunistic behavior; IA=investment in transaction-specific intangible assets) represents the slope of the linear relationship between opportunistic behavior and investment in transaction-specific intangible assets. Figure 9 shows that this is a U-shaped function. When contract detail is low, the slope is positive, indicating that increased investment in transaction-specific intangible assets increases the manufacturer's opportunistic behavior. As contract detail increases, however, the undesirable (positive) effect of transaction-specific investment in intangible assets on opportunistic behavior decreases. When contract detail is greater than 2.82 (centered score greater than -1.86), the slope becomes negative, which means that an increase in investment in transaction-specific intangible assets is associated with less opportunistic behavior by the manufacturer. However, as contract detail increases further and reaches 5.58 (centered score greater than +0.90) or above, the slope becomes positive again and greater investment in transaction-specific intangible assets is again associated with greater opportunistic behavior. Figure 9 shows that only when there is a moderate level of contract detail (2.82<contract detail<5.58) will the supplier's investment in transaction specific intangible assets be associated with less opportunistic behavior by the manufacturer, as we hypothesized in H1b. When contract detail is low, the use of a contract can mitigate the undesirable (positive) effect of investments in transaction-specific intangible assets on the opportunistic behavior by the manufacturer because it provides a guiding framework for the relationship and enhances the understanding by the partners, helping them to adjust their expectations about each other. If a contract is too detailed and stringent, it signals distrust and reduces normative relationship commitment, and thus opportunistic behavior in the presence of investments in transaction-specific intangible assets increases. Our empirical results support H_{2b}, but not $H2_{a}$.

H_{3a} and H_{3b} explored the moderating effect of relational norms on the relationship between the supplier's investment in transaction-specific

Figure 9. Impact of contracts (CO) on the relationship between investments on transaction-specific intangible assets (IA) and opportunistic behavior (OB) by the manufacturer. (Note: The lowest point is 4.20; centered score is -0.48)



tangible and intangible assets and opportunistic behavior by the manufacturer. Our results indicated that relational norms did not have a significant main effect in Model 3; however, the interaction between intangible assets and relational norms was significant in Model 4, indicating a moderating effect. The interaction of tangible assets and relational norms was not statistically significant. As expected, an increase in relational norms enhances the desirable (negative) effect of the supplier's investment in transaction-specific intangible assets on opportunistic behavior by the manufacturer. However, relational norms did not moderate the relationship between the supplier's investment in transaction-specific tangible assets and opportunistic behavior by the manufacturer. Thus, while H_{3a} was not supported, H_{3b} was supported.

DISCUSSION

We studied the relationship between a supplier's transaction-specific investments in tangible versus intangible assets and opportunistic behavior on the part of the manufacturer. We also examined the moderating effects of contracts and relational norms on those relationships. Our empirical findings supported the conceptual model and corresponding hypotheses, for the most part. These findings are important because they shed new light on the relationship between transaction-specific investments and opportunistic behavior.

This research makes several contributions to the literature on supply chain management and TCE. First, it examined the relationship between investment in transaction-specific assets and opportunistic behavior in greater detail than has been done previously, by including asset tangibility. Second, it conceptualized and empirically tested the moderating effect of contracts on the relationship between investments in transaction-specific assets and opportunistic behavior as a complex relationship. Third, it explored relational norms and their moderating effect on this relationship. These findings open the door to explaining some of the contradictory findings from the previous research on the relationship between investments in transaction-specific assets and opportunistic behavior. Each of these contributions is elaborated upon below.

Transaction-Specific Investments and Opportunistic Behavior

Our findings contribute to the literature by demonstrating that whether or not a partner engages in opportunistic behavior is influenced by the tangibility of the transaction-specific asset investments. TCE's predictions hold true for tangible assets; when a supplier invests in tangible assets, the manufacturer will be tempted to engage in opportunistic behavior. However, when the supplier dedicates intangible assets to a relationship, such investments serve to constrain the manufacturer's opportunistic behavior, with the proper level of contract detail as a safeguard. These findings help to explain the previous conflicting literature and advance the knowledge about the effects of both asset specificity and asset tangibility on opportunistic behavior.

Moderating Effect of Contracts

This research also provides new insights into the role of contracts in moderating this relationship. From a theoretical perspective, much of the previous research has argued that contracts should reduce opportunistic behavior, however, this has been only inconsistently supported by empirical results. For example, Achrol and Gundlach (1999) found no significant moderating effect of contracts on the relationship between transaction-specific investments and opportunistic behavior. Jap and Ganesan (2000) found that contracts and relational norms had no significant moderating effect in the overall sample. However, in the exploration, buildup and decline state of the phases of evolv-

ing relationships, relational norms did have a significant moderating effect. Contracts had a significant moderating effect in the exploration and decline stages.

Our research helps to resolve these inconsistencies by examining the tangibility of transaction-specific asset investments. When a supplier invests in transaction-specific *tangible* assets, the use of contracts is not effective in discouraging opportunistic behavior by the manufacturer. However, when a supplier invests in transaction-specific *intangible* assets, the employment of contracts has a more complex effect. A contract that is too general does not provide an effective framework for what the supply chain should and should not do. In this case, increasing the detail of the contract will help to mitigate the undesirable (positive) effects of intangible transaction-specific investment on opportunistic behavior. When an appropriate detail is specified in a contract, the supplier understands the expectations and requirements of the manufacturer, and the manufacturer will have more realistic expectations about the supplier. Therefore, the use of more detailed contract serves to intensify the inverse relationship between transaction-specific investments in intangible assets and opportunistic behavior. If the contract is too detailed, however, further increases in the level of detail will enhance the undesirable effects of intangible transaction-specific investment on opportunistic behavior. After some point, the use of very detailed contracts counteracts the inverse relationship between transaction-specific investments in intangible assets and opportunistic behavior by the manufacturer. Although the use of contracts has the potential for reducing opportunistic behavior by a manufacturer in the presence of a supplier's investment in transaction-specific intangible assets, if the contract is too stringent, it can have the opposite effect. These findings make an important contribution toward explaining why TCE's predictions have not been supported by previous empirical research.

There are a number of reasons that can potentially explain the behavior of contracts in this research. First, this research was conducted in China, and contracts may function differently in China than they do in Western countries. Historically, contracts have been perceived as being used primarily by foreigners to take advantage of Chinese companies and managers, so contracts may not be trusted. In addition, the Chinese government has historically been unreliable in enforcing contractual specifications (Wong, et al., 2005). In fact, there is evidence that, in the presence of a non-supportive or erratic government, personal relationships emerge as a more important governance mechanism than contracts (Pearce, 2001 a, b; Rao, Pearce & Xin, 2005). Thus, the findings about contracts might not be generalizable outside of China.

Second, it is unclear what the relationship between the level of detail in a contract and the specific situation is. For example, a contract may be extremely stringent because it needs to be, based on past behaviors by the manufacturer. Thus, its decline in effectiveness may be related to the manufacturer's continuing with its opportunistic behavior despite the presence of a contract. Third, contracts exist between two parties. A contract may be written from the perspective of the supplier, from the perspective of the manufacturer, or in a way that benefits both parties. Thus, the mere existence of a contract does not guarantee that it was written in a way that would protect the supplier from opportunistic behavior by the manufacturer. Fourth, our measure did not assess the duration of the contract. Trust may be built through repeated interactions and repeated contracts. Thus, trust may be an intervening variable. Although our findings regarding the use of contracts are somewhat counterintuitive, they raise many questions that provide a foundation for future research.

Moderating Effects of Relational Norms

Our findings help to address the conflicting literature by indicating that the presence of relational norms will intensify the inverse relationship between investments in transaction-specific intangible assets and opportunistic behavior. In other words, relational norms moderate this relationship only when it involves intangible assets, making opportunistic behavior by the manufacturer even more unlikely. These findings imply that relational norms have a differing impact in safeguarding against a manufacturer's opportunistic behavior, dependent on the tangibility of the transaction-specific assets. Although we had hypothesized that relational norms would constrain a manufacturer's predicted opportunistic behavior, based on the supplier's investment in tangible assets, this was not supported. Because tangible assets are visible and physical, investments in them are generally made at the beginning of a supply chain relationship, often in order to secure the relationship. Because the supplier and the manufacturer are less familiar with each other at that point, the relationship is not characterized by solidarity or full information exchange. Thus, relational norms have not been established at the time that the investment is made. It makes sense, then, that the supplier's subsequent development of relational norms will not reduce the manufacturer's opportunistic behavior. Although relational norms are informal control mechanisms, relying on self-control to govern a supply chain relationship (Heide, 1994; Dyer & Singh, 1998), they do not have the power to compel behavior. Knowledge of this allows the manufacturer to engage in opportunistic behavior when relational norms have not been fully formed.

MANAGERIAL IMPLICATIONS

The findings in this chapter provide important guidelines for managers on how to effectively employ contracts and relational norms to safeguard against the potential for opportunistic behavior, in light of their investments in transaction-specific assets. Related research and practice have indicated that transaction-specific investments are a key component in establishing harmony and a successful supply chain relationship (for example, Jap, 1999; Rokkan, et al., 2003). By examining the relationship between investments with different levels of asset specificity and asset tangibility and opportunistic behavior, this research leads to the development of guidelines for suppliers striving to protect against opportunistic behavior by their supply chain partners.

Our findings about the moderating effect of contracts and relational norms on the relationship between transaction-specific investments in tangible assets and opportunistic behavior are particularly enlightening. We found that neither contracts nor relational norms were effective in moderating the relationship between investments in transaction-specific tangible assets and opportunistic behavior. Thus, managers need to consider other safeguarding mechanisms, such as hostage and ownership mechanisms, for moderating this relationship. Hostage, or pledge, mechanisms are actions taken by one party to show good faith and intention to maintain a relationship (Anderson & Weitz, 1992; Jap & Ganesan, 2000). In most cases, hostage mechanisms are operationalized as the other party's (the manufacturer) investment in transaction-specific assets, which Heide and John (1998) termed offsetting investments. Ownership, or vertical integration, is when a firm decides to own its factors of production as a means of forestalling opportunistic behaviors (Brown, Dev & Lee, 2000).

In contrast, because transaction-specific investments in intangible assets reduce the potential for opportunistic behavior with the proper use of contracts, suppliers should consider investing in transaction-specific intangible assets, in their effort to integrate with their customers. They should also carefully consider the appropriate level of

detail and extent of reliance on the contract as the safeguarding mechanism for the relationship. If employed properly, contracts and relational norms will increase the effectiveness of investments in transaction-specific intangible assets in curtailing opportunistic behavior. However, the use of contracts that are too specific should be avoided because they will weaken the effectiveness of the transaction-specific investments in intangible assets in reducing opportunistic behavior.

LIMITATIONS AND FUTURE RESEARCH

Although this chapter contributes to the research on supply chain relationships and provides useful managerial implications, there are nonetheless some limitations which should be addressed in future research. This study lays a foundation for studying investments in transaction-specific assets by suppliers and the resulting potential for opportunistic behavior by manufacturers, however, TCE suggests that the balance of investment in transaction-specific assets may be weighted toward either the supplier or the manufacturer and that opportunistic behavior is associated with the other partner. Future research will benefit from expanding upon the supplier-focused work in this research to study this relationship from the perspective of the manufacturer (opportunistic behavior by the supplier) and more complex reciprocal relationships.

Although we considered the tangibility of transaction-specific investments, opportunistic behavior was considered as a unidimensional construct. Some previous studies have argued that there may be different types of opportunistic behavior. For instance, Wathne and Heide (2000) discussed active and passive types of opportunistic behavior. It is possible that investment in tangible versus intangible transaction-specific assets will be related to active versus passive opportunistic behavior in different ways. Future research should distinguish between types of opportunistic behavior and further investigate the impact of investments in transaction-specific asset tangibility. This will provide a new understanding about the relationship between transaction-specific investments and opportunistic behavior.

In addition, our model considers the moderating effect of contracts and relational norms on the relationship between different types of transaction-specific investments and opportunistic behavior, since they are the most popular governance mechanism in practice (Cannon, et al., 2000). However, we found that these governance mechanisms were not effective in moderating the relationship between investments in transaction-specific tangible assets and opportunistic behavior, although they were effective in moderating the relationship between transaction-specific intangible investments and opportunistic behavior. There may be other governance mechanisms which moderate this relationship, for example, hostage (i.e., transaction-specific investments made by the manufacturer) (Anderson & Weitz, 1992; Jap & Ganesan, 2000) and ownership (i.e., vertical integration) (Brown, et al., 2000) mechanisms. Future research should account for the effect of additional types of control mechanisms in preventing opportunistic behavior due to investment in transaction-specific assets.

The universal significance of the findings may be constrained by the nature of the sample, which is drawn from the household appliances sector in China. For instance, the very rapid growth of China's economy could be a contributing factor in the opportunistic behavior of manufacturers. In addition, national culture may be important in this relationship. China's highly collectivist national culture may help facilitate the development and role of relational norms, reducing opportunistic behavior (Ryu, Han & Frank, 2006). Therefore, it is important that the conceptual model and corresponding hypotheses are tested using data collected from other industries and in other countries.

Future research should also examine this relationship from the perspective of the manufacturer's investment in transaction-specific tangible and intangible assets and the resulting potential for opportunistic behavior by suppliers. Indeed, there are many examples of opportunistic behavior by suppliers, and it will be useful to study the importance of the tangibility distinction on manufacturers' investments in transaction-specific assets.

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Section 5
Organizational and Social Implications

This section includes a wide range of research pertaining to the social and behavioral impact of Human Resources Management around the world. Chapters introducing this section critically analyze and discuss trends in Human Resources Management, such as transnational learning, collaboration, action research, and SME success factors. Additional chapters included in this section look at ICT policies and organizational justice. Also investigating a concern within the field of Human Resources Management is research which discusses the effects of trust in Human Resources Management. With 10 chapters, the discussions presented in this section offer research into the integration of global Human Resources Management as well as implementation of ethical and workflow considerations for all organizations.

Chapter 43
Transnational Learning and Collaboration in Delivering MBA Programs in Emerging Markets: The Challenge of National Culture

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ABSTRACT

This case focuses on the challenges of delivering Western-style MBA programs in emerging markets, looking at the experience of the Researcher in teaching and assessing courses within management programs (especially in Organizational Behavior and Human Resource Management) and in thesis and dissertation research and writing. The case considers: cultural differences, learning style differences, language differences, economic backgrounds of students, classroom behavior and etiquette, involvement in the learning process, teaching methods, the teacher and the students, group work, examining and evaluating, assignments, projects and reports, theses and major pieces of research-based work, life in the classroom, inter-student behavior, and life out of the classroom. The case focuses on MBA course delivery in China, the Arab World, Africa, Iran, Malaysia and Indonesia, Vietnam, Eastern Europe, former Russian states such as Kazakhstan, and South America, such as Peru and Suriname. Examples of specific MBA teaching and assessment are provided to give in-depth insights into the issues involved.

ORGANIZATION BACKGROUND

The organization under reference in this case is one of the leading Schools of Management in the Netherlands. The school has more than 20 transnational learning collaborations across the developing world. Some of these collaborations have been in operation for over ten years and have produced as many as 1,000 MBA graduates per single academic partnership. Overall, nearly 1,000 graduates emerge from all the collaborations annually.

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SETTING THE STAGE

MBA programs from "the West" are now increasingly being delivered in emerging markets, such as in Asia, Africa and Middle East. An MBA from a reputable and accredited international business school or university enables students in these countries to join international companies, become expatriates, earn significantly more money, and gain elite status in society. For the MBA providers, this expansion possibility internationally – together with online and distance courses – can facilitate these business schools and universities to increase revenues and remain competitive. This can be both outbound – the providers go to them – and inbound – they come to the providers. Here, the focus is on the former scenario – transnational learning provided by the School of Management considered here through collaboration with partners (mostly other universities or business schools) in China and the countries of Africa, The Middle East, South-East Asia, South America, Eastern Europe, etc.

CASE DESCRIPTION

The following case study has been based on the experience of the Researcher in four and a half years of teaching around the world, following four years of delivering "Western" style MBAs whilst based in one of the countries of the Middle East.

MBA program delivery outbound to emerging markets can present completely new challenges, especially for faculty. The students behave in completely unexpected ways, and demand unheard of – and sometimes quite unacceptable – new arrangements. These can include issues of academic integrity and other matters relating to academic standards. The students ask for special treatment with more time to finish assignments and examinations, want to attend less than the full hours of study, expect compromising insights into the assessment items, resist individual accountability, refuse to accept rules about plagiarism, and admire those who can hoodwink or otherwise undermine authority. These issues can be seen as reflecting cultural norms: high power distance, uncertainty avoidance, ascribed leadership, collectivism, synchronism and diffuseness, particularistic behaviors and other national cultural concepts identified in by theorists in the literature.

This case study has aimed to identify the cultural barriers to successful MBA delivery in emerging market contexts and to recommend strategies for maintaining product quality and integrity, through evidence-based research to help decision-making for hands-on faculty members and the initiators of international partnerships, who should take these operational, delivery issues into account when preparing their strategies. This can be seen as a perspective for technology-related issues, which must take the socio-cultural-economic aspects of transnational learning initiatives into account.

In summary, the rationale for this case study stems from the fact that more and more MBA courses are being launched in emerging markets, despite the overall worldwide recession; that this represents an ongoing challenge for teachers of these courses, sometimes ill-prepared for these environments, given the lack of orientation provided to them; and the existence of considerable cross-cultural issues, which are rarely explored in detail. Teachers of executive courses, language teachers, aid workers and all visiting expatriate teachers and consultants focused on emerging market participants will also probably face these and similar issues. How can MBA faculty in particular gain insights to overcome cross-cultural barriers, keep up standards of the course and product, and manage multicultural training groups in the best way they can? Technology can be both an enabler and a barrier here. The standardization of course materials, the ability to electronically send materials in advance, the use of technology in the classroom when delivering the program – all these have benefits and drawbacks. These issues are discussed in detail in the following case.

CURRENT CHALLENGES FACING THE ORGANIZATION

The faculty members of the School of Management considered here spend much of their time teaching MBA (and doctoral-level, DBA) courses to emerging market students in their own locations, at the premises of the partner institution. Through trial and error and some sharing of experiences, the faculty members encounter (and try to cope with) many challenges. In some countries, these challenges include technology-related issues based on intermittent electricity supply, lack of internet connectivity, supply of outdated hardware and software and lack of funds to purchase laptop computers, etc. Other countries have advanced technology but significant language barriers (all the courses are taught in English). Some countries experience students using technology to circumvent accurate assessment (i.e. cheating such as plagiarism). But this mostly tacit knowledge of these challenges and how to deal with them is rarely shared outside the organization – hence this case study.

Most of the research on the challenges of teaching MBA students seems to be focused on the USA and Europe, without much attention to emerging market MBA students, despite impressive statistics, and upward trends in emerging-market student MBA enrollments.

However, there are significant cultural barriers to successfully delivering MBAs to emerging-market students. There are issues in terms of creating sustainable programs which build local capacity, of both faculty and students, including developing the necessary technology. There can be pressure to compromise on academic standards. Many students are unable to successfully complete the programs. Some of these programs are failing and closing, and even this school – which enjoys a strong track record of partnerships – has to pull out of a program occasionally. More practical insights are needed into many aspects of these programs, including the critical issue of cultural challenges in program delivery. The faculty members involved in this delivery process, often finding themselves the bastions of the academic standards of the MBA provider, are trying to prevent "the debasing of the coinage" – yet most MBA deliverers in emerging markets are "reinventing the wheel". They do not often learn from their predecessors (many of whom are unknown to them, are competitors, and as mentioned above, the most vital knowledge is of a tacit nature). There is a particular concern among many faculty with cultural differences and attitudes which can compromise the quality of the product which the provider has developed and on which its reputation depends.

TRANSNATIONAL LEARNING AND COLLABORATION ISSUES

Cultural Differences

In coping with these issues, there is a need to basically understand the theoretical framework to national cultures: power distance, uncertainty avoiding behaviors, individualism and collectivism, sequential and synchronistic behaviors and other dimensions, derived from theorists such as Hofstede (1984, 1991, 1993) and Trompenaars (1997). This basic understanding of cross-cultural management theory can help, but it won't guarantee success – cultural stereotypes can be misleading and all students are different – especially would-be MBAs, always the elite of the local society. It is clearly important for teachers to be culturally sensitive, as there is a heightened risk of exposure of cultural prejudices, which might be tolerated at the home campus. The relevance of the historical, social, political and religious context of each country must be appreciated, as these can impact on students. Technology tends to straddle different cultures, and possession of the latest technological aids is a source of status to consumer-conscious and social-climbing MBA students in emerging markets. They expect teach-

ers coming from the West to understand and use the latest teaching technology. They criticize local teachers for old-fashioned 'chalk-and-talk' methods, and look to visiting foreign professors to use web-based materials, interactive technology, video-clips and other multimedia teaching aids. This is particularly challenging when the teaching environment provided by the local partner lacks a reliable electricity supply and internet connection. The visiting faculty member is then the butt of complaints, most of which are completely outside his or her domain.

Learning Style and Content Differences

This former issue of learning style can have a relationship with culture, in terms of preferences for visual, aural, oral, and written information and learning materials. The ways in which students learn in emerging market environments and the ability to concentrate, and the length of concentration span, often have a cultural dimension. In the latter issue of content differences, for many faculty members, the challenge of arousing interest and creating curiosity in presenting completely new material, which may be unrelated to the experience of the students, is always there. Taking ideas imported from the West, including concepts of employee empowerment and autonomy, and presenting these in command-and-control leadership environments, is often received with incomprehension, doubt or hostility – or all three emotions. The use of technology here can help visually-oriented students and can be used to present course content in a way which can be more attractive and acceptable than in a plain written/printed format. However, there can be a danger of over-simplification of material, the use of distracting transitions and animations obscuring real information, and more interest in the delivery vehicle than the content.

Language Differences

The implications of teaching courses in English when many of the students are not fully conversant in the language; the use of group-based and practical study techniques to allow participants and students to operate in their own language; the challenges of teaching through a translator/interpreter; the assessment of the work of these participants and students, alone and in partnership with local teachers; the teacher's need to understand the classroom discussions, when these need to be translated back; these are all important transnational learning issues. Sometimes the pronunciation of English by some students is more challenging to visiting professors than the students' vocabulary or grammar. Some students, especially from wealthier backgrounds, have been toying with the use of speech-recognition technology to save their time in transcribing interviews, etc. When inadequately edited by the students, this creates challenging reading for the faculty members.

Economic Backgrounds

The socio-economic level of the students and participants, in terms of being hard-working achievers or wealthy aristocrats, is a further issue. Study time can involve a sacrifice of much-needed potential income for some students; others expect to buy qualifications without studying, like buying a new car. There is a further challenge in teaching and assessing members of the country's royal family, who own the university, for example. All of these issues can compromise the fair and meritocratic treatment of students in the teaching process. The more wealthy students have access to a higher level of technology, so it can be seen as important for teachers to create a level playing field for all participants in the program.

Classroom Behavior and Etiquette

This issue includes attendance, punctuality, mobile phone usage; emailing and sending text messages during class-time; side-talking; the constant in-and-out of the classroom behavior of students making and receiving phone calls, and smoking and chatting outside the classroom regardless of official breaks. The tolerance of lax classroom discipline can lead to tolerance of non-completion of assessment items, late submissions and a feeling by students and participants that they can get their MBA Certificate and still get away with whatever they like. Many students in emerging markets are trying to demonstrate their perceived higher status in society, or are showing their attitude of 'buying' their qualifications, and thus disregarding the authority of their teachers. Other cultures show an immediate respect for their teachers, which can be sustained throughout the course or can be lost when the teacher is perceived to be indulgent and easy-going. The use of individual communications technology in the classroom – which many faculty members did not experience when they were students themselves – puts more pressure on teachers to either 'act the policeman' and ban these items – or try to make the class sufficiently interesting to hold the students' attention.

Involvement in the Learning Process

Related to the above points, this issue considers classroom behavior during instruction, including the students making notes or just sitting at the desk; and the presence or absence of learning accessories, such as pen and paper, or just mobile phone and car keys. What is the attitude of students to their classroom experience in terms of expectation of entertainment value, or of the need to work and study? Is there a preference for "interesting" classes, or desire to maximize potential learning by attending all classes, whatever the subject might be? How do the students feel about the sharing of ideas, or do they prefer to keep quiet and wait for others? Do they expect the teacher to provide all of the learning opportunities, and show scant regard for the contributions of other students, such as side-talking whilst other students are speaking in class? Do the students tend to actively participate in the class or do they think that being an empty vessel into which information should be poured is OK? All these issues can result in variations in student performance which does not necessarily reflect an accurate summary of their academic abilities, and can also be reflected in faculty evaluations. There is always the problem that many students think that if they possess the content materials – without actually reading them – then the information will magically be transmitted into their brains without any effort on their part. The same thinking applies to hard copy books and print-outs as it does to soft copy documents. When asked if they read an article sent by email, some students explain (and perhaps believe) that they downloaded it and saved it to their hard drive, which is 'doing the work' and as much as they are prepared to do!

Teaching Methods

Continuing from the point above, this issue considers the role of lectures and the degree of participation in these, in terms of asking and answering questions; the extent and nature of reading assignments; the use of handouts and textbooks and the requirement to read these; presentations with PowerPoint slides and their effectiveness; the value of cases, examples, guest speakers, videos and films, current events and newspaper clippings, and the overall need for variety in the use of teaching methods and materials. Teachers used to a high level of participation can find it difficult to vary their teaching methods to get more results, and may not give accurate marks because students are unused to their approach (as above). There is a problem with video clips that students watch them in a mindless way and switch off mentally, whereas they might be forced

to concentrate with a more conventional presentation. Business case examples – especially those presented in a visual and practical way – can be attractive to students, but many regard them as entirely academic and not relevant to their own experience. Many excellent guest speakers – with many years of experience behind them – can be interesting to students – but in some cases they are also subjected to the 'technology-test'. If their PowerPoint slides lack sophistication, if their presentation lacks any multimedia content, they can be seen as 'old-fashioned'. This is less of a problem with more mature students, who see through presentation issues and are more interested in content – but these are not necessarily the kind of students encountered in some emerging markets.

The Teacher and the Students

The impact of the personal experiences of the teacher on the learning experience, and that of the students, can be a further issue. The differing appeal of the teacher and the subject can influence the teaching outcome, and this is more the case in some cultures than in others. Some students are most influenced by the teacher, regardless of the subject. The level of dependence of the students on their teacher also varies: can they study independently or do they require a high level of direction? Students from cultures expecting a high level of 'spoon-feeding' who do not receive this can be highly critical of visiting faculty, and the latter may feel that this requirement is beyond their obligations. This can be seen in cultures where students pay their money and expect a high level of service, such as staying in a five star hotel; in other cultures the level of dependence is the same, but stems from huge respect for the teacher and reluctance to challenge his or her views. Such students are anxious to please and, being of a strong uncertainty-avoiding culture, are afraid of 'making mistakes' and 'doing the wrong thing'. Teachers from cultures which accept a high level of ambiguity can become frustrated and irritated by students insisting on a huge level of detail in every instruction, such as font size, margins and headers in an essay and exact pages of the textbook to be read for revision.

Group Work

The issue of the learning value in the interaction between group members is culturally-loaded, and teachers assuming that group work can lead to positive learning outcomes are not always on the right track. Some students show perceptions of superiority and inferiority in relationships with others, and the mixing of genders in groups can be problematic in some cultures. In Saudi Arabia, for example, there can be a screen in the classroom between male and female students, or even separate classes. Even in some of the more modern cities of the Middle East, seen as open and Western, some students refuse to sit in a mixed gender group for discussion. Experience with group projects and the perception of their value is therefore varied. Equality of contribution between group members can be an issue. There can be differing attitudes towards group-based games and simulations, in terms of taking them seriously. The attitudes towards practical activities, compared with the expectation of chalk-and-talk lecturing, can mean that although students enjoy them – particularly the visually-oriented multimedia-based exercises – they see them as entertaining rather than academically useful. There is clearly a need for careful facilitation and interpretation here. The value of group outings to companies, factories etc. can be questioned. Members of some cultures refuse to board a bus with other students, insist on coming in their own cars, and arrive late or cannot find the destination. Some cultures are much less individualistic than others, and depend on group work to get through the programs; it can be important to offset this with some individual assessments, otherwise the results may not be accurate. Some expatriate students attending classes in the countries of emerging and rich markets find

themselves doing 'all the work' for their group-mates. What you said is completely true but for publication, it can be moderated to avoid any confrontation at the later stage.

Examination and Evaluation

As this is an academic course, there will be a need for written examinations at the end of each MBA program, and this can be a challenging cultural issue. Should these assessments be held in examination conditions or as take-home exams? When operating with open-book exams, even in exam conditions, there can be issues of marking-up the textbook and bringing-in crib-sheets. Cheating and copying others during the exams can be seen as culturally acceptable, and can even be considered as admired behavior in some cultures. MBAs generally are increasingly seen as having a tendency to cheat (Reeves & Knell, 2009). The use of model exam answers is often demanded by students, who want to do everything 'exactly right'. Faculty members from different cultures are concerned with the impact on creativity and originality, especially in more 'soft skill' courses. The announcing of exam performance and the giving and receiving of feedback needs to be handled in culturally-sensitive ways, with some cultures suffering 'loss of face' with public exhibitions of their performance. This can be a very difficult issue when one student is in a more senior job and can be the manager of some of the others (see below in the country-specific cases,). Social and cultural pressure on faculty members to mark over-generously is a very difficult issue in several target countries for the MBA program. The formality of examination conditions can vary considerably and this can impact on attempts to maintain academic standards. One of the problems here can result from the attitude of partner institutions, where a business school from the West partners with a local university, and the staff of the local university collaborate with the local students to undermine the authority of the business school from the West. In some cultures, where local administrators support local students against foreign education providers, evidence of leniency in examination and evaluation of performance is common. These clearly cannot be compared with students who are very strictly monitored. This reflects the on-going problem of a lack of supervision and control from a distance.

Assignments, Projects and Reports

Attitudes by students vary here – are assignments better or worse than exams in terms of the effort involved? Are these written projects carried out in their own time easier or harder? The teaching of research and writing skills in different cultural environments can be problematic. Integrity in research and writing are culturally loaded, with varying attitudes to copyright and intellectual property ownership. The challenge of teaching referencing and the avoidance of plagiarism have been compounded by advances in technology. 'Cutting and pasting' from the internet is all too easy for students, but so is the use of plagiarism detection software by teachers. However, some 'talented' students have found a way around it, by saving an old version of their work on the internet in a website, which is then found by the search engine which then searches no further. Also, the saving of whole theses and dissertations as a.jpg file can mean that, as a picture, they cannot be searched! Many faculty members lament that such ingenuity is used for purposes of deception rather than for the pursuit of academic excellence. Attitudes to the acceptability of these practices by students can clearly impact on academic standards.

For students with comparatively weak written English, there are further issues. Problems can arise with the use of Microsoft tools such as 'SpellCheck' and 'GrammarCheck'. The students see underlining in green and red and then lack judgment about correct usage. Many incorrect words are not underlined, because although incorrect in spelling and usage, they are proper words and are

thus not detected. Many students have become lazy, expecting these tools to do their work for them. Also, the use of personal reflections, diaries and log entries is quite strange to some cultures, and can be seen as an invasion of privacy. They sometimes fear compromising organizational secrecy by discussing issues experienced by their companies. Even in an assignment read by only the foreign teacher, who knows none of the background of the company being described, they present a 'whitewashed' view, refusing to tackle contentious issues for fear of reprisals.

Theses and Major Pieces of Research-Based Work

The approach of students to long-term, lengthy and research-based projects can present even greater challenges for faculty to avoid plagiarism and copying. The task of sustaining students over two- and three- month projects, when they find it hard to concentrate for an hour at a time, can be problematic. There is a strong tendency for students to 'sub-contract' such large tasks to fellow students and 'professional' thesis and dissertation-writers. These 'providers' sometimes coach their 'customers' so successfully that it can be very difficult for the examiners to differentiate between authentic students doing their own work and those sub-contracting. In a recent series of thesis defenses in one of the country where the MBA program is running with local collaboration, there were instances of plagiarism and, indeed, were competent pieces of work. But they were not researched and written by the student with his or her name on the cover!

Behaviour in the Classroom

The use of jokes is clearly culturally difficult, and can be pointless and time-wasting if students do not understand them. The jokes told by the students are similarly often incomprehensible to the teachers. Laughing at individual students can be OK for other students, but not always for the teacher. Much humor is cruel and hurtful, with different cultures taking different attitudes to picking on each other. Acceptable subjects of conversation, during periods of small-talk during break times, can be limited; as in other situations, the weather and tourism are always safe, if boring. Religion and politics are probably to be avoided, unless the students initiate the subjects after a long period of getting to know the teacher. The challenge of remembering the names of students, especially in a big class, can be extreme. It depends on the personal experience of the teacher – some find Arabic names easy; Chinese names less so; and Vietnamese names impossible. However, the effectiveness of this technique, once mastered, can improve the ability of the teacher to manage the class effectively. Dealing with gender issues – of the faculty member and the students – can be more of a problem in some cultures than others. Women faculty can be seen as more sympathetic towards personal issues, and may be taken less seriously in some cultures. The task of failing a student can be more difficult for female teachers in the Middle East. The male student being failed can find his humiliation compounded by the gender of the teacher. The role of life in the classroom is more important to some cultures than others; some cultures find distance-learning programs requiring a level of self-starting ability and discipline beyond their inclination. They need the classroom experience to keep going.

Inter-Student Behavior

They are our friends; or they are the enemy – there can be a "them-and-us" situation between groups of students. Co-operation and competition between students can go different ways. There can be too much collaboration – when sharing the load goes too far and some students do too much work on a project, and others too little. The importance of relationship-driven cultures in inter-student

behavior is culturally-loaded, and there is therefore a need for faculty to appreciate differences here.

Life out of the Classroom

When faculty members hold private meetings with students – how much is acceptable and what is beyond the call of duty? Meetings in the classroom or faculty office can be safer for many reasons. Hospitality is offered in many cultures and a decline to accept can offend. As in the case of corporate ethics, dinner invitations and small gifts are more acceptable for faculty members after the event. This can be at the end of a course or after marking exam papers and assignments. In many cultures, offering bribes is common practice, and most business schools lack clear guidelines on how faculty should deal with these. Relationships outside the classroom with students are universally regarded as probably ill-advised by most academic institutions, but students from some cultures (such as Chinese) use these as a vehicle for self-advancement.

NATIONAL CONTEXTS FOR TRANSNATIONAL LEARNING AND COLLABORATION

The researcher has used her personal teaching experience while delivering the MBA program of this particular School of Management in the different countries of emerging markets. These include: China, Jordan, Kuwait, Dubai, Saudi Arabia, Africa, including Egypt, Cyprus, Iran, Malaysia, Indonesia, Vietnam, Bangladesh, Hungary, Romania, Russia, Kazakhstan, Argentina, Peru, and Suriname.

(In this study, the Researcher has not included USA, Canada, UK, Europe, Australasia, and India as teaching delivery locations – as these countries do not necessarily attract overseas teachers, have enough domestic teaching talent of their own; or are developed markets for education delivery; similarly, Hong Kong, Singapore and Taiwan are probably not seen as "emerging" any more.)

SPECIFIC COUNTRY-BASED OBSERVATIONS IN TRANSNATIONAL LEARNING AND COLLABORATION

This series of detailed observations, illustrating key points of teaching delivery, experienced by the Researcher as a teacher in the field, have been selected to express concerns, reveal insights, and suggest a discussion of how important issues in MBA teaching have been handled.

Should You Know about Their History and Politics?

I was teaching in one of the countries of Arabian Peninsula, on a Human Resource module in the MBA course, and I wanted to illustrate the varied tasks faced by an HR manager. In particular I wanted to talk about how HR managers help employees to cope in times of crisis and emergency in a company. I found a very good Harvard Business Review case, which I had used successfully before in another country of this area, on the role of HR in a company which lost over a hundred staff in the September 11th incident. Bad idea! The class erupted into a huge anti-American outpouring. Several of their comments were irrational and over-emotional, and did not make sense, but this was no time for argument, I decided. My heart missed a beat as I could suddenly see myself arrested, deported, etc. etc. So I announced that this case was clearly not appropriate, they got the message anyway, let's move on, it's time for a break from class. They all rushed out of the class as students do anyway, and I followed them and spoke to a couple of them I knew well. I apologized for being 'culturally-insensitive'. I went back to the classroom and collected as many copies of the handout as I could and stuffed them in my bag

and later threw them out in the hotel waste bin. Meanwhile the students were distracted by the release of marks from the previous class, which took place in the break, so they forgot all about this offending article. A lucky escape!

Implications

This does mean that it can be impossible to use uniform handouts and materials in teaching in different locations, so there will be more work for faculty preparing extra cases and examples, etc. It also shows a level of diffuse thinking, that political and nationalistic views cannot be easily kept outside of the classroom – the students don't see their different interests and activities as separate, but all mixed up together. This can have implications for maintaining academic standards as the students can accuse foreign teachers of cultural insensitivity and can thereby avoid studying certain topics, take extra time off for religious observances and other ways around the system. Foreign teachers can be intimidated into agreeing to student demands because of a fear of cultural offence – and legal implications, even deportation.

How Can We Arouse their Interest and Create Curiosity?

I was in east-central Africa, in Rwanda, again presenting a module in HRM. All the students were public-sector managers. They were very quiet when I first arrived, for several reasons. I was a stranger, their country is quite isolated, as a nation they are still recovering from a bloody Genocide, they are typically high power-distant, and their English language skills are variable, from weak to hesitant at best. Rwanda was a Belgian colony and French is widely spoken, although many of those escaping the Genocide went to nearby Uganda and Kenya and their English is quite good. But in the first few hours, they weren't saying much. So I asked them about their jobs – which I found very difficult to understand. I could work out what the Tourism, Utilities, Transport and Education Ministries might be doing, but what about the Genocide Reconciliation Ministry? Then I asked them what they had studied before – theoretical HRM. What were their ambitions? To get promoted, change jobs – but how? Through trial and error I discovered that they wanted to hear about new things no-one knew about in Rwanda, to challenge existing practice, and learn new skills. I reworked the syllabus and every day we learned about new HR practices, policies and initiatives; we discussed what was wrong in their ministries and how it might be fixed; and tried out new HR tools. We practiced basic forms of job evaluation, psychometrics, competency-based interviews, manpower-planning and all manner of exercises, mostly quite new to them. Even though some of these tools were probably impossible to implement in the near future (if at all) the participants were excited, empowered and were curious about what was going to happen next.

Implications

Again, not only do faculty flying in need a range of materials to suit different interests, but also different teaching approaches, such as more group-based work, to accommodate students with language difficulties. There is also the issue here of a high power-distant culture hesitating to discuss problems with this remote figure, the foreign teacher! This can mean that participants will sit in classes hour after hour, day after day, without understanding much of what is going on. Then it can be a big shock for the students when they receive failing grades, especially if they are used to high ones from their own local institutions. There is often a co-existence of high uncertainty avoiding behaviors at the same time in this environment, with students demanding a high level of detail about assessment items, to a much greater extent than they might in the home campus. This can create a discrepancy in standards.

Dealing with Members of the Royal Family

I was teaching at a university in one of the Middle East countries, and one of our students was a son of the then Crown Prince. He was tall, good-looking, popular with the other students but lazy, unpunctual and infrequent in attendance, and expected the others to do the work, which they gladly did. One of the assessment items on the course was a group project. His group made a video of themselves acting out a management problem – 'How to Deal with Difficult People'. It was really good, and funny, and the Royal played a prominent role. They got 19/20 for this, but the remaining 80% of the marks were based on essays and exams. The Royal never appeared again. I called his mobile phone several times, but he never took my calls. I went to see the Dean, who gave me a lecture on the cost and sacrifices involved in doing business in emerging markets. He didn't want to come up with any kind of policy statement or make a decision about my problem. I posted the marks, and the Royal got 19%. Nothing happened, although I was worried at the time. But I'm glad I did this now.

Implications

In many hierarchical societies, there are different rules for different levels of people, and attempts by faculty members to create a meritocratic classroom can be fraught with problems. In particularistic cultures, where relationships can be more important than rules, there's an understanding that rules exist for most people but not for some special people. The foreign teacher can 'pretend' that he or she didn't know these exceptions to rules, and that all students have to be treated the same. The problem is that exceptions can become norms and students with special status can gain more and more favors, undermining the standards which foreign education providers are trying to maintain.

Active Participation or Empty Vessels?

I was teaching in mainland China for the first time, having spent time in Hong Kong, and I started off my topic by asking the students questions. What are some of the greatest management concerns you face in your companies? How is the level of productivity of your staff? What is your organization culture? Is it positive or negative? What is the staff turnover level? They looked at me blankly. Some fidgeted. Some whispered to their neighbors. But no-one answered. So I carried on anyway, presenting my material. In the break one of the students, an elected group representative, came up to me and explained that it is my job to give a lecture, not to ask questions. And their job is to listen. So I carried on with my lectures, and it took a while to get them to participate, as they had to feel comfortable with me first, and I must have put them off a bit at first, by being so demanding and provocative and confrontational.

Implications

This highly neutral, power-distant behavior, where the students are expecting to be recipients of received wisdom rather than being critical, challenging and argumentative, is a difficult one for foreign faculty. It can also potentially compromise learning outcomes where critical reasoning, the balancing of different points of view and creation of arguments is rewarded behavior, as is often the case, especially in MBA programs. It is impossible to change mindsets formed over centuries overnight, but there will be a need for a much fuller explanation of expected learning outcomes of the courses, with many examples for clarity. The larger and more progressive cities in China – such as Shanghai and Beijing – may pose fewer problems than the more remote cities.

Cheating and Copying

One of my colleagues was teaching his last class in the series of an MBA in one of the countries in the Middle East region and the administrative staff member came around with the teaching evaluation forms. As is required, the faculty member left the room. Then one of the students quietly crept up to the computer and stuck in his memory stick. Then he downloaded all the files off the teacher's memory stick onto his own. He was in the middle of doing this (and looking for the exam questions amongst the teacher's files) when the teacher came back. Despite being caught red-handed he denied everything and lied about his intentions. Then he made out that others had put him up to it and it as their fault, really. The incident became huge. But the college administration was reluctant to investigate the students, who were regarded as customers. In the end they all got off the hook. The lesson is, don't make it easy for them. Make it more or less impossible for them to steal any valuable information. OK, they can hack into your computer, but there's not much you can do about this. But you can make sure you always have your memory stick with you – that's why they have a string to hang around your neck!

Implications

Levels of honesty and tolerance of telling untruths clearly varies a great deal between different societies, and the concept of students being 'customers' rather than 'candidates' is also a contrasting feature. We can buy anything we like – we have the money. For people wealthy enough to watch the movie *Casino Royale* and then buy a 50% stake in the Aston Martin car company because they liked the car – 'buying' an MBA seems logical. Taking any other short cuts, such as buying exam questions obtained by others, also follows. This can be highly compromising and means that examination and assessment committees can receive disproportionate numbers of queries (especially challenges to grades) from these countries. Only by standing firm can the standards be maintained.

Further Short Observations

I was teaching an MBA module wearing Islamic-style clothes and having to fit in with their culture. This is essential to avoid problems with the academic authorities, and to win the students' trust and respect. Then they open-up and share some very personal insights, although there is always a strict Islamic Republic supporter in the class keeping an eye on the foreign teacher and everyone else …

Implications

It takes time to break down the barriers, lots of political censorship going on, could be cultural insensitivity on the part of foreign faculty, fear and anxiety from the students in case of unacceptable material being presented and how to deal with this

I was teaching an HR module, in one of the major cities in the Middle East, in interviewing skills, and the participants were asked to conduct role plays. Students who regarded themselves as superior in rank to others refused to be "interviewed" by those whom they saw as junior and inferior…,

Implications

Hierarchical societies, high power distance, classroom management issues, group work problems – when part of an assessment, can be difficult

I was teaching a group exercise in a much more cosmopolitan city in the Middle East, in a classroom of around 50, and many of the men would only work in a group with other men, and would not accept female group members. Many of the students arrive late, but must be accommodated, in a group of their choice. If attempts are made to strictly enforce punctuality, it can alienate these students, who will resort to complaining to the university president….

Implications

Students as 'customers' rather than 'candidates', strong role of status and power

I was running a class of Kazakhstan students, of very wealthy individuals (mostly females) who were more interested in shopping, fashion, surfing the internet and going to night clubs. It was very challenging to encourage them to focus on the class…

Implications

Ascribed rather than achieved status issues – they have a position in society because of their wealth, so they can do whatever they want

I was teaching an MBA module in China and warned the students against the consequences of plagiarism. I spent hours explaining the concept, with examples. Nevertheless, when I came to mark their exam papers and assignments, the incidences of plagiarism were almost universal. And several students reused material in their exams and in their assignments, and could not understand why this might not be acceptable, and argued in emails for weeks later…

Implications

Different moral perspectives – 'stealing' of intellectual property, feeling of superiority of own rules

In a class in Kuwait, we had several people from one organization, including their boss. Unfortunately this student was weaker than all the others, but this fact (known to all the teachers) could not be exposed, as then all the students would withdraw from the program en masse, forcing it to close. This was a very delicate situation, reflecting the tendency towards high power distance in this environment…

Implications

Ascribed rather than achieved leadership roles, power distance

In Yemen, I was expected to train two local teachers to teach the course for the next intake after I left. One was quite extravert and a good laugh and we got on well but when he had the class to himself he would not focus on the subject, but talk about anything, as he never did any preparation. The other was very old, traditional, very strict and religious, gained his PhD about 50 years ago, spoke no English, and didn't have a clue about any research in his subject in the last 50 years. He tried hard but I think it was probably too much for him to cope with…

Implications

Different mindsets, different ways of thinking, lack of exposure, need to save face of local teachers but face up to the challenges of the course

I had a mixed group of students on a course in the Netherlands, some Europeans (Belgians, Dutch) who were very outspoken, lively, and talkative and had very good English – and a group of Chinese who remained a mystery. The latter didn't join in much, and were anxious to not be put on the spot, so it was hard to know if they were following the course or not, and if they were getting anything out of it…

Implications

Cultural differences in behaviors within a group, dealing with noisy and quiet participants, need to work with all, even those less attention-seeking

SOLUTIONS AND RECOMMENDATIONS

This case, based on the personal experiences of the Researcher, primarily from insights gained whilst working among the Outreach Programs of the School, considers a wide range of cross-cultural issues in MBA teaching delivery. These issues are important, as they can compromise not just effective delivery and the teaching and assessment of the program, but can threaten the academic standards and reputation of the mother campus. Yet most practitioners of MBA delivery of offshore courses work in isolation and rarely share ideas and experiences. Faculty members newly-exposed to working in the field cannot easily access the insights of their more experienced colleagues. Hence this case, which seeks to consider these challenges, especially in the light of new advances in educational technology. A number of solutions and recommendations are suggested in the discussion of issues and the specific observations, but it is impossible for the current case to a) offer hard-and-fast rules or b) try to replace individual judgment in specific cases. Faculty members develop their own approaches to these issues; this case can only raise awareness of some of the dangers and threats to academic integrity which can be faced by individuals and institutions.

This study focuses on the teaching delivery aspects of transnational collaboration in advanced-level management education; it does not look at the development of collaborations between education providers, and all the technical, administrative and financial aspects involved.

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KEY TERMS AND DEFINITIONS

Cross-Cultural Management: The study of cultural differences between nations in management terms, especially relevant for multinational businesses and their executives operating cross-culturally; can also be an issue in trade between nations.

Cultural Barriers: Can be experienced when cultures between two countries or persons are radically different and can prevent effective communications, teaching, doing business, etc.

Cultural Norms: Seen as typical behaviors by persons of specific countries.

Emerging Markets: Defined in various ways but in this study especially China and South East Asia, the Middle East, Africa, Eastern Europe and the former Soviet bloc, and South America. India, Hong Kong, Singapore and Taiwan are not included, as educationally these are no longer viewed as 'emerging'.

Faculty Members: Usually PhD qualified teachers working more-or-less full-time for a university or business school in the West, in this case then travelling to emerging markets to teach, which might comprise all or part of their workloads.

MBA Programs: A series of courses, each with separate modules, which as a whole comprise a master's level qualification. Can be full-time or (usually, in emerging markets) part-time – taught in evening classes and/or over weekends. Different programs can have a broad or specific focus, with concentration courses at the end. Can include a thesis or dissertation.

Plagiarism: The representation of the work of other authors as one's own work, strictly not allowed by most business schools and universities in the West, but culturally-acceptable in some emerging markets. Enabled by internet technology, which can also be used for detection.

Tacit Knowledge: Knowledge accumulated from experience but often not codified or recorded, and may be only informally passed-on, or retained in the consciousness of the person who has gained the knowledge.

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Chapter 44
Using Action Research to Assess Student Performance in Traditional vs. E-Learning Formats

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ABSTRACT

While the popularity and acceptance of online education is undeniable, many are concerned about measurable performance of student learning in Web-based courses. The issue of student performance dates back to the start of correspondence courses as the initial challenge to the traditional classroom (McLaren, 2004). Yet, today, it is not a question of whether we pursue this educational medium, but rather, are students in the Web-based courses performing equal to or better than their counterparts in the classroom-based courses? An action research study was conducted to assess student performance in a traditional versus e-learning format at a historically Black land-grant university located in the southern part of the United States. The population sampled included 293 declared business majors who were self enrolled in either organizational behavior or international business undergraduate courses. Both courses in both formats were conducted over a 3-year period. A chi-square test was run to determine if correlation exist between final grades and delivery method. The results revealed that the delivery method did not impact student performance; hence, concluding that there was not sufficient evidence to assert that a relationship exists between final grades and delivery method.

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INTRODUCTION

The growth of the Internet and the World Wide Web are attracting the attention of educational institutions across the nation. Increasingly, the World Wide Web is viewed as an effective and inexpensive means of delivering courses in the educational sector. Professors and instructional designers are being asked to adapt courses for Internet delivery while students are being promised more flexible learning formats.

The move to Web-based delivery of college- and university-level programs and courses is on the rise. This trend is driven by everything from changing enrollments to increasing costs associated with maintaining school facilities. The diversity of today's student population demands that educational institutions adapt the delivery of their programs to accommodate student's concurrent commitments, including work and family.

The Internet and the World Wide Web are significantly impacting all levels of education by changing the nature of the way we teach and learn. These resources open a boundless range of new learning opportunities and experiences for the classroom. The World Wide Web provides new methods for delivering course materials, enabling distance educators to create learning communities of students and teachers that collaborate and explore subjects of interests. It has created a paradigm shift in pedagogical practices, whose potential is largely untapped.

Education via the Internet is essentially online education, which Desmond Keegan (1988) characterizes as:

- the physical disjointing of instructors and students that differentiates it from traditional classroom education;
- the use of computer networks to deliver educational content; and
- the provision of two-way communication between and among instructors and students.

There are many terms for online education, which refer to the use of electronic applications and processes to learn (e.g. e-learning, online learning, web-based learning and virtual learning, to name a few). "E-learning is here defined as interactive learning in which content is available online and provides automatic feedback to the student's learning activities" (Paulsen 2002). The term e-learning is a broader concept which encompasses the use of all available electronic media to deliver educational content, including Internet, intranets, extranets, satellite broadcast, audio/video tape, interactive TV and CD-ROM (Backroad Connections, 2003; ANTA, 2003).

While the popularity and acceptance of online education is undeniable, many are concerned about measurable performance of student learning in Web-based courses. Given the rapid pace of technological innovation, there's a subtle distinction between being on the cutting edge and the bleeding edge of change. Because our students are the one's to suffer from our mistakes, this concern for quality of learning is paramount. The issue of student performance dates back to the start of correspondence courses as the initial challenge to the traditional classroom (McLaren, 2004). Yet, today, it is not a question of whether we pursue this educational medium, but rather, are students in the Web-based courses performing equal to or better than their counterparts in the classroom-based courses. With the hopes of assuring quality instruction, numerous studies have compared the performance of distance learners to that of traditional learners. Johnson and Aragon (2003) argue that student performance is directly impacted by the quality of instructional design and recommend a conceptual framework that represents a holistic perspective when developing online courses. Rungtusanatam and colleagues (2004) suggest that educators and researchers alike should focus on how best to design instruction for diverse populations in widespread locations. Educational institutions across the nation are impacted by many diverse forces motivating

institutions of higher learning to develop and deliver education via the Internet (Rungtusanatam, 2004). This chapter will provide: (1) a summary of the most notable findings from an exhaustive literature review comparing student performance in two distinct formats and (2) a detailed discussion, data analysis, and lessons learned from an action research study conducted to assess student performance in traditional and e-learning formats.

NOTABLE FINDINGS FROM THE REVIEWED LITERATURE

Experts in the field of performance assessment are actively debating whether students in Web-based courses perform equal to or better than students in traditional courses. A review of literature reports on a number of primary research studies that have provided comparable data on student performance between traditional and e-learning environments. A few notable findings (inclusive of non-significant and significant differences) are presented for your perusal.

A number of researchers have compared student performance in traditional versus e-learning courses and have found no significant difference between the two modes of instruction. The following studies add to the literature that states student learning, as measured by performance, does not appear to be different based on course delivery method. The study conducted by McFarland and Hamilton (2005) involved senior-level undergraduate MIS students who were enrolled in an E-Business course during the fall 2003 and fall 2004 semesters. Students self-selected into either the traditional section or the online section. Using Chi-Square analysis, results found no significant difference in the final course grade between the online students and the traditional students. Hoban, Neu, and Castle (2002) conducted a similar study, for two academic semesters, which compared the performance of student teacher candidates seeking state certification through the educational administration program at National University in both on-ground and online delivery modes. Data collection included student surveys, grades, and a comprehensive exit examination. The results revealed that the students academically performed comparably in on-ground and online courses and that both groups mastered established standards.

Ali and Elfessi (2004) report the findings of a study that examined student performance and attitudes towards the use of information technology in virtual and conventional settings. Participants were 47 pre-service undergraduate students enrolled in an educational media and technology course. The study consisted of two treatment groups, one group completing the course online while the other group completed the course in the conventional setting. Data collection included a survey, a likert-type attitude assessment, and a pre and posttests on student performance. Analysis of covariance (ANCOVA) revealed a non-significant difference in student performance and attitude between the two groups.

Fields and Collins (2005) compared examination scores of students enrolled in 3 self-selected, introductory statistics courses. The study consisted of three treatment groups: a face-to-face course, a hybrid course, and a fully online course. The authors found no evidence of a difference in the students' mastery of statistical concepts. Likewise, studies conducted by Hilton and Christensen (2002), Allredge and Som (2002), Zhange (2002) and Fields and Collins (2004) have consistently found no significant difference in student performance when comparing courses delivered in the traditional setting versus the e-learning format.

Buchanan and colleagues (2000) compared traditional classroom instruction with web-based equivalent courses in a graduate program in library and information science and found no significant difference in student performance. Similarly, Gagne and Shepherd (2001) analyzed the performance of students enrolled in both a face-to-face and web-based section of an introductory graduate level accounting course. A one-way fixed effect

analysis of variance was used in this study and determined that the performance of students in the web-based course was similar to the performance of students in the face-to-face course.

Other notable research findings include the study conducted by Dellana, Collins and West (2000) in which they examined the effectiveness of a virtual classroom for an undergraduate course in management science. The results indicate no significant difference in student's final course score, when comparing the online option and the traditional course settings. Carey (2001) compared the outcome measures of a management information systems course offered at a small, urban, upper-division university in the two delivery modes. Data collection included a pretest/posttest to assess students' understanding of generalized knowledge of the course, final course grade, student evaluations, student satisfaction and their ability to apply course concepts. The results revealed no significant difference between the learning outcomes of students receiving the online-delivery mode and the face-to-face delivery mode. Likewise, McLaren (2004) found no significant difference in performance when comparing 7 online sections and four classroom sections of a business statistics course.

On the other hand, several notable studies have reported findings contrary to the aforesaid authors. Opposing results were reported by Ury (2004) who conducted a study in which he compared performance over time between online and traditional classroom students enrolled in a management information systems courses and an elementary programming course. Performance, as measured by final grades, indicated that the online delivery method was most effective. The results revealed that students enrolled in the online sections showed a significantly lower mean score than students enrolled in the traditional sections.

Connolly, MacArthur, Stansfield, and McLellan (2007) conducted a quasi-experimental study to investigate student performance in 3 masters-level computer courses that were developed and delivered in online and traditional formats. The study spanned 3 years and included 4,684 participants. Study results show that online students consistently performed better than face-to-face. Identical results were found by Stansfield, McLellan, and Connolly (2004) who examined the results of four modules from the Masters of Science Management of e-Business program with the purpose of comparing the overall performance of students enrolled in the modules online versus those in the face-to-face. Analysis of the results during the period 2000-2002 shows that online students in all four modules, Technologies for Global Commerce, Information Theory and Practice, International Technology Management, and Fundamentals of Database Systems, consistently performed better than the students enrolled in the face-to-face modules.

Studies conducted by Sapp and Simon (2005), Ellis, Goodyear, Prosser, and O'Hara (2006) and Carbonaro, Dawber, and Arav (2006) support the significant difference perspective when comparing student performance in a traditional setting versus the e-learning format.

ACTION RESEARCH STUDY BACKGROUND

Implicit in the term "action research assists educators in assessing needs, documenting the steps of inquiry, analyzing data, and making informed decisions that can lead to desired outcomes" through a process that is undertaken in a school setting (Watts, 1985, p. 118). The idea of using research in a natural setting is traced back to Kurt Lewin, a social psychologist and educator whose work on action research was developed during the 1940s in the United States (McFarland & Stansell, 1993). "Lewin is credited with coining the term 'action research' to describe work that did not separate the investigation from the action needed to solve the problem" (McFarland & Stansell, 1993, p. 14). Action research was introduced to the

field of education by a professor at the Teachers College at Columbia University, Stephen Corey. Corey argued, "that the consequence of our own teaching is more likely to change and improve our practices than is reading about what someone else has discovered of his teaching" (Corey, 1953, p. 70). Educators and researchers alike view the practice of action research viable and of great value in the engagement of educational reform (Noffke & Stevenson, 1995; Best & Kahn, 1998).

The current study was conducted at a historically Black land-grant university located in the southern part of the United States to assess the academic performance of students in both traditional and e-learning formats. The demographics of the population sampled consisted of 73% African Americans, 18% Caucasians, 4% Hispanic, and 5% other races. Additionally, 57% were between the ages of 17-24, while 43% were reported as non-traditional students that were employed, commuting, single parents, adults with families, and/or retired military personnel. The following research question was postulated for this study: Does student performance differ based on delivery method (traditional vs. e-learning format)?

Course Design, Data Analysis and Discussion

Action research methodology was employed to examine student performance in two core senior-level undergraduate business courses that were designed for both the traditional classroom and e-learning instruction. The study included 293 declared business majors, who self selected and enrolled in Organizational Behavior and International Business courses over a 3-year period, beginning in the fall 2004 through the spring 2007. These courses were requisites for all business majors, who were required to maintain at least a 2.5 GPA in all core courses. The same instructor, who holds a Ph.D. in Organizational Behavior and has extensive international research and consulting experience, taught all the courses used in this study. Prior to developing these courses, the instructor received training in the Blackboard Learning Management System and online course design from the University's Center for Innovation in Teaching and Learning.

The traditional classroom-based sections of both courses met for 2.5 hours per week for a 16-week long semester. The pedagogical practices centered around lecture and discussion in the face-to-face courses. In addition to the chapter readings, the requirements for both courses included a variation of chapter quizzes, case analysis, formative and summative examinations and participation. Class participation was measured by the quantity and quality of oral contributions.

The e-learning courses were developed, delivered and managed with the Blackboard Learning Management System. Utilizing Blackboard's teaching and learning tools, the instructor designed the lecture notes and PowerPoint slides that were used in the Traditional classroom format. The course readings, aside from the textbook, were made available electronically as PDF files. Both the e-learning and traditional sections used Blackboard for the administration of all quizzes, examinations, and submissions of written assignments.

Because there were no face-to-face meetings of the e-learning sections, participation centered upon the discussion board, where both collaborative learning among students and open dialogue with the instructor was encouraged. The threaded discussions about the assigned readings served as a measure of participation, based upon the quantity and quality of the electronic postings of each student.

Year 1 (2004/05)

A student centered approach to teaching and learning was used in the first year in which the responsibility for managing the pace and depth of learning was left to the students. Because the chapter quizzes were primarily intended to be self-study tools, they were posted on Blackboard all

semester for students to take at their own pace. The quizzes were comprised of fifteen multiple-choice and true/false questions randomly selected from a database of 120-150 questions that were timed for completion in fifteen minutes. Importantly, to enable the students to self-assess both their reading comprehension and their level of achievement, the quizzes could be taken repeatedly without limit. In an attempt to avoid the memorization and regurgitation process of examinations, case analyses were required, which served to demonstrate the students' working knowledge of the course concepts and promote analytical thinking and writing skills. Consequently, each of the two (2) case analyses was to be a minimum of ten (10) pages in length and was heavily weighted for the overall grade. The International Management courses also required fourteen (14) one-page summaries of current events in the global marketplace. As a process based strategy, the students were permitted to revise and resubmit their writing assignments repeatedly, until they achieved their desired grade. In contrast to a time centered strategy, where primacy of compliance with time limits for deliverables influences results, this strategy enables students overall effort determine their learning outcomes.

Data analysis for year 1, as represented in Table 1, show that less than twenty percent (18.8%) of the students earned grades below the required level in the traditional format. Additionally, 41.3% earned year-end grades between 91-83, 35% earned between 91-83, and 5% earned between 82-73. In the e-learning format, a significant percentage of students failed below acceptable levels (31.9%), while 29.8% earned between 100-92, 25.5% earned between 91-83, and 12.8% earned between 82-73. Descriptive statistics indicate a larger percentage of year-end grades that averaged between 100 and 73 (81.2%) in the traditional format compared to (68.1%) in the e-learning format.

During the first year, when the instructor placed minimal deadlines upon the students, he discovered that they were not taking the quizzes or responding to the discussion board assignments. Despite numerous appeals that they keep up with the readings and be prepared for class, only a few students kept up with the weekly assignments, while the majority waited until the last month and weeks of the semester to fulfill these course requirements. The students indicated that because of their work and family responsibilities, they had to prioritize the course work for their more instructor-centered classes for which there were severe penalties for failing to meet scheduled deadlines and weekly attendance.

Because the instructor actively coached the students to revise and resubmit the written assignments for evaluation, most students took advantage of the opportunity, which resulted in improved grades. Because the course quizzes and written assignments could be indefinitely revised for improvement, the students' continuous effort largely determined their final grade. In many cases, up to three and four revisions of the writing assignments and up to ten attempts at the quizzes. By the end of the semester, the instructor recognized that the time demands for both the students and he was unreasonable. He discovered that his expectations for writing exceeded most students' abilities, and the quizzes were not assessing their reading comprehension. Rather their success with these assignments reflected their persistence to resubmit papers and re-take quizzes with minimal improvements until they attained their desired results. While the dedicated students were able to achieve A's and B's, numerous students who

Table 1. Year 1 final grade report

Final Grades	Traditional		e-Learning	
	Count	%	Count	%
100 - 92 (A)	33	41.3	14	29.8
91 - 83 (B)	28	35.0	12	25.5
82 – 73 (C)	4	5.0	6	12.8
72 and below	15	18.8	15	31.9

attempted to complete the assignments at the last minute failed the class. A binomial grade curve resulted, in which the average C student either improved their grade or failed the course depending upon their self-discipline and tenacity. The disproportionate failure rate of one-third of the class leads the instructor to perceive the lack of course structure as the cause.

Year 2 (2005/06)

In response to the first year's outcomes, the instructor changed the teaching strategy for year 2, from student-centered to instructor-centered and added formative and summative evaluations. An instructor-centered approach was used to provide more structure and control over the learning process. The instructor provided more conventional guidance, disseminating the information, providing corrective feedback, and establishing timelines. While the courses chapter quizzes were similarly designed and administered, deadlines were imposed to ensure that the students didn't fall behind. These quizzes were due to be completed within two weeks of the assigned chapter readings. Unlimited revisions of the writing assignments were continually accepted, but only until the due date of each assignment. Late submissions of the written and discussion board assignments were not accepted in order to contend with pervasive procrastination. The paper's length requirement was reduced from ten to eight pages, in hopes of improving the quality of writing. And finally, to enhance the assessment of student comprehension, empirical measures were introduced in the form of four multiple-choice exams. The exams were comprised of thirty instructor-selected questions from the test bank and were administered online with a one-hour time limit.

Data analysis in year 2, as displayed in Table 2, shows 21.3% earned final averages between 100-92, 19.1% earned between 91-83, 27.7% earned between 82-73, and 31.9% fell below passing in the traditional format. Comparable percentages were reported for the e-learning courses with 18.2% earning between 100-92; 29.5% between 91-83, 20.5% between 82-73, and 31.8% with averages falling below 73%. Quite the reverse from year 1, the year-end grade averages of year 2 indicate a minute difference (.01) in the percentage of scores between 100 and 73 (68.2) in the e-learning format compared to (68.1) in the traditional format.

In year 2, the instructor imposed assignment deadlines to create more structure that would control the learning process and reduce the time commitment for evaluation. The quizzes for the assigned readings were due within two weeks, and late submissions of any assignments were not accepted. Unfortunately, many did not complete the quizzes on time. Consequently, the blackboard quizzes were made available one week prior to the exams, in hopes that they would be utilized as reviews and study tools. Upon inquiring why many of the students failed to complete the quizzes in the allocated fifteen minutes, the instructor discovered that they were using the book to look up the answers, defeating the intended purpose for self-assessment of reading comprehension.

Because the students with poor writing skills in the first year were disadvantaged, and the instructor desired to decrease cheating on the quizzes, four multiple-choice exams were introduced and the relative weight and length of the written assignments were reduced. The two writing assignments for the Organizational Behavior courses were limited to 10 pages worth 50% of their grade. Only one case analysis was required in the second year

Table 2. Year 2 final grade report

Final Grades	Traditional		e-Learning	
	Count	%	Count	%
100 - 92 (A)	10	21.3	8	18.2
91 - 83 (B)	9	19.1	13	29.5
82 – 73 (C)	13	27.7	9	20.5
72 and below	15	31.9	14	31.8

of the International Management course, in lieu of the requirement of weekly one-page summaries of current international news. Similarly, the writing assignments were weighted as 50% of the final grade in the International Management course.

Importantly, the results of the multiple-choice exams in all courses reflected the students' performance on the chapter quizzes, suggesting that they served as a reliable measure of performance. These instructor-centered changes resulted in student performance that more closely resembled a normal grading curve, yet nearly one-third of the students failed to complete the course assignments in the second year.

Year 3 (2006/07)

The third year courses incurred greater instructor-centered control over the learning process and student participation. To minimize student's open book cheating, the chapter quizzes' fifteen questions were to be completed in only ten minutes. Additionally, the quizzes had to be completed within one week of the assigned readings and could be attempted only three times. To increase quality of the eight page writing assignments, revisions were subject to one grade reduction. With hopes of improving empirical measures, while assessing analytical thinking, twenty-four review questions were assigned one week prior to the assigned exams, of which eight short answer questions were included in each of the four exams, along with sixteen instructor-selected multiple choice question. Because the required answers were comprehensive, the questions needed to be completed ahead of time. Students who failed to be fully prepared found it difficult to successfully complete the exam within the one hour allotted.

Data analysis in year 3 illustrates a large percentage of students (40.9%) earned year-end averages between 100-92 in the traditional format despite 31.8% earning failing marks. This year also reported 11.4% earning scores between 91-83 and 15.9% earning between 82-73. In the e-learning format, the majority of the students earned grades between 91 and 83 (35.5%), while only 19.4% earned between 100-92, 16.1% earned between 82-73, and 29% earned grades below the acceptable average. The frequency distribution, as depicted in Table 3, show that in year 3 (reminiscent of year 2) a slightly larger percentage of year-end grades averaged between 100 and 73 (71%) in the e-learning format compared to (68.2%) in the traditional format.

In an attempt to address the failure rate, further time restrictions were imposed upon the course assignments in year 3. The chapter quizzes were due within one week of the assigned readings, in hopes that the students would keep current. To more accurately assess reading comprehension and prevent open book cheating, the fifteen question quizzes were timed for only ten minutes. As a result, the quiz scores dropped dramatically. When students who failed the quizzes achieved high scores on the first exam in the Organizational Behavior course, the instructors' investigation revealed that the students were collectively taking the online exam in the University computer lab and sharing answers. Consequently, eight short answer questions were including in all courses remaining exams for the year to more effectively prevent cheating. Due to the changes in examination methods, a disproportionate number of students withdrew or failed the Organizational Behavior courses in the third year.

Table 3. Year 3 final grade report

Final Grades	Traditional		e-Learning	
	Count	%	Count	%
100 - 92 (A)	18	40.9	6	19.4
91 - 83 (B)	5	11.4	11	35.5
82 – 73 (C)	7	15.9	5	16.1
72 and below	14	31.8	9	29.0

FINDINGS

The performance of the 293 students enrolled in both the traditional and e-learning was measured by the final grades achieved. This data was analyzed using a Cross Tabulation to determine any significant differences between the variables, for which Statistical Package for Social Sciences (SPSS) was used with the significance level set at a = 0.05.

Data analysis in this study consisted of two phases. In Phase 1, descriptive statistics such as the mean and standard deviation were calculated (see Table 4) to measure the spread of values in the distribution of final grades. The mean and standard deviation for final grades between 92-100 were 1.31 and.467, respectively; between 83-91 were 1.46 and.502; between 73-82 were 1.45 and.504; and final grades between 72 and below were 1.46 and.502. In every instance, the final grades achieved were clustered around the mean.

Table 4. Descriptive statistics for final grades

Final Grades	N	Mean	Std. Deviation
92 – 100	89	1.31	.467
83 – 91	78	1.46	.502
73 – 82	44	1.45	.504
72 and below	82	1.46	.502
Total	293	1.42	.494

Additionally, descriptive statistics provided a breakdown of final grades by delivery method. Figure 1 illustrates student performance in the e-learning format with 23% of the study population earning final grades between 92-100; 29.5% earning between 83-91; 16.4% earning between 73-82; and 31.1% earning a final grade of 72 and below.

Figure 2 depicts student performance in the traditional format with 35.7% of the study population earning a final grade between 92-100; 24.6% earning 83-91; 14% earning between 73-82; and 25.7% earning a final grade of 72 and below.

In the second phase of the data analysis, a cross tabulation of category frequencies were computed to determine if correlation exist between final grades and delivery method. A Chi-Square Test was run to obtain a measure of statistical significance with the significance level set at a=0.05. The Chi-Square Test indicates that p>.05 (.141) and cannot be regarded as significant (see Table 5). Accordingly, we conclude that there is not sufficient evidence to assert that a relationship exists between final grades and delivery method.

In summary, this study sought to determine whether student performance differs based on

Figure 1. Student performance in e-learning format

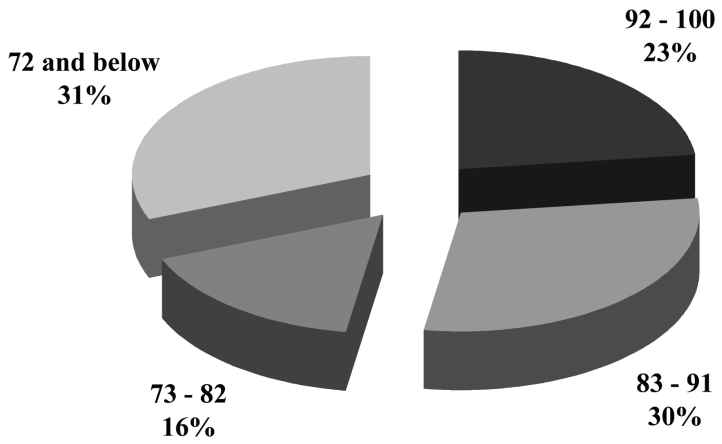


Figure 2. Student performance in traditional format

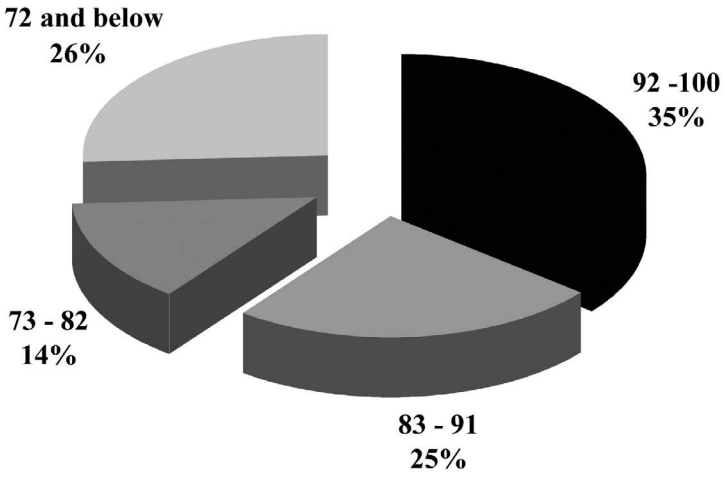


Table 5. Delivery method chi-square test

	Value	df	Asymp. Sig.
Pearson Chi-Square	5.458[a]	3	.141
Likelihood Ratio	5.565	3	.135
Linear-by-Linear Association	3.383	1	.066
N of Valid Cases	293		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 18.32.

delivery method (e-learning and traditional formats). The findings revealed that the delivery method did not impact student performance. In likeness to the findings of this study, the reviewed literature reveals a predominance of non-significant differences found between the two modes of delivery.

STUDY LIMITATIONS

As with any research, particularly in the area of online education, there were a number of limitations that may impact this study; accordingly, caution is necessary when interpreting the findings. While this study provides research on a population that is underrepresented in the literature, it also gives way to the first limitation in focusing solely on participants attending minority-serving institutions with no comparative data from majority-serving institutions. The second limitation pertains to final grades as influenced by institutional standards, which may be at variance with the current study's articulation of final grades as a measure of the extent to which the student successfully complies with the academic requirements set forth by the university's board of regents.

The courses used for this study were business related which addresses the third limitation that frames the assumption not all disciplines have courses that are compatible with the e-learning delivery mode relative to content and subject matter. Lastly, the e-learning courses were created and delivered using Blackboard. To date, there is a significant number of management learning platforms that provide a host of online collaborative tools; therefore, caution should be exercised in generalizing the findings relative to different e-learning platforms.

LESSONS LEARNED

Academicians, researchers, and practitioners across the globe have learned valuable lessons

regarding what works and what does not work for online education. As described in the discussions of this chapter, there were several challenges in the development and design of the online courses. These challenges and lessons learned can be summarized as follows:

- There is an ongoing concern regarding students dropping out of online courses. Researchers have cited poor technology skills, lack of self-discipline and motivation, and minimal interaction between and among students and faculty as reasons for the high attrition rates. As previously stated, a disproportionate number of students either withdrew or did not complete the course assignments in the e-learning format. In view of such, it is important to develop a learning community with meaningful interaction, collaboration and engagement. The use of asynchronous and synchronous communication tools should be employed to provide sufficient levels of interaction.
- A more demanding issue with online education is how to design and offer content. The current study failed to provide content using synchronous tools which promote communication simultaneously; lectures were merely created in PowerPoint and posted online for students to view at their convenience, lessening the online courses to simply threaded discussions and forums. To correct this problem, the use of streaming audio and video coupled with PowerPoint presentations as well as web conferencing is recommended not only to promote interaction simultaneously but also to promote an online environment in likeness of the traditional classroom.
- The instructor-centered approach was used in year 2 and 3 of this study as a means of controlling course activities and student participation and disseminating information. Flexibility has been cited as one of the prevailing advantages to taking online courses. In as much, students have the flexibility of completing assignments at their convenience with the option of working ahead. However, to enable students to work leisurely and ahead, all course material should be finalized and posted on the web site at the beginning of the course requiring upfront design and development, not development as the course progresses.
- The instructor repeatedly noted that students were using the book to look up answers to the quizzes. To avoid the problem of cheating, online exams must embrace structured questions or other assessment methods that represent intellectual activity that require students to apply, analyze, synthesize, and/or evaluate the concepts they have learned rather than the regurgitation of simple recall or recognition of facts. (Krathwohl, Bloom & Masia (1973).

CONCLUSION

The current study set out to assess the academic performance of students in both the traditional and e-learning formats. The results, while consistent with the predominance of the current literature reviewed, indicate that the e-learning format offers flexibility with no loss of performance.

The 2003 Sloan Survey of Online Learning polled academic leaders... and asked them to compare the online learning outcomes with those of face-to-face instruction; a majority said they are equal. (Roach, 2003, p. 1).

From the prevailing research, we can conclude that the use of the Internet and the World Wide Web to abet in the development of Web-based courses is a growing trend that cannot go unnoticed (Rungtusamatam et al, 2004; Simonson, 2006;

Fornaciari and Forte, 1999). The data gathered in this study can inform future planning and implementation of online instruction. Although significant differences in performance were not generally reported in the reviewed studies, there are many challenges to overcome if we are to make e-learning a rewarding experience.

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Chapter 45
21st Century Learning Opportunities for SME Success:
Maximizing Technology Tools and Lifelong Learning for Innovation and Impact

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ABSTRACT

This chapter informs SME (small and medium enterprise) owners, developers, consultants, and academics with the reasons, means, and possibilities afforded by 21st century technology in helping SMEs to improve their operational efficiencies and discover more effective marketing strategies for their products and services. With the rapid development and broad-based integration of web-based technologies across domains of communication, marketing, e-Commerce, and training, SMEs can benefit greatly by using these inexpensive tools to their advantage. SMEs typically underutilize opportunities to enhance their efficiencies by using more complex e-Business systems, and in so doing under develop the talents of their workforce for innovation and success. This underutilization is not just because of ignorance of technological capabilities, but also from a lack of exposure to leadership and HR development training. Knowing the need to learn must be a strong foundation before technological development can ensue. This chapter provides a synthesis of research and literature across several related, but seldomly connected fields - including, organizational theory, leadership, adult development and learning, 21st century learning, distance learning and human resource management. In developing this chapter, the authors are attempting to communicate the need for SMEs to both develop leadership and technological program developments to implement the changes needed to compete in a marketplace that reflects rapid change and imperfect information.

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INTRODUCTION

With the great proliferation and social adoption of web-based communication tools, e-Commerce platforms, and distance learning, SMEs are in a prime position to broaden their scope of service, increase scalability, cultivate innovation, and add to their profit margin. However, as the literature reveals, most SMEs do not know how to utilize e-Business platforms, nor are they aware of the various forms of education available to become proficient in this media. This chapter defines the current dimensions of what e-Business is, what it offers SMEs, and strategies for evaluation and possible implementation. Moreover, the chapter documents current issues and trends regarding how SMEs are, or are not, using the e-Business potential, and what the obstacles are for learning and implementing these changes. In addition, the discussion includes a review of salient limitations and risks which SMEs may review as they weigh these substantial strategic organizational opportunities. The chapter concludes with an overview of the macro level of the opportunities and recommendations for action.

In addressing options and strategies to encourage SME adoption of e-Business technology, we will build upon the literature of human resource development, business management, organizational theory, leadership, adult development, adult learning, 21st century learning and distance learning. Specifically, the chapter defines a business epistemology for the proper mix of e-knowledge and vision that are relevant for SMEs who are developing an e-Business platform. The chapter focus culminates in proposed solutions to encourage SMEs to embrace e-change, and a call for future directed research in this business challenge. The chapter begins by clarifying e-Business types and their definitions which are essential to the focus of the discussion.

Definitions

In any discussion of such emergent and evolving concepts as e-Business, it is always beneficial to define the terms used. Therefore, this section defines the types of e-Business especially pertinent to this chapter. In reviewing the academic record, uniform nomenclature to describe the various types and platforms of e-Business has not as yet been normalized; however, for our purposes:

E-Business is the umbrella term for all uses of inter-company electronic networks to connect to intra- and inter-company systems, where the use of those networks and software is to organize and transact business activities in cyberspace (Brown & Lockett, 2004, p.1; Wu & Hisa 2009, p. 95).

E-Commerce is the simplest subset of e-Business, and relates to using the internet to order and pay for products or services, plus general e-mail activities (Wu & Hisa 2009, p. 96). Most SMEs (like many individuals) already use these base skills in order to communicate and order supplies. Research on SME adoption of e-Business has shown that SMEs are fine with e-mail/e-Commerce (low to medium technology) applications, but have very little engagement in highly complex applications (Brown & Lockett, 2004, p. 1). Most e-Business definitions exclude e-Commerce from their measurements of adoption of e-Business solutions.

E-Marketplaces, also known as inter-organizational networks (IONs), use the Internet to allow for the development of many e-Business models, which results in SME aggregation via IONs. These IONs form a web of SME exchanges that reflect cooperative and competitive elements, and vary in the form of network autonomy versus dependence, based on the specific needs, trust, and control requirements demanded of each individual network of SMEs. Aggregations in these IONs can range from social networking to formal integration (Brown & Lockett, 2004, p. 2-3).

An example of the first aggregation would be an industry social media which used blogs (web

sites which are easily updated and allow comments to be posted), forums (online discussion areas), wikis (collaborative websites allowing for multiparty editing of documents), etc for members to communicate and share their expertise in nuanced business matters. These aggregations serve two purposes, they make industry expertise available for all SMEs in a particular field, (rather than having expertise residing only with larger competitors), and these forums allow individual SMEs to advertise their knowledge and experience.

An example of formal aggregation sites would be ones in which members can:

- purchase supplies from an industry-aggregated catalog,
- sub-contract out portions of their workload to competitors who currently have excess capacity
- access industry websites that have product lists with price comparisons
- access industry developed back-office tracking systems for billing, payroll, etc.

E-Mobile expands e-Business to mobile computing devices. Wi-Fi networks and Bluetooth® LANs have allowed mobile devices to easily connect to local enterprise networks and the internet. This technology has allowed mobile employees to increase their range of activities and connectivity to allow them to service their customers while they are in transit or out on other business meetings. This extension of connectivity provides employees with flexibility, responsiveness and efficiency when they are not in the office (Sairamech, Goh, Stanoi, Padmanabhan, & Li, 2004, p. 651).

BACKGROUND

Why Do SMEs Need to Maximize 21st Century Learning Opportunities?

In a perfect world where SMEs have the same access to knowledge, financial and human resources, and wield the same marketing acumen as large corporations, the formation of SME aggregations and the advanced usage of e-Business applications would mirror the developments in other corporate practices. ION formation to advance sales efforts and for cost efficiencies would develop linearly. For these SMEs that adopt e-marketplaces, the cause célèbre for forming IONs in e-Business models would be to integrate suppliers, distributors, service providers and clients. These aggregations would ensure better communications with each party, and would enhance business transactions via the internet in order to produce value-added services/efficiencies for themselves and their customers.

Such e-Business networks would not just form in the ether of the internet. Motivated SMEs would link up through general intermediaries and SME targeted networks. These IONs would congeal as individual SMEs connect up to each other within structure provided by these intermediaries. Examples of e-Business intermediary networks are bCentral (Microsoft®), NetBusiness (Netscape™, etc), BizProlink, and Achilles, 2002. These platforms provide host software networks for SMEs, and would also serve as a portal to more complex e-application via consultancy services (Brown & Lockett, 2004, p. 3).

Building upon these foundational definitions of different types of e-Business, the next section describes the current applications of e-Business today. Based on a review of the literature, the practices are analyzed for trends and themes pertinent to SMEs.

The Real World: E-Business Use by SMEs Circa 2010

Based on literature review and analysis, the only SMEs that have fully engaged in highly complex applications are those that are imbedded within a client or supplier chain network, and were required to be compliant with the best practice e-Business applications of these larger companies (Xu, Rohatgi & Duan, 2007, p. 83). In effect, they were forced to adopt because of their captive position in an e-Business vertical chain. Also, the network that was forcing compliance would also have had the expertise to guide these SMEs through the adoption phase.

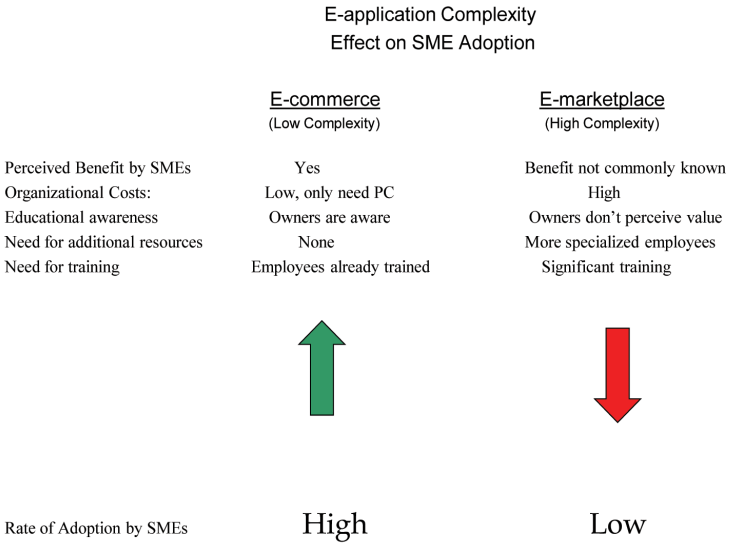
As e-Business applications become more complex, most independent SMEs are slowing in their adoption of this technology. Academics and policy makers had assumed that as large organizations implemented e-practices, that these would trickle-down down to influence the practices of SMEs. This has not transpired. The high level of application complexity has had a negative impact in SME adoption decisions (Brown & Lockett, 2004, p. 1).

Researchers on this adoption question had speculated that the internal and external critical factors that would effect whether an SME adopted complex e-Business solutions would come down to either barriers to adoption, or enablers to adoption. They speculated that these considerations would fall into 3 categories: specific perceived benefits, organizational readiness/resources, and external pressures to adopt (Levy, Powell & Worrell, 2005 p. 2). However, these generally accepted factors did not include a review of the e-Business application complexity, which appears to have a high correlation on why SMEs lag in adopting complex e-Business applications.

Government sponsors of e-Business initiatives and academia sought a more granular explanation than a simple large to small trickle-down effect, and expanded their considerations. A more nuanced explanation involves the relationship of three barriers to SME adoption of complex e-Business: access to education/information, financial and human resources, and employee training.

One way of depicting and better understanding the relationships among these concepts is illustrated in Figure 1. At the easiest levels of e-Business,

Figure 1. E-application complexity effect on SME adoption



SME owners and employees are self trained -from their personal experiences with e-mail, online shopping, etc. As complexity increases, SME owners are less aware of the e-benefits, and are more constrained by limited resources (financial and staffing), and are less willing to provide formal training for their employees.

Demands on SMEs

There have been many studies on the issues affecting SME adoption, most point to the limiting effects of the three barriers listed above; the education of SME owners on the benefits and applicability of e-Business solutions for their firms, limitations of funding and available personnel, and ignorance that employees training programs exist for e-Business applications. We have carefully selected six of these studies as representative of the dominant issues reviewed.

The first study examined more obvious, practical aspects of these barriers. Without intellectualizing the factors, Xu, Rohatgi, and Duan (2007) revealed that the development and implementation of e-Business technology by SMEs tends to focus only on short-term benefits (operational savings, etc.) to the detriment of long term strategic planning. This shift away from long-term planning is most likely caused by limited financial resources and employee capacity at most SMEs, which serves to impact the ability to fund and provide training due to limiting constraints. At the more basic levels of e-Business, such as e-mail and the ordering of supplies, employees teach themselves how to use the systems – it is easy. However, the more complex the application, the less likely employees will train themselves, and financial constraints prevent formal management training of these employees. Therefore, advanced applications are ignored (Xu, Rohatgi, & Duan, 2007, pp. 82-85).

In a concurring study, the relatively low rates of SME adoption of e-Business applications relates to a lack of e-Business competency, and a lack in training (Eikebrokk & Olsen, 2009. Lack of time and resources within SMEs and a general ignorance of the training available are seen as the primary barriers to organizational adoption of e-Business (Eikebrokk & Olsen, p. 7). Jeon, Han, and Lee conducted another study in South Korea in 2006 which demonstrated that the most critical determinants of SME adoption of e-Business was the vision and support of the CEO, and the dissemination of information showing business relevance of e-Business applications, as well as access to properly promoted training programs (Jeon, Han, & Lee, 2006, pp.1905-1916)

A Canadian business study, Canadian e-Business Initiative (2003), identified a barrier to SME adoption of e-Business to be a lack of technical expertise in the Canadian marketplace. Universities are producing IT specialist that are trained for the needs of Fortune 1000 companies. Since SMEs need as much business planning as technical development, IT graduates alone are not very useful to them. SMEs need employees or consultants that can design and implement turn-key e-Solution systems (Canadian e-Business Initiative, 2003, pp. 10-11). That requires specialists that can evaluate an SME's existing manual procedures toward redesign, look to identify sales and savings potentials from e-Business platforms, design the technology, train employees and implement the new process. These types of specialists are not being trained at universities currently.

In a follow-up Canadian business-sponsored report, SME adoption of e-Business solutions was found to be stalling (Canadian e-Business Initiative, 2004). While most SMEs have adopted e-Commerce, most have not adopted the more difficult integrated solutions. This report also found that most SMEs do not understand how e-Business can help them, don't have the internal capacity to implement, and that the quality of external consultants to help plan and instruct was uneven. A further concern on that last point was that SME owners felt that there were no coordinated or trusted sources of information and training.

Another study that interviewed the owners of SMEs found that most executives believe that they should pursue e-Business solutions, but that they had concerns over technical and human resource constraints (Ihlstrom & Nisson, 2003). Specifically, there was a lack of knowledge about the topic within their organization, and if anyone did have some e-knowledge, they were too busy on other work responsibilities to be reassigned to program development (Ihlstrom & Nisson, 2003, p. 221).

In Figure 2, the findings of the above studies on issues surrounding the adoption of more complex e-marketplace applications is diagramed from the SME owners' perspective. Education to address these misconceptions is critical if SMEs are to adopt e-Business, and the degree of this education will depend on the SME owners' perception of the usefulness of e-Business to their operations. Once owners' misconceptions are addressed and e-Business plans are devised, technical training can address employee competencies.

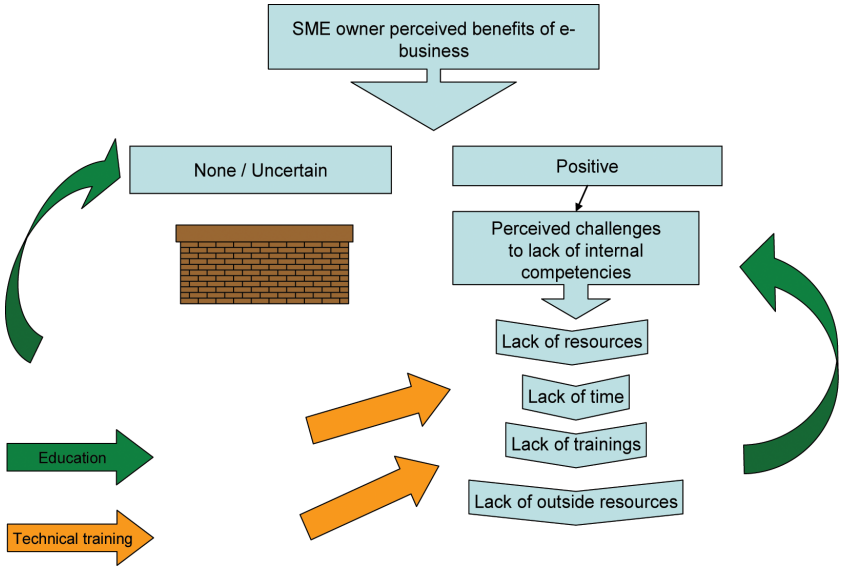
As can be seen in this diagram, SME owners' education of the capabilities of e-marketplace applications starts at a basic level if the owners do not have any perceived value in e-Business solutions. If they do have a positive perception, then the education process would be focused on their misconceptions of the costs, lack of supports, and savings associated with e-applications. Technical training would proceed once the misconceptions were redressed.

Understanding the current practice, trends and challenges of e-Business today, provides the context for pursuing our discuss ion. However another critical building block is the theoretical framework. The next section describes the theoretical foundation which guides our discussion.

SYNTHESIZED THEORETICAL FOUNDATION

Introducing e-Business to SMEs is not just about an e-Business plan, consultations and training. The process is developed within the framework of a theoretical understanding of leadership skills, management and adult (employee) centered learning. As such, the literature can illuminate salient principles, strategies and models of addressing organizational change, training needs, human performance issues and human resource development needs for our SME e-Business process.

Figure 2. Owners' perceptions of barriers to SME e-marketplace adoption



Leadership and Organizational Theory

Due to the very nature of SMEs, the leadership has a vast impact on the organizational climate and vision. Based on our review of the current literature, it is to be expected that SME leaders will also have vast impact on the choices, comfort level and implementation of e-Business. While leadership theories have varied greatly over the centuries, current trends are that leaders will usually adopt styles which are congruent with their personality style and social adeptness (Kouzes & Posner, 2007). That said leadership has also been encouraged to realize that different missions, situations and constituencies require different strategies and communication approaches. Being able to read the signs of the economic, political and organizational field are high on the list of skills required by successful SME leaders and entrepreneurs in any-sized organizations (Tapscott & Williams, 2006).

Human Resource Development

Concomitantly, organizational theory demonstrates that while organizational structure may be established and organized identically, leader "A" and leader "B" can create entirely differently organizational climates without changing the structure. The blend of organizational climate and structure cannot be ignored because either alone is insufficient to characterize the dynamics and environment of a specific organization. In fact, in SMEs the impact of the leader on the climate is magnified because of smaller numbers of personnel, greater interaction across ranks and cross training needs (Yorks, 2005). When people fulfill several roles in an SME, they work across departments and sectors of organizations that they may never encounter otherwise (Enriquez, 2001). Greater interpersonal communication provides abundant opportunities to influence and craft the climate of SMEs (Caffarella, 2001). Much like a potter with clay, the CEO may well have direct interaction with large percentages of the employees and able to personally control the delivery of leadership vision, intentions, favor and disfavor, and preferences, thereby molding the climate of his/her SME (Kouzes & Posner, 2007).

Business Management

The literature of business management offers several astute insights which bear on our question and need. Specifically, current practice includes global project management which successfully implements company-wide processes from product and service development, to customer service (Ahoy, 2008; Feigenbaum & Feigenbaum, 2009; Tapscott & Williams, 2001). The fundamental elements comprising this need is found in being able to design and implement data driven decision making, benchmarking, and greater accountability. The emphasis on data driven decision making and bench marking provide a foundation to guide SMEs to document, quantify and evaluate the cost of doing business via non-automated and e-Business platforms. It provides urgency for cost-benefit analysis and return on investment (ROI) in most decision making processes which can guide the CEO and leadership to the degree that they wish this information drive their organization.

In global economies which create more possibilities of fiscal uncertainty (ASTD, 2009), such evaluations become major determinants of making decisions based on real-time data rather than solely projections and expectations (ASTD & Booz Allen Hamilton, 2009). However, in the area of human performance and human resource management, data-driven decision making is imperative and needs to be not only well documented, but also consistent, must demonstrate a lack of prejudice or bias, and closely follow tax, legal and industry requirements (Wang & King, 2009; Yorks, 2005). In times of rapid legal, industry and economic change, SMEs do well to examine the ways the human resource management services

as well as performance can be outsourced to large cooperatives (IONS) or web based for outsourcing (401Ks (retirement plans), payroll, employee handbooks, etc)

Adult Development

The closely related field of adult development reminds SME owners that the increased life span of our workforce means not only an aging workforce, but also a greater number of life transitions, all of which leads to a growing demand for more human resource services (Wang, & King, 2009). Whether it means upgrading credentials in order to satisfy regulations for the same job title, or changing focus of the work of the organizations due to rapid shifts in global markets or technology-driven obsolescence, training is a larger need for today's worker than ever before (ASTD, 2008, 2009). Increased numbers of SMEs cannot afford training departments and sending workers to frequent off-site (or out of town) training, which can be especially expensive and inefficient for SMEs with their smaller staffs (ASTD, 2009). Enter e-Learning, which includes not only learning on demand, but also video conferencing with inexpensive hardware and mobile learning options for staff to take continuing education credits, competency exams or updates via Blackberries®, iPhones®, or iPods®.

The adult development and career literature have indicated for years that adults are changing careers more frequently than even 20 years ago (Bjorklund &Bee, 2007). Add to this consistent trend the national and global economic changes, and businesses will experience even greater personnel turnover and changes. This pattern creates impossible demands for SMEs to handle frequent changes to benefits and industry or government related compliance issues such as, 401K plans, pensions, tax withholdings, staff information, organization wide bonding, individual employee bond compliance, individual employee licensing compliance, etc. Again the cooperative resources of an e-Source or outsource provider can be most effective in addressing these increased demands and thereby allow SME leadership and to staff focus on the business they are engaged in rather than trying to master increasingly specialized and time consuming personnel services. Electronic solutions allow these services to be integrated into a one company based employee portal (enterprise system), or web-based accounts with major providers.

Adult Learning

One of the most exciting breakthroughs to impact adult learning in the last 8 years is from the field of neuroscience and boldly contradicts of the old saying, "you can't teach an old dog new tricks". Instead, we have learned that children and adults of any age are able to create new brain neuropathways, as long as they are not cognitively impaired by disease or disability (Jensen, 2006; Willis, 2008). Furthermore, the brain remaps areas which no longer function, or functions less than optimally. Much of this development happens through simple practice as adults use their minds in moderately complex mental activity. Such activities include simple number calculations, reading different types of literature, discussions, conducting word or numerical analysis, and visually discerning differences among images or characters.

The research demonstrates that when adults, regardless of age, continue to use their minds actively and challenge them with different types of activities they are able to maintain or increase their mental alertness, and acuity (Begley & Check, 1999-2000; Willis, 2008). The message for SMEs is that all employees can continue to benefit from training, because adults are never too old to develop new skills, improve existing abilities, and master new procedures.

Adult learning theory also confirms that the multiple learning styles identified by Gardner (2006b) apply to adults. Indeed, this is likely in part why people gravitate towards different

careers. While your marketing and development team will likely be highly visual intelligence and learning, bookkeepers, compliance officers, benefits personnel, technical support, and technicians are likely to be inclined towards numerical intelligence.

The current and foundational theoretical literature which has been discussed provides a framework for the discussion of how SMEs may best address the challenges of technology use and training in the 21st century. By bringing together these varied disciplines (leadership and management, business management, adult development and learning) the framing view is one of leveraging and empowering human capabilities rather than solely technological. The two cannot be isolated, and our discussion will illustrate how essential it is to understand the human capabilities in considering SMEs opportunities.

21st Century Learning and Distance Learning to Address the Opportunities

Gardner's book, *Five Minds for the Future* (2006a), is a compelling application of his original premises to current trends and the scope of the business world. This book proposes that there are 5 different types of "minds" which best meet the demands of the current workplace, technology driven society and global marketplace. Consistent with the Partnership for 21st Century Skills (2004) and The Conference Board (2009) reports of global business and workforce needs he identifies critical thinking, problem solving, creativity, and team building major characteristics.

While 21st century skills has been prevalent in k-12 schools for many years, and are now gaining attention by President Obama and Secretary of Education, Duncan's *Race to the Top* educational reform (Duncan, 2009; Obama, 2009; US Department of Education, 2009) and the broader ARRA legislation, the term has been less often applied to the workplace and human performance. However, the same skills are identified in major literature from UNESCO education initiatives and higher education reports (2009), and also professional associations such as Society of Human Resource Management (SHRM) and American Society for Training and Development (ASTD) (The Conference Board, 2009). SMEs can act on this unequivocal message by making sure the training they are securing for their leadership and staff includes the emphasis on these same skill sets and the best minds which address them for their specific industry.

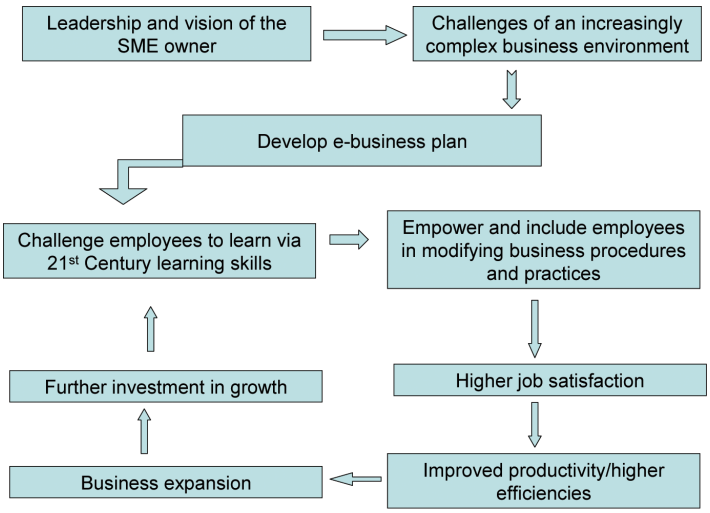
Taking these theoretical underpinnings and applying them broadly to e-Business adoption, Figure 3 encapsulates a possible synthesis of best practices for management theory, adult learning, and the development of e-Business solutions.

SME SUCCESS: STRATEGIES FOR 21ST CENTURY LIFELONG LEARNING

Scenario 1: Providing Top Notch Training, For All, And Under Budget!

Up, Up and Away International (UUAI) *is a global import export company which has a virtual team of 50 employees spread across three continents. It is an exciting time as they have purchased a new software solution to increase productivity, project management and communication company-wide. However it is no small challenge to roll-out this extensive new platform across multiple sites of varied staff members. Part of the dilemma is a situation where there are several major types of equipment, settings and workflow process for different employees. For instance, just two examples reveal that while the CEO and several of the front line account executives primarily use high-end handheld devices to conduct all their work, most of the home office administrative, payroll and marketing staff are terminal based. Moreover, many of the virtual team are located in*

Figure 3. E-business, management, and adult learning



one-person offices worldwide and have entirely different hardware specifications, tasks and needs.

Many SMEs are faced with similar challenges as seen in the UUAI Scenario as they struggle to serve a wide variety of learning needs of their staff effectively, conveniently, and under budget. In smaller organizations you might only have 1 bookkeeper, instead of 5. When new software is acquired or upgraded, do you hire a specialized trainer to train one person?

As indicated in our earlier discussion, the need to support, cultivate and provide ongoing training of SME employees is paramount in sustaining organizational success. In many cases the vast resources available through e-Learning can be combined with face to face and personal instruction so that based on the urgency of the need, e-Learning might provide more immediate and cost effective assistance. In the scenario above, employees in different offices could access software and procedure tutorials on-demand via a web-based interface. In this case the SME might purchase the number of seats they need for their staff with an e-Outsource provider who has a large variety of quality self-paced software tutorials. Then they can also work with the company to develop simple presentations about company-only policies which would be proprietary to their staff.

High level technical and complex learning may be best facilitated in-person or via interactive synchronous technologies and learning experiences. While in other instances, general introductory instruction for software or hardware might successfully addresses the entire staff's needs, and may be negotiated for a reduced fee, bundled in the cost of the product purchased or in varied formats and time frames as described.

Table 1 provides a detailed chart which enumerates technology options for addressing many of these concerns and needs which are facing this familiar SME dilemma. Software, or web-based solutions, can be selected from open-source, inexpensive and enterprise categories as appropriate. However the focus is in maximizing ROI and cost-benefit results for SMEs. Readers will find this practical and informative chart of resources, benefits and limitations includes integrated e-platform solutions, remote login and tech support systems, IT help desk and dashboard solutions, personnel need solutions such as remote and synchronized travel trackers, and more.

Table 1. Comparison Charts of Resources for Scenario 1: UUAI

Need	Resource	Benefits	Limitations
Integrated e-Business Platforms Examples Most have these capabilities included: • CRM • Customer • Supplier • Inventory • Accounting • eCommerce • Banking • Reports Manager • System Manager • Point of Sale **All have these benefits:** - Streamline and coordinate processes because of integration - Potential of increasing customer purchasing, retention and repeat purchases - Better, more comprehensive tracking of vital processes: inventory, client needs, banking, etc	**Interprise Solutions** http://www.interprisesolutions.com	- Fully integrated system across business, product and sales processes - Free online trial available - Extensive product information available - Many available modules, not all have to be purchased.	- Because it is an extensive software, it is not inexpensive - Time for training staff in new software needs to be set aside -Likely new/revised processes to be established and learned
	Oracle e-Business Suite http://www.oracle.com/us/products/applications/ebusiness/index.htm	-Comprehensive business performance management -Extensive integration of knowledge resources and capital - Large tech support staff and extensive product development	- High cost - Long list of included features may not be needed
	Insite Commerce http://www.insite-commerce.com	- Capable of enterprise resource planning (ERP) integration - Integrated system across business, product and sales processes - Free online demo available - Includes content management system - Online shopping cart - Order tracking - Create online product catalog	-Greater focus on eCommerce, maybe less on CRM, accounting, and inventory needs - Only a representative lead demo - Price is not published
IT Dashboard Examples - Immediate download and install - From one computer can gather information on all software and hardware assets, licenses and versions. - Helpdesk ticket system built in- keep track all requests for tech support even in your SME	**Spiceworks** www.spiceworks.com	- Open source - Free online community of users serving as detailed tech support community	- Ads posted except on paid version
	SysAidIT http://www.ilient.com/	• Free version for under 100 computers • Varied price plans available for larger organizations	• Ads posted except on paid version - Other free products including online customer service support www.sysaidcss.com/
Remote Login and Backup Examples Remote desktop control of computers to help user at another location - Remote tech support platform backup -Remote retrieval of files -Screen sharing for demonstrations, training, training	**Logmein.com** www.logmein.com	- Free version has fair number of features - Paid versions range in costs, most affordable -Client sit back and you connect to them once installed	- Requires download of software prior to use
	GoToMeeting www.gotomeeting.com	- Free version has fair number of features - Paid versions range in costs, most affordable - Paid version, setup page and then client put in code to connect	- Requires download of software prior to use

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Scenario 2: Going Global, Smarter with Scalable Products and Services

The amazing part of the GnuFone is that this inexpensive device allows people to interact effortlessly with family, friends and colleagues through an ear insert. This is possible because the R&D group at GnuTeam Inc. had discovered how to send video, audio and text via infrared messages to cell phones. The system was able to

Table 1. Continued

Need	Resource	Benefits	Limitations
Travel Tracker Examples -Web based -Mobile device compatible (iPhone®, Blackberry®, etc) -Track flights in real time -Travel itinerary -Travel reminders/ alerts - Calendar integration	**Tripit.com** www.tripit.com	-Widget to embed and share schedule in websites, Facebook, LinkedIn and more -Share access to different areas of your schedule with designated people - Integrates with other apps -Very simple to use - Space to track bonus travel points/ miles	-Free and paid versions
	World Mate www.worldmate.com/	-Travel reminders -Travel expense module available -Currency converter -World time converter -Weather reports - Video tutorials as help files -Windows Mobile, Nokia	Free and paid versions - Paid (gold) version enables reserving hotels, cars, flights from smartphone

track what the wearer was looking at, saying and writing without further intervention as it is closely tied to the activity of the brain. More than voice activated software; this device was turning the tech community on end because user-interfaces could become obsolete. The website at GnuFone was constantly crashing because of the huge number of people logged in. It was meant to be a place where aficionados exchanged ways to maximize the use of the device, hack new features, and seek company technical support. Instead it had become the major hotspot for social interaction, file uploads and downloads, dating and collaboration. People were clamoring for additional paraphernalia and products with the GnuTeam and GnuFone brands emblazoned on them. How does a company of 100 people keep pace with global adoption?

At a time when all companies must cope with rapid changing global markets, and provide high quality products and services, while retaining their expert talent, how do SMEs compete? Scenario 2 could be every small enterprise's dream and nightmare simultaneously. Their core product gains mainstream adoption and has a wide base of users-members, but the company is racing to figure out how to increase capacity, scalability and efficiency in service, development and production quickly enough to meet demand.

Fortunately, inexpensive and free technologies provide solutions to many of these needs when used in effective ways to support staff learning, innovation and motivation. Human resources are our most valuable asset and these reports indicate how to maximize their development.

Indeed, a critical element which has been identified in the adult learning and development field is that a vibrant organization cultivates motivation (Wlodkowski, 1998). Often in times of great work-related stress, people will find support and release in discussing their needs among their colleagues with professionals form similar settings. Web based technologies and the e-collaborations provide just such possibilities as even SMEs can enable their staff to participate in group activities, services and programs. Rather than having to start separate programs for each need as it arises in the ramp up mode, instead the community based support- provides a platform for SME on-demand service to their staff. Examples of collections of training, consultative support, even counseling and benefits may be needed to handle the extra stress during this time of rapid expansion. Leaders who

keep a close eye on the quality of life and health of their staff will have the opportunity to recognize early signs of excessive stress and provide access to resources. Sustaining and refreshing your talented staff is more cost efficient and beneficial to the knowledge capital of your company than seeing them burn out and leave, finding yourself forced to replace and retrain a new hire.

Furthermore an organizational climate which values individuals and dialogue provides additional support for change, and refreshment, detection of stress patterns across the organization and insight into needs, and possible recommendations. A climate of acceptance, support and dedication to each other and the organization is valuable in weathering the real struggles of even positive stress. (See Table 2.)

Regarding the technical dimensions of ramping up development, production and service e-Business provides a multitude of solutions which can integrate the diverse work responsibilities of a SME into a desktop application. Integrated dashboards are being used for many purposes across industries. Applications of these include free programs that cost $3000-20,000 just a few years ago. One example is a project management program that could help a team like ours help keep track of rapid changes in their processes, timelines and work assignments. Having a web-based or server-based application enables everyone to login and see the latest information, rather than chasing after files which are outdated. (See Table 2.)

Moreover, the same technologies may have modules which provide users to be able to individually and independently customize their purchasing, and community experience in a membership portal. At this time, such features can be provided by open source software hosted and configured on dedicated server space for $30-60/month. Mammoth corporations no longer have a monopoly on these valuable features. Table 1 provides a chart similar to the one for the prior scenario, but with details for technology solutions to address the specific needs detailed herein.

Connections to Training. As research has pointed out, an essential stage in designing implementation solutions for e-Business is the effort required for training. In order to swiftly and efficiently provide training, SMEs need to first communicate to employees how the new e-Business applications will help improve internal operating efficiencies and sales generation (Kouzes & Posner, 2007). This focus helps develop staff Ownership and motivation as they can see that their time and effort spent learning will have benefits for their success, professionally and fiscally (ASTD, 2009; Wang & King, 2009).

The second essential training focus is to strategize the message and means to develop SME owners' awareness of the vacuum in their training offerings and delivery methodologies (Caffarella, 2001; King, 2003). This goal can be accomplished by trainers demonstrating the application of common marketing success principles. For instance, trainers need to articulate that effectively serving staff needs applies the same principles, but produces more ROI benefits than building satisfied customers by serving *their* needs (ASTD, 2009). Moreover, a simple, specific cost benefit analysis can illustrate the ROI benefit of ideal training. This training serves the staff's and organization's needs and is characterised by being:

- targeted training content,
- delivered for rapid transfer of learning,
- designed and facilitated to address varied learning styles, support, and preferences, and
- prepared to scaffold support needs of the staff.

This synthesis of knowledge and practice regarding training for SMEs provides much needed direction in a changing world. However, without a doubt in coping with rapid changes and much technology integration, there will be limitations. The next section of our chapter explores these issues.

Table 2. Comparison Charts of Resources for Scenario 2

Need	Resource	Benefits	Limitations
Possible Providers for Health, Counseling Personnel Services	Trade Associations Professional Associations Chamber of Commerce	-Group rates are lower than if your company goes in solo. -Feedback from other plan participants.	
Project management software online Usually they include most of these features, and specialize with additional ones -contacts and group manager, -custom workspaces, -file management, -calendars & events, -blogs, -discussions, -chat and instant messaging, -RSS feeds, -web databases, -tasks, -reminders, -charts If your organization uses a paid version, usually these have low monthly fees- no long term contract needed	TimeStamp http://www.syntap.com/	-Simple to use -Track time on task -Set hourly rates -Add additional notes -Append new time to old files -Saved in compatible csv format -Loads quickly to startup	**-Only tracks time on task and hourly rates** **-No other project management functions**
	Basecamp.com	-Top notch project collaboration service that many top companies utilize. -Includes create and manage projects, private or public to-do lists, milestones, messaging, upload and share files, time tracking, notifications, time reporting. -Rights assignments differentiated - RSS, whiteboards, chat, calendars, assign milestones, - Design templates, activity stream, corporate branding Assign deadlines, commenting, drag and drop interface, and message boards. -Has other extras and 3rd party add-ons that integrate with it for iPhone® applications, billing and invoicing tools, planning tools, desktop widgets, etc.	-Offers a free plan that permits limited access. -Also paid version of their award winning service -30 day free trial of paid version
	Sosius http://sosius.com/	-Many features includes task automation, and access and permissions assignment - Free account has unlimited number of workspaces, unlimited users, but only 200 MB of storage space.	-Varied prices for paid plans
	GroupSwim – www.groupswim.com	-Different array of features - Groups, workspaces, discussion boards, file sharing, wikis, **semantic search, tagging, collective intelligence tools,** notifications, profiles, etc. -Free account includes has unlimited workspaces, up to 3 users, and 500 MB of storage space. - Great opportunity to growth and collaboration	May be too unusual for non-Gen Y people. -Varied prices for paid plans
	LiquidPlanner – http://www.liquidplanner.com/	- Has many features including project scheduling and analysis tools, task management, milestones, collaboration tools, personalized dashboards, resource scheduling, and more. -The free version lets you have up to 3 members, an unlimited number of projects, and 2 GB of storage space.	-Varied prices for paid plans

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Table 2. Continued

Need	Resource	Benefits	Limitations
	Huddle http://www.huddle.net/	-Unique in respects - Integrate online collaboration, project management and document sharing using social networking principles. - Free plan will get you up to 3 workspaces, 1 GB of storage, and an unlimited number of users.	-Varied prices for paid plans
Ecommerce Shopping cart – Provides two major components usually the storefront and administrative side of a shopping cart package. Basically a database backbone customized to maintain inventory tracking ad serve it up in web-based purchase catalog or listing. Includes also connection to credit card/paypal or other credit card/online payment provider (some include connection to limited number of merchant accounts) The backbone of being able to actually conduct online transactions/buy/sell.	Mals-e http://www.mals-e.com	-Entirely free Works from their website -No install on server needed	-Very plain -Cannot be customized very much -Limited help resources
	Cartville www.cartville.com	-Works from their website -No install on server needed -Better point-and-click interface for setup -More customize options -Integrated auto responder available (see below)	-Not simple, but somewhat user friendly - Varied price plans based on options needed -30 day free trial available
	Paypal Shopping Cart www.paypal.com/shoppingcart	-Works from their website -No install on server needed -Better point-and-click interface for setup -More customize options	-Not simple, but somewhat user friendly -Varied pricing plans based on size of catalog (number of items in your list)
	Zencart www.zencart.com	-Load on your own site -Widely used by others -Big support group	-Need your own server space -Not simple to install and configure
	OScommerce www.Oscommerce.com	Load on your own site	-Need your own server space -Not simple to install and configure
	Fantastico	Load on your own site OR have it hosted on a site for you -Widely used -Several add-on options -Open source -Usually free from web host	Usually on your won server Not simple to install and configure

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Limitations: Issues, and Potential Barriers

Certainly change does not come easily to any organization; however, when people realize it may provide benefit to them personally or collectively, they are more ready to invest the effort, learning, and complications (Kouzes & Posner, 2007; Wlodkowski, 1998; Yorks, 2005). Therefore, the manner in which change is introduced, discussed and experienced has an immense impact on its reception. When leaders and managers mindfully fine tune the message, process, participation in feedback opportunities, and incentives for participation, there are a multitude of benefits.

However, what limitations, issues, and barriers might be confronted also in such instances? Certainly many can arise, but this section identifies 3 areas of concern to evaluate prior to and during the process of incorporating e-Business tools in SMEs: interpersonal, processes, and growth.

Interpersonal. Our opening paragraph for this section illustrates the high stakes value of interpersonal communication skills in SMEs. Guiding an organization through change successfully is on the shoulders of the leader in SMEs

Table 2. Continued

Need	Resource	Benefits	Limitations
Ecommerce Auto-responders - Full strength auto-responders include tracking user forwarding, reading, etc. Watch out because some charge extra for survey capability while for same price it is included in others.	http://www.freeautobot.com/	Use their site and load your info Absolutely FREE	Not as user friendly to configure or use as some others Learning curve
	http://www.listmailpro.com/	-Use their site and load your info -$195 but only **one** time fee -Testimonies of ease of use -Technical support available	Varied pricing tiers Not as user friendly to configure or use as some others
	www.iContact.com	- Per month investment - Discounts when paying multiple months -All versions includes unlimited survey capability - Least expensive of paid versions - Abundant help resources, including videos	Varied pricing tiers
	www.getresponse.com	- Per month investment -Pro version includes unlimited survey capability	Varied pricing tiers
	www.constantcontact.com	- Per month investment - Discounts when paying multiple months	Varied pricing tiers
	http://www.dadamailproject.com/	Load on your own site Free version Pro version only $50 (one time fee)	Need your own server space Not as user friendly to configure or use as some others
	http://www.phplist.com/	- phplist is an open-source newsletter manager - Load on your own site	Need your own server space Pretty technical
	http://www.scripts4webmasters.com/	-Load on your own site -Free, basic, pro free -$99 -No monthly fees- as you buy to own -Inexpensive install service $	Need your own server space Not as user friendly to configure or use
Ecommerce- Integrated shopping cart, autoresponder, follow-up	www.cartville.com	$29, 34, 39, 99 /month Several Integrated options: autoresponder, affiliate package, digital download capability, recurrent billing	Run off their server All features more expensive, but extensive capabilities
	http://www.1shoppingcart.com/	- $29-99/month - $3.95, 30 day trial	Need your own server space Not as user friendly to configure or use

more than ever. However, this process has to be supported by transparency, frequent communication, constructive feedback and positive feedback about communication, and opportunities for staff to participation in decision making at every level of the organization. When staff have a voice, even if small in change processes, when their expertise in doing their work is recognized and called upon to guide the change process, they are much more willing to follow the leader. The power of cultivating Ownership in the vision can never be overestimated. Build Ownership, and create buy-in, then your organization will work long and hard. Fail to appreciate their efforts, hours of commitment to their work, and concerns, and you will have a much more difficult and uncertain journey ahead.

Process. Another urgent need is focused on processes. In contemplating change, SME leaders must study existing processes, identify where the

problems are, determine how to meet that need, and *plan* prior to implementing change. The emphasis on planning prior to implementing change cannot be overemphasized as history and headlines are replete with examples of catastrophes from lack of planning. Moreover, employees' personal memories of frustration will be unfortunate vivid reminders of the consequences of changes which did not occur smoothly. Instead, work with all levels of staff to understand and plan process transitions before, during, and after change. For example, temporary redundancy, running parallel systems to enable both old and new systems co-exist before the discontinuation of old processes (whether electronic or paper), can head off much of this disaster.

In addition, the strain on technical support during times of change might be excessive. Therefore, in planning for transition, SMEs need to negotiate upfront all technical support from vendors, or other sources, and consider how to scale this support down over time. The transition will be acutely felt at first, but if planned well, it will pass and business will be back to a steady pace, albeit quicker.

Growth. The final area is that SMEs are often caught off-guard with the surge of growth that occurs after making the shift to the integration of ebusiness technologies and platforms. The greater global reach for the marketing of their products and/or services, the expanded ability to serve global customers, may not have been anticipated in specific areas. Such areas may arise in scalability—being able to cope with large numbers of orders, with more sales people, support personnel, production timeline and capacity, and shipping volume, packaging, and costs. They also might not have anticipated how different geographic client bases might have different needs with their products and services either in different features and compatibilities, technical support, hours of availability, etc. Finally, the successful launch may also bring many suggestions for new products, large clients, new collaborations, affiliations, and partnerships. If the CEO has previously made all top level decisions, he/she might not be able to personally handle them all; instead cultivation of different levels of leadership and succession needs to be considered.

When SMEs use e-Business tools during the change process they have a much greter chance of success. e-Business tools can be effectively applied across there critical areas: interpersonal, processes, and growth. This discussion has laid the groundwork to proactively address change; the next section provides direction for solutions and recommendations within the scope of e-Business.

SOLUTIONS AND RECOMMENDATIONS

Strategy for Encouraging SMEs Adoption of E-Business Solutions

The strategy for SMEs adopting e-Business begins with the education of the SME owners on what e-Business can do for them. After that, specialists and consultants must be available to help design the e-Business plan, and introduce the e-marketplace platform. The last step is employee training.

SME owners must become aware that changes in their business and the technological environment can be first and foremost addressed using e-Business solutions. They must also be aware that these e-Solutions can help them offset these challenges, and in such ways that also improve their competitive edge. Once owners are aware of these possibilities, industry leaders will most likely see SMEs begin to migrate from low complexity e-Commerce to high complex e-Business applications.

The adoption of complex e-Business innovations requires two principal elements, development of internal and external technology, and adoption of new business models. The purpose of an e-Business model is to take advantage of new technologies (hardware and software) through a

flexible market structure that then translates into business value. Business value does not just mean profits; it can mean better communications, responsiveness, cost control, etc. Once implemented, SMEs must continually restructure their resources within an e-Business model to react to ongoing industry changes.

In adopting e-applications, SME owners must be educated to understand that their new e-Business model not only requires the adoption of these new technologies, but must also lead to the destruction of old practices and capabilities. Upon adoption, old ways become obsolete (Wu & Hisa, p.105). All this involves knowledge which few SME have, and the need for continuing refinement in training as new applications develop.

After SME owners understand the potential impact of e-Business on their business, the next educational goal (after the e-specialist has created a new business plan and designed the e-platform) is to train employees in the technology and e-Procedures prior to and during the transition. All the planning and education described is important, but remember, the academic reports show that SMEs do not really implement these procedures. Evidence reveals that there is a trend of SMEs not using training resources which they can afford, are available, and/or have been developed for them. SMEs need assistance in applying the recommendations included in this chapter and further research to determine ways to improve and any barriers to overcome.

FUTURE RESEARCH

Further research is needed in examining the adoption, integration and effectiveness of e-Business in a wide variety of industry areas. Building upon literature for each industry and researching related professional associations may provide substantial leads in comprehending the industry climate, expert and demands. By better understanding the context and organizations, specific studies may be posed and conducted to identify leading trends, and best practice. Just a few questions which might prove informative for efficiency, scalability and sustainability may include

- Are there similar or different ways to introduce ecommerce across SME industries?
- Are there similar or different ways to implement ecommerce across SME industries?
- Are there similar or different ways to introduce ecommerce across SME industries?
- What are trends in each of these areas?
- What are the best practices in each of these areas?
- What are promising practices in each of these areas?
- What are emergent technologies in each of these areas?

Action research (Glanz, 1998) can be a very valuable first level research model for SMEs because it is less intensive, and may be executed by a non-expert who has been sufficiently trained. At the same time action research takes inquiry in SMEs much further than evaluations. Action research allows the staff, leader or researcher to pose a question which they will research (Glanz, 1998; Stringer, 2007). The purpose is to identify how to serve that need. Therefore a proposed solution is established, in this case it would be vetted though the organization, tested in the action research study and data gathered which can provide direction for new or revised product development, marketing approaches, organizational processes, customer service quality, etc. In the context of SMEs, action research can guide and advance data driven decision making to a more proactive level to increase creativity, efficiencies and success.

Trends

Based on our findings, with the continuation of uncertain markets, increasingly global commerce and collaboration, greater e-Business services will

be adopted by successful SMEs. Therefore, how will these organizations respond? What will be the specific details and larger trends in the barriers, challenges, and new opportunities experienced? Continued research will reveal these answers. However, if these questions are pursued on the basis of interpersonal needs, skills, training and organizational change, the SMEs stand to gain much valuable information in readily usable forms. Specific trends which bear watching and tracking for impact on SME specific markets include technologies related to the delivery of more publications, media and entertainment products on-demand, web-based entertainment opportunities, green technologies, and knowledge management.

The e-Book has been the source of debate for decades now, but seems to be coming of age, more recently with Kindle DX®, Sony® Reader and the newer "Cool-er" (Pogue, 2009). Whichever of these or other devices wins the race for global social adoption and market domination; it is clear that people worldwide are ready to use technology to provide reading material. Furthermore, users *seem* to expect to be able to access video, audio, and text all in the same device and retrieve new information on demand. Like a great technological ballet we see features dance in and out of handheld devices over the years: stripped down, one-function-only devices, to the Swiss army knife of smart phones, for instance. The race continues for the next iPod®, iPhone® and Blackberry®.

Younger users' dominate the use of web-based entertainment, social media and networking, but they are also a large consumer market. Fast growing SMEs include those who have identified new and niche web-based entertainment opportunities. Netflix®, Twitter®, Hulu®, and craigslist are examples of sustained and new success in this area (MacMillan, 2009). SMEs are especially capable of making advances in this field due to their smaller size, fewer decision makers, and abilities to respond to new idea markets without having to shift the direction of a behemoth bureaucracy. Keeping a vigilante watch on emergent trends and evaluating opportunities to maximize your SMEs strengths in this market has been a wise strategy for many.

No other technology application matches the scope of information and constant use as knowledge management via the web. SMEs do well to watch the trends happening in this field and determine how their resources, expertise and strengths can be used to develop new products and services which serve the unquenchable hunger of the public for new information, false information, and on-demand information (Tapscott, & Williams, 2006). Moreover, in 2010 and beyond, users are expecting to *use and create* content. We only need to look as far as Google®, Facebook® and LinkedIn® for success stories in this area (McGrit, 2009). Therefore developing platforms, frameworks, communities, portals and spaces in which users, prospective clients or purchasers can find the information they need, manipulate in new ways and share more information there is a prime approach. Fortunately, many open source and inexpensive web-based tools exist which allow SMEs to host such communities, but why not develop your own, or develop entirely new dimensions of knowledge management and creation? The world is hungry for these experiences and you might launch the next profit making subculture, or must-have add-on feature for every SME.

CONCLUSION

What has emerged in this chapter is a clear image that SME owners lag in adopting e-Solutions for various reasons. These concerns include

- A lack of understanding of the solutions' applicability to their enterprises,
- A deep concern over the cost of development both in actual program dollars, training dollars, and higher personnel costs, and

- A belief that there is no outside help available for assistance should they decide to adopt e-Solutions.

We have also seen that innovative technology initiatives need to be developed within the framework of current theories of effective leadership skills, employee empowerment, and training in new and advanced processes. Moreover, these critical frameworks need to be supported by conclusions that a vibrant work environment motivates higher productivity.

The reality of coordinating successful SME ventures today is that increasing demands of global competition, more complex reporting requirements, and greater demand for human resource management have significantly increased the back-office cost of doing business. Giving even greater hesitation in the commitment of resources and direction is the fact that these expenses do not include the costs of increasing revenue volumes.

The misunderstanding that some SME owners have on the costs of implementing e-Business solutions is not only false, it is *inversely* false. SME owners that question cost often view business expansion in a linear fashion. When sales go up, they add one more person to the payroll. However, investing in future growth can require a high upfront investment in fixed costs – those being costs that are incurred regardless of whether the sales have yet materialized to support them. The benefit of e-Solutions is that proper implementation eats into fixed costs, existing and future, by making these fixed processes much less costly, or making them more like variable costs – that being a direct cost of sales. By joining IONs, the fixed cost nature of many back-office operations can be outsourced to collective systems, making those expenses part of current costs. The most competitive businesses in the world are those that have very low fixed costs.

SME owners must first understand that e-Business solutions will drive down their current fixed costs now. And that they will also make future growth less costly on a per unit of sales basis. By educating owners as to cost savings, the relative inexpensive investment in these platforms, and by improving support scaffolding available while developing e-platforms, more SMEs should be able to move towards adopting e-Solutions as a core component of their operations in the future.

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Chapter 46
Cross-Cultural Learning and Intercultural Competence

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ABSTRACT

Globalization has increased the need to understand the nature of work-related adult learning and development across national boundaries. It is driving the demand for the workforce that possesses knowledge of other countries and cultures and affecting those who are responsible for developing international learning activities. The author of this chapter calls for adult education and Human Resource Development (HRD) professionals to learn how to apply adult learning theories in cross-cultural learning to help individuals with different cultural backgrounds. This would help these professionals acquire intercultural competence and become successful in international assignments.

INTRODUCTION

Globalization demands are transforming the boundaries of the world. This change is leading us into a worldwide global economy where national boundaries become blurred. In reality, the globalization of the workplace and workforce has been a fact of life for many organizations (Roberts, Kossek, & Ozeki, 1998). Workforces around the world have become more diverse, more educated, and more mobile (Briscoe, Schuler, & Claus, 2009). Therefore, global mobility and global careers have emerged recently as the significant phenomenon for the global workforce (Lin, Pearce, & Wang, 2009). As a consequence, the challenge of developing and managing "global workforce" has received extensive attention (Briscoe et al., 2009; Tarique & Schuler, 2009).

In facing the challenge, international organizations, especially multinational corporations (MNCs) around the world have tried to seek new ways in order to survive in the competitive global

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arena. Some succeed, but many do not, and the inability of their managers or expatriates to function successfully in their global assignments has been the primary cause of international business failures (Apud, Lenartowicz, & Johnson, 2003; Lee & Croker, 2006). The need of developing internationally competent workforce becomes increasingly important. In literature, it shows that the degree of one's intercultural competencies to another culture results in the successful international performance (Chuprina, 2001). Learning in a new culture is a prerequisite to obtain intercultural competencies. Ferraro (2002) asserts that the essential competency for success in managing the global organization is also based on learning. There is a great demand worldwide for high quality workforce practitioners and adult educators who can work effectively with cultural diverse adult learners in the workplaces and facilitate the cross-cultural learning (Chang, 2004).

The purposes of this chapter are to review the related literature of cross-cultural learning and intercultural competence; to explore the relationship between adult learning theories, cross-cultural learning, and intercultural competence; to offer feasible solutions and recommendations to the problems; and to discuss the future trends that help adult educators and HRD practitioners to facilitate meaningful cross-cultural learning programs for adult learners to be successful across cultures.

BACKGROUND

Globalization has increased the need to understand the work-related adult education programs across national and cultural boundaries (Chang, 2004). Most importantly, it is crucial to understand how adult learners function and learn across cultural boundaries. The cross-cultural learning and experience of adult learners can occur in many forms. One of the most dominant cross-cultural learning and experiences comes from the expatriation experience, which is the work-related adult learning (Yamazaki & Kayes, 2004). Without formal training or education in the cross-cultural interactions, the notion of cross-cultural learning has become the key for the expatriates to obtain intercultural competencies (Yamazaki & Kayes, 2004). A growing research enhances the notion that successful expatriate adaptation and cross-cultural learning depend on how well an expatriate can learn from experience in the international assignments (Porter & Tansky, 1999). Many studies have applied and utilized adult learning theories such as experiential learning and transformative learning to be the research theoretical framework to investigate the work-related cross-cultural learning (Chang, 2004; Chang, 2007; Yamazaki & Kayes, 2004). Therefore, it is necessary for adult educators and HRD professionals to understand the nature of work-related adult learning programs in the intercultural settings and the need of developing intercultural competencies (Chang, 2004).

However, scholars, in the different disciplines, throughout the past 30 years have defined intercultural competence in a variety of ways. In the literature, the definitions of "competence" are theoretically and empirically inconsistent. There was no consensus in the definition of cross-cultural competence (Baxter Magolda, 2000; Lusting & Koester, 2003).

Intercultural competence as a concept has been explored and studied under different terms, such as cross-cultural effectiveness (Cui & Van Den Berg, 1991; Han, 1997, 2008), cross-cultural adjustment (Benson, 1978), cross-cultural competence (Ruben 1989), intercultural effectiveness (Cui & Van Den Berg, 1991; Hanningan, 1990), intercultural competence (Dinges, 1983), and intercultural communication competence (Spitzberg, 2000).

In developing cultural competent professionals, Campinha-Bacote (2002) has identified five components: (1) cultural awareness, (2) cultural skill, (3) cultural knowledge, (4) cultural encounter, and (5) culture desire. Similarly, Lister (1999) also has developed taxonomy for the cultural competent professionals. The taxonomy includes:

(1) cultural awareness, (2) cultural knowledge, (3) cultural understanding, (4) cultural sensitivity, and (5) cultural competence. In developing and managing expatriates, Black and Mendenhall (1990) suggest three skills to be successful in a new culture. The first skill is related to the maintenance of self-psychological and physical well-being. Another skill is related to relationship building with host nations through communications skills, interpersonal, and social skills. The final skill is related to cognitive skills that promote a correct perception of the host environment and its social system.

In addition, Han (1997, 2008) has conceptualized intercultural competency as measurable intercultural effectiveness (ICE) competencies, i.e. (1) the ability to handle psychological stress, (2) the ability to effectively communicate, (3) the ability to establish interpersonal relationships, (4) the ability to have cross-cultural awareness, and (5) the ability to have cultural empathy. Han's (1997, 2008) empirical studies have revealed a positive correlation between adult learning and HRD programs and intercultural competencies. Based on the findings, adult learning is crucial to intercultural competencies. Chuprina (2001) asserts that adult learning theories help the individuals learn in the cross-cultural adaptation process.

However, there was limited interdisciplinary research of exploring the relationship between adult learning theories, cross-cultural learning, and intercultural competence, and how adult learning theories help adult learners acquire the intercultural competence desired. Therefore, it is necessary to explore the definitions of the concept of intercultural competence in the first decade of the 21st century. A summary of findings is presented in Table 1.

CROSS-CULTURAL LEARNING/ INTERCULTURAL LEARNING

Cross-cultural learning is the process of adaptation to a new environment and its requirements through obtaining necessary knowledge, skills, and attitudes (Hannigan, 1990). Researchers seem to agree with each other that when there is less cultural dissonance, there is more cross-cultural learning taking place (Bennett, 1995). Methods for facilitating cross-cultural learning skills include assessment of individual commitment and value (Kayes, 2002), emotion and skill development (Mainemelis, Boyatzis, & Kolb, 2002), and immersion in different and challenging cross-cultural interactions (Mintzberg & Gosling, 2002).

In addition, literature has linked intercultural competence to cross-cultural learning. Scholars assert that acquiring intercultural competence is a process of cross-cultural learning (Bartel-Radic, 2006; Hannigan, 1990). The cross-cultural learning only occurs when the individual has passed through the realization of the impact of cultural differences, critical reflections, and practical experiences (Hofstede, 1994). In this chapter, the process is called an intercultural or cross-cultural learning process.

Bartel-Radic (2006) has established a definition for the intercultural learning as "the acquisition or modification of the representations of intercultural situations" (p. 652). Through ideas, concepts, beliefs, knowledge, and desires, an individual represents his/her world. In the assumption of intercultural learning, representations are the learning outcome, while acquisition and modification are the learning process. Intercultural learning does not mean to change one's own culture, but to understand other ways of seeing and finding the world, and that for effective interaction with others, the modification process starts to happen. Therefore, the intercultural learning process has to include how the individual has been modified or changed in knowledge, attitude, and skill in the intercultural situation.

Table 1. Definitions/Perspectives of Intercultural/Cross-Cultural Competence

Authors	Concept	Definition/ Perspective
Leiba-O'Sullivan (1999)	Cross-cultural competency	Knowledge, skills, abilities, other attributes
Cui & Van den Berg (1991)	Intercultural effectiveness	Intercultural success
Adler & Bartholomew (1992)	Global or transnational competency	Specific knowledge, skills, and abilities
Gertsen (1990)	Cross-cultural competence	The ability to function effectively in another culture.
Black & Mendenhall (1990)	Effective cross-cultural interactions	Cross-cultural skills development, adjustment, and performance
Earley (2002)	Cultural intelligence (CQ)	Cultural intelligence as a person's capacity to adapt to new culture based on multiple facets including cognitive, motivational and behavioral features.
Hunter (2004)	Global competence model	Knowledge, skills, attitudes, and experiences are necessary to become global competent.
Cross et al. (1989)	Cultural competence	A set of congruent behavior, attitudes, and policies that come together to work effectively in a cross-cultural situation
Collier (1989); Lusting & Koester (1999)	Intercultural communication competence	Intercultural communication competence "requires that individuals understand the meanings, rules, and codes for interacting appropriately" (Collier, 1989, p. 216).
Spitzberg (2000)	Intercultural communication competence is located in perception rather than behavior.	"competent communication requires attention to the factors of context, locus, and abstraction" (p. 111).
Deardorff (2004)	Intercultural competence	Pyramid model and process model of intercultural competence
Landreman (2003)	Intercultural consciousness	Intercultural consciousness is a more appropriate educational goal than multicultural competence
Bartel-Radic (2006)	Intercultural competence	The ability to adapt one's behavior to these meanings in order to produce effective behavior.
Redmond & Bunyi (1993)	Intercultural communication competence (ICC)	ICC is defined as "a multidimensional concept consisting of communication effectiveness, adaptation, social integration, language competence, and knowledge of the host culture and social decentering" (Redmond & Bunyi, 1993, p. 1).
Thomas (2003)	Intercultural competence	The ability to help/shape the process of intercultural interaction, avoid misunderstandings, and create problem –solving opportunities.

In addition, effective cross-cultural learning does not always come from a positive experience but from effective reflection. The reflection is a cognitive process based on the learner's personal maturity level of cognitive development. Mezirow (1991) views the change or modification from cross-cultural learning as an integrative and transformative process. It is necessary to explore how adult learning theories contribute to the process of cross-cultural learning and the development of intercultural competence. In this chapter, the relationship between cross-cultural learning and experiential learning theory and transformative learning theory are explored.

EXPERIENTIAL LEARNING THEORY

Many scholars have stressed that experience is a crucial element in adult education and learning (Fenwick, 2001, 2003; Kolb, 1984; Kolb & Kolb, 2002). In addition, the international business arena research indicates that cross-cultural learning and experience in cross-cultural settings play a vital role in developing global managers (Bartel-Radic,

2006). Therefore, international experience has been a tradition for cultivating senior management teams in many MNCs (Shen, 2005), as they basically accept the connection between experience, learning, and intercultural competencies.

Experience can be the real life textbook of adult learners. Kolb (1984) asserted that "Learning is a continuous process grounded in experience. Knowledge is continuously derived and tested out in the experience of the learner" (p. 27). Experiential learning focuses on how adult learners apply their direct experiences with the world in order to solve problems, to make the meaning for everyday lives or events, and to create new knowledge. Experiential learning theory is based on a variety of assumptions about the nature of learning. For example, learning is a process that allows an interchange between a person and his/her environment, and results in the creation of new knowledge.

Based on experiential learning theory, we are able to understand the process of knowledge transfer (Kolb & Kolb, 2002). Learning has been considered a vital key to the success of knowledge transfer. Kayes and Yamazaki (2005) have pointed out that cross-cultural knowledge transfer is an issue of cross-cultural learning. "At the heart of any successful cross-cultural knowledge transfer effort lies an individual or group of individuals with the skills to manage a complex ambiguous and often stressful process" (Kayes & Yamazaki, 2005, p. 87). To develop intercultural competence in the workplace, it is important for adult learners to transfer knowledge from one cultural context to another by their work-related practices and experience. Cross-cultural learning helps adult learners to navigate the knowledge transfer process across national borders. They have concluded that the better they understand how adults learn during their experiences in cross-cultural settings, the better they understand the cross-cultural knowledge transfer process.

Globalization has created a growing interest in extending experiential learning to new applications and new ideas. The quest of globalization and knowledge creation has driven adult learning theories to explore the cross-cultural learning domain. It is clear that learning is the most essential activity that helps global organization to obtain success (Ferraro, 2002). Experiential learning has proven invaluable in developing intercultural competence for individuals across cultural borders. In addition, Kolb has described experiential learning as "a holistic process of adaptation to the world" (Kolb, 1984, p. 31). Kolb's experiential learning theory is one of most influential theories to explain how managers learn from experience across culture (Kayes, 2002).

Kolb (1984) states that learning from experiences requires four different kinds of abilities: (1) concrete experience allowing oneself to be involved in new experience with his/her openness and willingness, (2) reflection and observation allowing oneself to have reflections and observations to view the new experience from a variety of perspectives, (3) abstract conceptualization allowing oneself to analyze from the observation and integrate concepts and ideas, and (4) active experimentation allowing oneself to make the decision and solve the problem by using new ideas and concepts. He also points out that experiential learning is the totality of the learning and knowledge creation process, which experience becomes the foundation of learning.

In a recent study, Fenwick (2003) proposes "reflection on experience" (p. 22) and emphasizes that knowing intertwines with doing and "Learning is rooted in the situation in which the person participates, not in the head of that person as intellectual concepts produced by reflection" (p. 25). Many scholars have argued that Kolb's experiential learning theory needs to take the learner's context (Fenwick, 2001, 2003) and emotional influence into consideration (Dirkx, 2001a, 2001b). Fenwick (2001) has asserted "specific contexts shape an individual's experience in different ways" (p. 11). Therefore, the individual's cultural background, histories, learning methods,

and emotional maturity should all be considered in the learning and knowledge transfer process.

Kayes and Yamazaki (2005) have extended Kolb's (1984) concept to explain how experiential learning theory helps managers to create and transfer knowledge in the global organizations. According to the process of knowledge transfer in the cross-cultural learning, they propose a process of seven competencies of cross-cultural learning. It has answered the quest of how managers learn to be effective in both their home culture and another or host culture as following: (1) valuing different cultures, (2) building relationships, (3) listening and observing, (4) coping with ambiguity, (5) translating complex ideas, (6) taking action, and (7) managing others (Kayes & Yamazaki, 2005).

TRANSFORMATIVE LEARNING THEORY

In literature, transformative or transformational learning is interchangeable. It is about change in the way that adult learners see themselves and the world in which they live. It is defined by Mezirow (1994) as "The social process of constructing and appropriating a new or revised interpretation of the meaning of one's experience as a guide to action" (pp. 222-3).

Transformation is a deep and structural shift in the thoughts, feelings, and actions of a person, which represents and explains the world around oneself. Learning is a process of making meaning and about how adult learners make sense of their own life (Mezirow, 1996). The tranformative learning process begins with an experience of a "disorientating dilemma" for learners. In addition, he asserts that "the process by which we transform our taken-for-granted frames of reference (meaning schemes, habits of mind, and mindsets) to make them more inclusive, discriminating, open, emotionally capable of change, and reflective so that they may generate beliefs and options that will prove more true or justified to guide action" (Mezirow, 2000, p. 8).

However, not all learning is transformative. According to Mezirow's (1991) work, there are four components in transformative learning: (1) experience, (2) critical reflection, (3) reflective discourse, and (4) action. First, learning begins with the learner's experiences. Second, the self-examined interpretation follows. Third, after testing the new meanings, the learners engage in the discoursing dialogue to obtain a new and empathic understanding and assessment of the interpretation. Last, the learner takes "immediate action, delayed action or reasoned reaffirmation of an existing pattern of action" (Mezirow, 2000, p. 24).

The process of intercultural competence is seen as transformative learning (Kim & Ruben, 1988; Taylor, 1994). In effect, they seem to indicate that intercultural competence is a transformative process where the learner develops adaptation skills that allow the learner to effectively understand the other culture over time. Kim and Ruben (1988) assert that a learning and growth process develops where the learner's old perspectives break down and new beliefs are constructed by the intercultural knowledge, attitudes, and behavioral competencies, are facilitated.

Transformative learning in acquiring intercultural competencies is an on-going process of individual's internal system. Taylor (1994) views intercultural competence as an adaptive capacity that allows individuals to become effective across cultures. Cross, Bazon, Dennis, and Isaacs (1989) also define cultural competence as a set of behaviors and attitudes for enabling professionals to work effectively in cross-cultural situations. In addition, McPhatter and Ganaway (2003) indicate that cultural competence is the ability that allows learners to transform knowledge and awareness. Kim and Ruben (1988) confirm that the process of acquiring intercultural competence is transformational and it is also a learning and growth process allowing individuals to function effectively across cultural and national boundaries.

Taylor (1994) has elaborated Mezirow's (1991) transformative learning theory and pointed out that "the literature seems to indicate that intercultural competence is a transformative process whereby the stranger develops an adaptive capacity, altering his or her perspective to effectively understand and accommodate the demands of the host culture" (p. 155). He states that "the transformation is becoming intercultural competent is anchored within the individual" (Taylor, 1994, p. 157). He has echoed Kim and Ruben's (1988) perspective and viewed the process of intercultural competence as an individual's internal transformative learning. Gaining intercultural competencies is the outcome of the transformative learning, which starts from the need of change. In conclusion, Taylor (1994) has offered a linkage between transformative learning and the process of intercultural competency.

THE ISSUES AND CONTROVERSIES

There are several issues, controversies, and problems that adult learning and HRD professionals should give more attention:

1. Pluralist society in the U.S.: The United States is experiencing a growing immigrant population. In 2005, immigrants comprised over 12 percent of U.S. residents and 15 percent of the workforce (Migration Policy Institute, 2007a, 2007b). The increasing complexity and diversity of U.S. society has enhanced the challenge. The need for multicultural learning and educational services has increased as the new immigrant population has grown and dispersed across the country. Due to the limited English proficiency and distinctive culture, every immigrant has experienced a certain degree of culture shock, stress, and sociocultural disruption. As a result, policy makers, adult learning, and HRD professionals in public, private, and non-profit organizations should pay more attention to applying adult learning theories in fostering intercultural competencies and facilitating cross-cultural learning.
2. Imported talents versus brain drain: There is no doubt that "the single most important skills to acquire in the 21st century is intercultural competence" (Virjee, 2004, p. 35). However, a shortage of international managers is a significant constraint for many MNCs. (Shen, 2005). Richmond (1988) indicates there is a growing demand of importing highly qualified immigrant talents, which is known as "brain drain"- intellectual talents flowing from the less developed to the more technologically advanced countries. A call for professionals in international education, cross-cultural learning, international training and development, international business, and adult education to work together is on the rise.
3. Challenges in higher education: The higher education institutes have faced the challenge of how to prepare their graduates with the intercultural competencies for the global competition. In addition, Lin, Pearce, and Wang (2009) state that there is a great demand of American higher education to import talents such as foreign-born faculty and researchers from other countries. From fluency in multiple languages to an understanding of the culture, the immigrant intellects have encountered many challenges in the host countries just like academic expatriates. These two issues have increased the demand of facilitating cross-cultural learning and developing intercultural competencies in the curriculum development.
4. Lacking of the unified definition: Rathje (2007) has stated that "we see the difficulty in defining intercultural competence as a key to communicative efficiency" (p. 259). Lacking of consensus of definition in intercultural competence and cross-cultural learning has presented a problem. To develop a deeper

understanding in the issues of intercultural competence and cross-cultural learning has become crucial.

5. The quest for adult learning research: Much international business research has been ascribed the high failure of expatriates to a lack of intercultural competence. Although Yamazaki and Kayes (2004) have tried to apply adult learning theory to explain the process of knowledge transfer of intercultural competence as the result of cross-cultural learning, there is still limited literature available regarding how adult learning theories help to develop the global-ready workforce by cross-cultural learning programs.
6. Experiential learning theory: In Kolb's (1984) experiential learning model, the learner's context has been neglected. The learner's context is mainly formed by the learner's culture. Rathje (2007) states that the external conditions and variables affect the intercultural success during the cultural interactions. It is crucial to be aware of the learner's cultural context in the cross-cultural learning.
7. Transformative learning theory: Mezirow (1990) has stated that learners reflect on prior information, knowledge, and experiences to determine how they acquire their beliefs and values and use this information as a basis for greater understanding of their own values as well as the values and perspectives of others. The core of the learning process itself is mediated through a process of critical reflection on one's assumptions and beliefs. However, Mezirow's work has been criticized in two ways, i.e., there is a need to explore how emotional and spiritual dimensions affect adult learning (Taylor, 1997), and different levels of capability in the meaning making, which is the level of maturity of cognition, influence how adult learners experience the transformative learning process (Erickson, 2002; Merriam, 2004). Therefore, it is necessary for adult learning and HRD professionals to consider the holistic situation of learners when they develop, conduct, and deliver cross-cultural learning for adult learners.

SOLUTIONS AND RECOMMENDATIONS

Based on the issues and controversies, the problems, solutions and recommendations are offered as follows:

1. To facilitate knowledge transfer in the process of intercultural competence (Kayes & Yamazaki, 2005). The knowledge transfer process plays a vital role in cross-cultural learning and acquiring intercultural competencies. It is recommended that adult learning and HRD professionals get involved in the process of knowledge transfer of cross-cultural learning in order to develop intercultural competencies proactively. They should also develop the capability to transfer cross-culture knowledge through learning and development programs.
2. To mandate internationalization in higher education. Higher education has been a civic learning organization and played the key role in making a contribution to sustainable human development. Specifically, higher education is now facing the need of directing higher education toward helping humanize globalization and to support lifelong learning (Lin, Pearce, & Wang, 2009; Reimiers, 2009). Higher educational institutions should keep adding more international courses in the curriculum and encourage the international cooperation. More interdisciplinary collaborations in higher education or those outside and in public and private sectors need to integrate adult learning theories into their implementations.

3. To foster global literacy and cultivate a global mindset (Gupta & Govindarajan, 2002). It is necessary to blend cross-cultural learning in the formal and informal education systems. Reimers (2009) recommends that "The avenues are to make the development of global competence a policy priority for mass education systems, to develop a scientific knowledge base that helps discern the success of projects, and to continue developing rigorous curriculum, instructional materials, and opportunities for teachers' education" (p. 27).
4. To develop adult learning and HRD professionals as continuous learners (McLean, 2006). Intercultural competencies assist the organizations in coping with ever-changing international work environments, and understanding international markets. There is also a crucial need to educate a new breed of adult learner and education professional that can develop learners' cross-cultural competencies and keep up the competitive advantage for the organization. In addition, HRD and adult learning professionals should always answer the following four questions: (1) how to develop effective cross-cultural learning programs for adult learners in the organization, (2) how to cultivate a continuous learning organization, (3) how to promote the cross-cultural competent organizational culture, and (4) how to attract, retain, and develop a global talented person in the organization.
5. To include the national culture in developing of the theory of cross-cultural learning. Chang (2004) recommends that adult learning programs should include national cultural differences and adjust programs to accommodate learners' backgrounds. Therefore, to include the learner's context in terms of national cultural background, environmental or situational variables, and the process of personal growth should be examined in the process of developing cross-cultural learning and acquiring intercultural competence.

FUTURE TRENDS

Adult learning and HRD professionals will need to pay more attention to the following trends when they are going to facilitate cross-cultural learning and develop intercultural competencies for adult learners:

1. Professional development for adult education professionals in cross-cultural learning: Developing a framework for quality professional development of adult education programs and practitioners to facilitate adult learners in cross-cultural learning and to help them to acquire intercultural competence becomes crucial (Schaetzel, Peyton, & Burt, 2007). The content of professional development will be focused on the knowledge that adult education practitioners need in order to work effectively with broader adult learners in the programs.
2. Non-western perspectives: One-way assimilation and accommodation of culture and increasing cultural hegemony will no longer suffice. The inclusion of all cultures and their value systems will benefit all concerned (Olaniran & Agnello, 2008). Understanding the different values between West and East will be helpful to manage a multicultural and multinational workplace. A call for an inclusive perspective from different cultural backgrounds is rising.
3. Developing global talent: According to the Conference Board Report (Kramer, 2005), a majority of companies want to accelerate the development of their global talent. The literature reveals that finding talented global managers is getting harder due to the lack of global talent (Bhasin & Cheng, 2001). In the future, the adult learning and HRD profes-

sionals will need to identify what lessons and what technologies will help to develop and train the global talent.

4. Cross-cultural training: Cross-cultural training, one kind of cross-cultural leaning, has long been advocated as a means of facilitating effective cross-cultural interaction and intercultural competence (Han, 1997, 2008; Landis & Brislin, 1983; Mendenhall & Oddou, 1986). In addition, it is important to continue identifying new technologies that assist in the development of successful cross-cultural training and intercultural competence for adult learners.
5. Virtual world and on-line learning: The virtual workforce has become one of most radical transformational issues that challenge adult learning professionals. How cross-cultural learning and intercultural competence issues have impacted the virtual workforce will need to be studied in the field of adult learning and HRD. Currently, the new technology has offered new directions for adult learning and HRD research and practice with this regard (Chapman, 2008).

CONCLUSION

Organizations have been struggling to survive under rapid internationalization. It has made a profound impact on the pattern of global competition and workforce. The request of global managers, leaders, and talents in the organization has been launched by many MNCs or even domestic businesses that are ready and eager to take a leap in the global market. Educating global-ready graduates will help bridge the dramatic shift in the global workforce conditions (Deardorff, 2008). Gupta and Govindarajan (2002) have stated "Heterogeneity across cultures and markets is a pervasive feature of the global economic landscape" (p. 116). They have recommended that cultivating the global mindset for workforce should be the answer to the response of the quest of global competition. Several mechanisms such as formal education, cross-border teamwork, cross- cultural immersion experience, and multi-year global assignments have been recommended (Gupta & Govindarajan, 2002).

In America, the immigrant labors have long been the underpinning of the country's economic success. However, the dramatic shifts in population have impacted the United States in the past decades. The rapid changes in the population are widely affecting the demographics of the schools, societies, and workplaces. While globalization, global education, and global citizenship have become the new challenges of learning in the 21st century (Olaniran & Agnello, 2008), in facing these challenges, McLean (2006) has offered his personal learning reflections and recommended that adult learning and HRD professionals should improve their understanding of adult learning across cultural boundaries, avoid ethnocentric worldview, and continue to grow and learn.

Finally, tomorrow's leaders must possess a broad understanding of history, of culture, of technology, of human relations, and of cross-cultural learning. Although Hudson (1999) states that the speedy change we face today has brought a global chaos to the adult learning and development world, it seems that there is a light at the end of the tunnel by promoting cross-cultural learning and cooperation. To achieve this goal, adult learning and HRD professionals need to review and explore the relationship between adult learning theories, cross-cultural learning, and intercultural competence in order to facilitate cross-cultural learning and develop intercultural competence for learners. Moreover, they should take the lead to educate global-ready workforce in order to function successfully in the United States and abroad.

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KEY TERMS AND DEFINITIONS

Cross-Cultural Learning: It is the process of adaptation to a new environment and its requirements through obtaining necessary knowledge, skills, and attitudes (Hannigan, 1990). Bartel-Radic (2006) has established a definition for the intercultural learning as "the acquisition or modification of the representations of intercultural situations" (p. 652).

Cultural Intelligence (CQ): Cultural intelligence as a person's capacity to adapt to new culture based on multiple facets including cognitive, motivational and behavioral features (Earley, 2002).

Experiential Learning: Kolb (1984) asserted that "Learning is a continuous process grounded in experience. Knowledge is continuously derived and tested out in the experience of the learner" (p. 27).

Intercultural Communication Competence: It is located in perception rather than behavior. "competent communication requires attention to the factors of context, locus, and abstraction" (Spitzberg, 2000, p. 111).

Intercultural Competence: It, as a concept, has been explored and studied under different terms, such as cross-cultural effectiveness, cross-cultural adjustment, cross-cultural competence, intercultural effectiveness, intercultural competence, and intercultural communication competence. In the literature, the definition was theoretically and empirically inconsistent.

Intercultural Effectiveness (ICE) Competencies: It has included five measurable variables as following: (1) the ability to handle psychological stress, (2) the ability to effectively communicate,

(3) the ability to establish interpersonal relationships, (4) the ability to have cross-cultural awareness, and (5) the ability to have cultural empathy (Han, 1997, 2008).

Transformative Learning: In literature, transformative or transformational learning is interchangeable. It is about change in the way that the learners see themselves and the world in which they live. Mezirow (1994) has defined "The social process of constructing and appropriating a new or revised interpretation of the meaning of one's experience as a guide to action" (p. 222-3).

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Chapter 47
Analysis of Social Media in Administration:
Epistemological and Practical Considerations

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ABSTRACT

This chapter analyzes some case studies about social media in organizations' administration. To do this, social media's epistemological base will be introduced, considering contributions from the subject of organizational behavior. The importance of this discipline is that it brings together social sciences points of view (social psychology, sociology and anthropology). After this, views will be presented regarding the mathematical nature of social media. In this part, the internet's influence on social media will also be discussed, for it has contributed to a new common sense, and it is responsible for social media popularity. Finally, how social media interferes in organizations will be attested to, as well as how it can be managed. In order to help the understanding of such knowledge, a survey will be introduced, with articles related to organizational practices in social media.

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INTRODUCTION

Communication through computers has been changing organizations and conversation, allowing for the creation of social media on internet. This media also has been changing how people communicate, work and are entertained. With the coming of the internet in the 1990's, this media basically consisted of small focal groups. Nowadays, social media has become a wide public space where millions of people feel more comfortable in using their real identity online.

However, Silva Junior (2007) has asserted that the term 'media' itself is very broad, referring to relationships among many characters. Some authors approach the subject as organization in networks, organizational networks, networking, bondless organizations, nets, collegial approaches and so forth.

This chapter aims to emphasize how important the use of social media is in the field of administration. But, before analyzing this point, the chapter will show the basis of social media, through the way in which the 'media' concept has been developed in some fields such as philosophy, sociology, anthropology and organizational psychology. After, the focus will be social media on the internet, where this subject has been spreading lately, especially with information and communication technology expansion (ICT).

From here, the theoretical reference will show the diversity of the subject 'social media' in a variety of scientific fields. It can be concluded that the origin of social media is before the internet. Indeed, the internet has contributed to the technological improvement of social media, serving as a disseminator for it to be widely debated.

THEORETICAL REFERENCE

With the literature studied in respect to social media, we can see that it is a subject which permeates many different fields such as philosophy, sociology, anthropology, organizational psychology, computer science, information science, data processing etc.

In order to approach the main tendencies that have influenced social media in administration, this theoretical reference is divided into two parts: the Social Current and the Technological Current.

SOCIAL CURRENT

In Social Current, the bibliographical review is based in philosophy, sociology, anthropology and organizational psychology fields. Those sciences analyze social media's influence on society before the coming of internet. It means that those sciences go to the essence of what grounds human interactions, and at the same time they analyze technology's impact on an individual's daily life.

Philosophy

In the beginning of civilization, humankind was gathered in clans. These primitive units shared the same interests, values and communication tools, defining specific hierarchical structures. The clans founded the first societies and as they spread, techniques developed.

Rudinger (2007) attests that only in the XVII century did techniques start truly affecting the way of living, cultural life and society's sociability, making the concept of culture strongly connected with the concept of technology, which originated technoculture.

For Subirats (1989), the analysis of modern technoculture must consider the ontological dimension of the technique as the principle present in forms of culture. Thus, the way in which technology affected society found a wide field for discussion in philosophy.

There are basically two lines of thought in philosophy about technique: technologic thought and "technophobia". Technologic thought is divided into Prometheans or technifiles and Faustians.

Both have as a guide the following idea: "whatever is missing in our lives, such a lack will be filled in by a greater access to databases and new technological resources," (Rudinger, 2007, p.14). For technological thought, technology has a huge influence on humankind's faith and its progress does not depend on other factors that interfere with life in a society. In this case, the human beings stand out when greater command of technology is bestowed upon him.

The technophobic view personifies technology by giving it a Machiavellian domination over man. This view believes that technology brings out the main weaknesses of society and to that it suggests ways of sabotaging computer systems so as to save humankind.

Regardless of the views for and against, it is worth saying that technology is just a means and cannot be labeled as good or bad, for it is only a way of knowing developed to fulfill humans' needs.

Thus, technological improvement has contributed to broadening the social media concept, which came to be known as a group of points with mutual communication. In the field of sociology, it came to be used for explaining the phenomena of reciprocal relationships among human beings.

Anthropology

In social anthropology, the notion of social media aims to support the analysis and description of the social processes which involve connections beyond the bond of groups and categories.

When those connections are managed through technology, there is a certain loss. The loss results from the high technological dependence that makes life easier, reducing the complexity of its material needs. However, technologies design it in subjectivism or disorder, from a spiritual point of view.

For McLuhan (1968), such technological dependency will contribute to extending the creative process of knowledge to all of human society through many means and different related tools. Nowadays this thought is easily seen through ideas that flow freely throughout internet and are also easily accessed.

But McLuhan (1968) warns about those facilities, especially regarding the meaning of technologic progress for everybody. This worry was supported by the written press of that time, which was already pointing out the first hints of forming a poor culture, which makes a person cold, lonely, impersonal and calculating. For Rudinger (2007) telecommunication reveals this fact. For it is essentially audiovisual, capturing especially the immediate senses, telecommunication allows the reconstitution of human collective experiences, which is shared, sentimental and no different from primitive communities. In this observation, the individual is designed in a subjectivism or disorder, spiritually speaking.

Sociology

Castells (2003) says this sociologic understanding of the network concept came to be used and improved upon in social sciences. From the end of the 1980's on, the media conception was reinforced as structured relationship arrangements of transition among members of a social system. According to Mayer (2000), the word *network* means the ascending social relationships with computer communication, showing hints of a new system of relationships among human beings.

Because of that, a sociologic analysis in the context of social networks is valid, given that sociology is a study of social behavior of human organization and interaction.

In Rudinger's view (2007) electronic communications are catalysts of social interactions that reflect a kind of decreasing of society for individuals. According to this idea, social networks together with electronic tools explain the superficiality and changeability of social relationships, which are only important while the contacts make dividends.

Rudinger (2007) emphasizes this perception attesting that social networks express the disintegration of personality, the fragmentation of social relationships and the representation of the world as the Babel of Capital. In this space, the individual, when she does not succumb to some kind of informational bliss, she relinquishes the focal point of her own existence, losing her efficacy and social and historical wealth.

Organizational Psychology

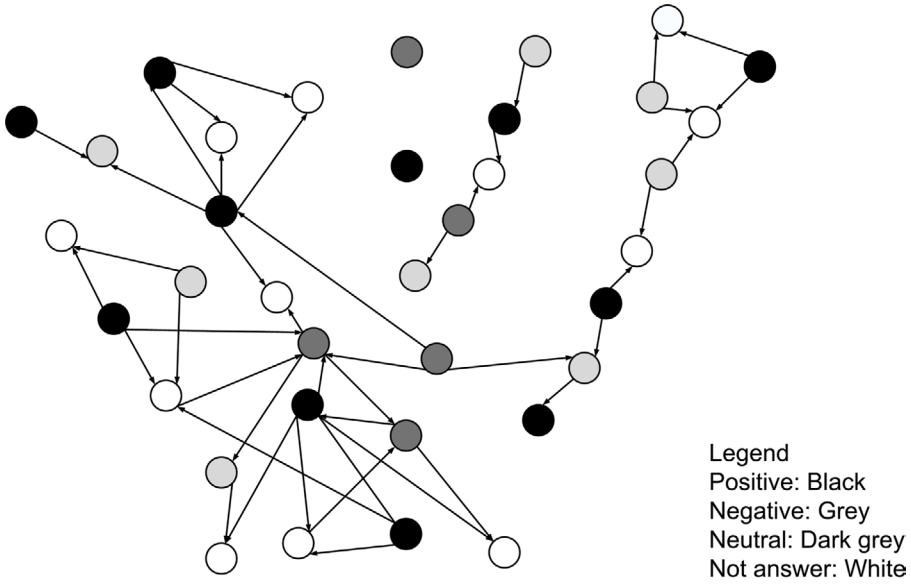
In the organizational environment, the individual attitude is stimulated by group dependence, a fact attested to by a study from Hawthorne in 1924. This study aimed to verify the luminosity effect in employees' productivity. In order to do that, a group of employees had their productivity tested under different light intensities. The result showed that in spite of the light intensity, the group started to work harder. Then it came out that this group worked harder because it was being observed. That the emergence of informal leadership was also verified it was noticed that group influence determined the individual results rather than the payment.

Since then companies started to care about knowing the groups present in the company, in order to map the leadership and participation profiles. They verified how those groups affect communication, create potential conflicts and define who is nice and who is not and who is good for the job or not.

To obtain this knowledge, a sociometrics technique is used to map the social network or to analyze an organizational network. It also works as an analytic tool for studying group interactions.

Figure 1 represents a sociogram or social graphic where each dot represents the employees of a company and the arrows linking them are the relationships. In this figure it is revealed, specifically, that the changes in this organization happen in a negative way. Social networks in an organizational psychology context are a specific set of links among a certain people set. Those networks are made up of conglomerates, which would be the existing groups inside the social networks, formally and informally.

Figure 1. Information network with employee assessment



The networks, also known as relationship networks, were not created with a business/organizational objective, but they became important communication means for news, channels, influences and organizational communication.

For this reason, the operation of the networks has automatic mechanisms for changes and historical transformation that do not depend on the will of its components. They are social changes and are not chaotic. The basic idea of a network is simple: a set of actors (or nodes, points or agents) among whom there are links (or relationships) (Martelo, 2004).

For Christakis and Fowler (2010), a group can be defined by a specific attribute or as a specific collection of people. Although a network, like a group, is a set of people, it includes something more: a specific set of connections among people, and those connections are usually more important than the individuals.

Next, Table 1 shows Robbins (2002) variables with the benefits gained when someone joins a group.

Despite the benefits acquired when joining social networks, it is also valid to analyze the motivating factor that encouraged people to seek out those networks more often.

The famous theory about motivating factors is the Needs Theory by Maslow. For him, in each human being there is a hierarchy of five needs: physiological, security, social, esteem and self-achievement. Thus, the first need the individual has to fulfill is physiological such as hunger, thirst, shelter, sex and other corporal needs. Then, there is the need for security and protection against physical and emotional damage. Next, social accomplishment is needed which includes affection, being accepted, friendship and the feeling of being part of a group. After, the person needs self esteem that includes self-respect, accomplishment and autonomy, in addition to external factor of self esteem, like: status, to be recognized and attention. Finally, there is the need of self-accomplishment, when the person achieves everything she wants to be.

Table1. Group benefits

Variables	Description
Security	The person diminishes the insecurity of feeling lonely and gets more strength, having fewer doubts and becoming more resistant against threats.
Status	The person feels important.
Self esteem	The person feels his own value by showing status, and he is also valued among the other members.
Association	The person satisfies his social needs..
Power	The person reaches goals through group action.
Reaching goals	The person does some task that requires competences.

What is noticed regarding social networks is the relationship among people or between people and companies that, sometimes, happens when some of those needs are stimulated. Specifically, the item about the influence of social networks in companies shows that the more successful companies in terms of networks are the ones which can show they really care about clients' and potential clients' opinion. Wouldn't this be the same as fulfilling, momentarily, the need for self esteem? Once companies seek to recognize and give some attention to clients and make them feel part of the company, it is like the clients have gained status.

It can be noticed in related literature that there are many theoretical approaches and explanations about the social networks phenomena. Balestrini (2008) says that part of the different definitions and concepts of the term organizational networks found in economics, sociology, administration and political sciences is from the diversity of theoretical approaches in the network study, which should be looked upon as more of a complement than as an excluding factor.

TECHNOLOGICAL STREAM

Technological Streams will analyze social networks in the network, on internet and in technologic context.

Networks

In Computer Science for instance, the concept of network has been adopted proposing to empower the set of resources available in computers, giving form to strong information networks that refer to the biggest network of all: the *internet*. Castells (1999) defined network as a group of knots connected, like the elements that are part of the media network, the political network and the global financial network. The intense, continuous and expansive flux of immediate information interchanges among varied agents has transformed the planet in a way never seen before. The world watched the birth of a network society (Castells, 1999).

Lazzarini (2008) defines a network as a set of individuals or organizations connected through different kinds of relationships. Recuero (2009, p. 24) says that social networks on internet are defined as "a set of two elements": actors (people, institutions or groups, the knots of the network) and their connections or social bonds".

Internet

The expression "social networks on internet" has been used by the media and by academy meaning sites that offer communication tools and services through the computer. Social Network Sites – SNSes empower interpersonal networks that pre-exist through computer communication (Aguiar, 2007).

According to Recuero (2009 p.102) the Social Networks Sites are spots used for social network expression on the Internet.

Boyd and Ellison (2007) say that the social networks on Internet offer services based on the Web, allowing the individuals to create a public or semi-public profile within a personal page; to have lists to be shared with other contacts in order to have a connection in common; to look over the connection list and see other people on the system. Authors say people, a majority of the time, are seeking communication with groups already known in social networks sites. It has been noticed with the big social network sites that users are not necessarily looking to meet new people; on the contrary, they especially want to communicate with people already in their social network.

Aguiar (2007) says the first SNS were launched in the US in the mid 1990's, having as a reference direct links established among classmates, indirect links among friends of friends. This was based on two academic studies: the experiment on "the small world", from 1967, and about the "strength of weak bonds" (especially in professional contacts). The second generation arose with the launching of Friendster, based on the "Friends Circle" model where users build up a public or partially public profile from data structured in a form and associate it with their friends' profile, friends of friends and acquaintances with which they have a kind of bond in real life. Friendster reached an unexpected audience, but the servers could not support the demand, what allowed the opening of new services like MySpace, Facebook and Orkut (Aguiar, 2007).

Currently there are many sites that offer "social network services", each one seeking a spot in the market related to whatever kind of interest (music, games, sex, etc).

Aguiar (2007) says the entities directly involved with environmental questions and social development problems were the pioneers in using electronic networks for articulating their social networks. There are two perceived articulation "patterns" in these entities' sites: the inter-organizational networks, where all users are only institutional, and the plural social networks, which are divided according to the actions of its interests. Some are formed by different individu-

als and social actors (activists, community leaders, researchers, lawyers, NGO representatives, companies, etc.) and by stakeholders or benefit actors in the processes in which they participate collaboratively (Aguiar, 2007). Recuero (2009, p. 102) says that the basic difference between "social network sites and other forms of communication through the computer is how social networks are visible and social bonds are maintained". For example, Fotologs (flickr), communication tools (Twitter), systems like Orkut and Facebook.

Boyd and Ellison (2007) talk about two important elements of social networks: appropriation (system used to maintain social networks) and the structures (how it is exposed to the actors).

According to Recuero (2009, p. 104), social network sites with appropriation are the social networks sites themselves and the appropriated social network websites. The sites themselves are those that are focused on exposing and making public the actors' social networks. They are systems that allow the publication of profiles and there is a specific place for showing the connections among the users, like Orkut and Facebook. The appropriated sites are the systems that were not intended to be uses as social networks initially, but they were appropriated by the actors for this aim. Those systems do not have places for profiles and connections, for example Twitter and weblogs.

Marteleto and Silva (2004) say the interest in studying social networks is also related to the importance of social capital. Participation in networks is connected to the structural social capital, which makes it relevant to understand the kind of network to be observed (user diversity, institutionalization of decision norms, general or specific goals, size and geographic area, etc). The issue of values constructed in these environments can be realized through the social capital that aids in creating popularity impressions, for instance, the list of followers. These built connections can be maintained by the system and by interactions. The social network sites increase the social groups' expression opening up space for visibility, reputation, popularity and authority inside the groups.

Table 2. Social capital and values

Realized Value	Social capital
Visibility	Relational
Reputation	Cognitive relational
Popularity	Relational
Authority	Cognitive Relational

Source. Recuero (2009 p. 114)

Recuero (2009) defends that the use of social networks for constructing social capital is efficient in influencing the values directed to the construction and maintenance of the network.

Virtual Communities

According to Recuero (2009) cyberspace is changing human life, broadening the size and power of social interaction. From this point of view, the author says that this perception of change leads to the birth of virtual communities in the form of a social group. Rheingold (1995) cited by Recuero (2009) defines that virtual communities are social aggregates which come from Internet, when a sufficient amount of people move forward public discussions for a period of time, with human feelings, to form relationship networks in cyberspace.

Thus forming elements of virtual communities would be the public discussions and the people who get together and keep in touch through internet. The cited elements could be social network creators, forming the communities (Recuero, 2009).

Lemos (2002) cited by Recuero (2009) defends that the virtual community is an aggregation around common interests, independent of boundaries and the geographically defined place. So, the concept of community is broad. Some authors adopt the same classification that others analyze the virtual communities from the notion of network, such as: communities as Clusters, network communities' topology, emergent com-

munities, association or filiation's community, hybrid community (Recuero, 2009).

Social Network Planning

Social networks exist everywhere around us, at workplaces as well as within families and social groups. They are designed to help us work together over common activities or interests, but unreliable evidence suggests that many SNSs lack such common objectives.

SNSs usually offer the same basic functionalities: a network of friends' listings, private messaging, discussion forums or communities, event management, blogging, commenting, media uploading and so on. With such features, SNSs demonstrate how the Internet continues to better connect people for various social and professional purposes.

Cetina (1997) has argued that social networking sites' longevity is proportional to their object-centered sociality - that is, the degree to which people are connecting via items of interest related to their jobs, workplaces, hobbies, and so on.

Similarly, Jordan and colleagues (Jordan et. al, 2003) advocate augmented social networks, in which citizens form relationships and self-organize into communities around shared interests. One way to develop object-centered sociality on the Web is via people's actions around the content they create together, comment on, link to, or for which they use similar annotations.

Naturally, people across all society and cultural settings naturally and routinely use Web 2.0 tools such as wikis, blogs and social networking services such as Facebook or LinkedIn, for personal purposes. The use of these services for personal and cultural purposes leads to their application in a business or professional application. These personal networking tools, or SNSs (Boyd and Ellison, 2007), are starting to penetrate the workplace.

The major business purpose so far is the use of social networking sites is for marketing purposes as a way to reach customers. But beyond their use as a simple tool for broadcasting a commercial message or interacting with customers, is the promise of productivity improvements in how employees and the enterprise's peers network and communicate. This is the establishment of a communication ecology mediated by technology in the workplace (Hear and Foth, 2007).

So far, Fortino and Nayak (2010) have proposed integrating business processes into the emerging functionality of social networks, such as architecture. Its key elements and some of the major attributes of each, includes:

- Professional Networking:
  - group association;
  - repositories for resume and credential sharing;
  - work spaces for interaction for mentoring;
  - support for career advancement activities; and
  - job search and job matching.
- Professional Communication:
  - instant Messaging;
  - chat;
  - texting;
  - scrapping;
  - book/Message Wall;
  - e-mails;
  - IP Conferencing;
  - discussion forums;
  - file Sharing;
  - video and photos;
  - sharing;
  - blogs;
  - posting polls and reviews; and
  - news.
- Professional Knowledge Base:
  - permanence;
  - easily searchable;
  - easily modifiable;
  - content aggregation;
  - supports different file types (text, images, charts); and

- ◦ ability to be modified/edited by multiple contributors.
- Professional Collaboration:
  - ◦ Threaded discussions;
  - ◦ virtual synchronous work sessions;
  - ◦ shared document site with versioning;
  - ◦ support for multiple document types;
  - ◦ conducting focus groups for feedback on products;
  - ◦ communities of practice for problem solving.

Note that the approach of Fortino and Nayak (2010) analyzes and represents relationships among social interactions, discussion, and communication media and technology of individuals, collectives and networks in a business context.

The applicability of these key elements can yield successful social network creation for effective enterprise uses. The architecture of the social networking space applied to workplace needs consists of categorizing enterprise communication modes based on the distinct characteristics of each communication need.

As with any new enterprise related to intellectual property, there are several issues which have arisen from social and professional networking sites. These include (Lloyd, 2009):

- Privacy: There have been growing concerns about users giving out too much personal information and the threat of others using this information for identity theft, data theft, virus spread, etc. There is also a perceived privacy threat in relation to placing too much personal information in the hands of large corporations or governmental bodies, allowing a profile to be produced on an individual's behavior in which decisions, detrimental to an individual, may be taken;
- Malicious Misuse: The relative freedom afforded by social networking services has caused concern regarding the potential of its misuse by individual patrons. The misuse of social networking services has led many to cast doubt over whether any information on these services can in fact be regarded as true (the same concern exists for on-line user generated definitions in tools such as Wikipedia). As professional networking sites generally associate the individual with their employer, these sorts of concerns are somewhat diminished.

Currently, social responses to privacy in social networks do not tend to deal with the potential misuse of personal information. This sensitive information is suitable for all kinds of phishing and other similar attacks.

Accordingly to Barnes (2006) there is a conflict between users' security awareness and their actual behavior, the so called privacy paradox. The solution to the paradox is not simple. Awareness is the key to solving the problem. She emphasized that, we as individuals need to be more proactive about educating each other and protecting our privacy on the Internet

Additionally, recent surveys show that problems of social networks are occurring more often, due to openness as one of the key features of these sites. So, it is desirable to raise user awareness of security as well and persuade people to confront their behavior about their belief in such environment.

As the number of social and professional networking sites grows, it is becoming more difficult for individuals to participate and maintain contact on multiple sites. Attempts are now being made to standardize services on networking sites to avoid the need to duplicate entries of friends, interests, profiles etc. There is also a trend to facilitate more interoperability between different networks driven by technologies such as Openid and Open Social. Using these tools a set of social or professional networking sites can form one seamless network.

Different positions of the individuals within a network do influence the resource flows and

enterprise performance. In order to measure the network structure, three main methods have been adopted in past network analysis literature. Network size measures the extent to which resources can be accessed by entrepreneurs. Network centrality measures the ability of actors to control resources through direct and indirect ties at the interpersonal level (Brajkovich, 1994). Network density measures the extent to which actors contact each other (Burt et. al, 2002). The density of a social network is used to measure the degree of relative connection in network members. Bigger social network density increases the degree of information sharing among network members.

Nowadays, we have found out there is coherence between these methods and the criteria used to evaluate online social networking. According to (Toptenreview, 2010) the main features include:

- Profiles: the most popular social network websites put a strong emphasis on the user's profile, making it easy to use yet still reflective of the user's personality;
- Security: all social networks should provide the ability to set up profiles privately in some way or another;
- Networking Features: additional features should include music sections, video uploads, groups and more;
- Search: common search functions include search by name, city, school and email address, and so on;
- Help/Support: most social network sites are self-explanatory;
- Legitimate Friend Focus: the growing trend for social networks is to communicate and keep in touch with people you already know.

Given these characteristics we can find Facebook, MySpace, Bebo, Friendster, hi5 and Orkut leading the ranking of the best social networking websites (Toptenreview, 2010). Websites such as Twitter which target more general social interaction between individuals and groups, and others called professional, such as Xing and LinkedIn which have become widely adopted by people was not considered by this review. So, the success of a social network relies on an individual's background and interest.

So far, the issues of functionality and applicability of social networking services to business purposes are just the beginning of a robust system design.

SOCIAL NETWORKS IN ORGANIZATIONS

Hakansson and Snehota (1995) defined business networks as "a set of relationships among the actors". These relationships make companies part of the network, connected to each other at the same time. It makes the companies influence the network with their relationships, at the same time they are influenced by other relationships with other actors. So, because there are in a network, the organizations are permanently influenced by their suppliers, clients, competitors, suppliers' supplier, clients' clients and other actors, in the same way they are influenced by the organization. Companies are waking up to their actions in social networks and are also realizing that a social network on internet is much more complex than a social network outside the internet. In social networks outside the internet, the messages are processed, fulfilling their goal or not and are filed away until further notice, if they are not lost. On the internet, messages are registered and can be multiplied thousands of times over, creating a complex net, like a social fork. But why would companies have interest in social networks? McCarthy (1960), one of the great names in marketing, says companies must try for four items: product, price, place and promotion. Those items are basic elements of business marketing. The product is what a company makes to be promoted in some place, under a determined price which people are

able to pay for. Such considerations force companies to think about how to expand their market share; it means the companies should go where the client and potential client are. Therefore, the right place to find the customer is on the internet and a tendency is being noticed that internet users are accessing more social networks. Thus, the internet became the world's square and social networks have the role of promoting or harming companies.

According to an Ibope Intelligence poll together with the Worldwide Independent Network of Market Research (WIN), India leads the ranking of countries which have more access to social networks, 100% of Indias' internet users visit social networks sites, followed by Serbia, South Korea, Russia, Spain, China, Turkey, Romania, Italy and Brazil.

In Brazil's case, the Associação Comercial de São Paulo – ACSP did a survey with 500 companies in São Paulo to know the acceptance of social networks (Valle, 2010). It found out that 66% of researched companies work with their own brand website and only 17% accept social networks on internet. It was noticed that 68% of researched companies admitted they do not answer the comments made about them on social networks. Among the researched segments, financial institutions take part with 26% on social networks, the service segment with 21%, wholesaler commerce with 17%, industry with 15% and retailing commerce with 12%.

Another survey done by Robert Half (2009), with 375 executives from Brazil, has revealed that more than 90% of the executives of medium and high management use social media actively, as a work tool and as a tool to contact friends. LinkedIn is the favorite of 36% of people interviewed. Between 23 and 31 years old, Orkut is the most used, with 33% of preferences. Despite the growing importance of social networks for professionals, companies still do not have profiles on those platforms. The research shows that only 20% of the companies where the interviewed ones work have profiles in digital relationship places. This research also revealed which activities are more developed in those channels by the companies. Thus, the most performed activity is brand monitoring with 20%. Secondly comes divulgation and launching with 14%, followed by a research about rivals with 13% and profile creation so as to interact with customers with 13%. Last, public exams and professional recruitment, both with 11%.

A recent survey from the communication agency Burson Marsteller (2010) reveals that from 100 of the biggest companies in the world, 79 are on social networks. The majority of these companies' interest is to seek improvement of communication with the client. This survey identified which companies stand out. To do this, these companies were analyzed according to some criteria, like answering clients' questions and promoting events and promotions. Since 2008, when Starbuck's business fell off, the company's founder launched a virtual community so that the clients could ask questions and make suggestions. From the 80 thousand ideas, 50 were put into practice in the stores and they helped the franchise grow again. In general, the companies that stand out in social networks follow the same profile, orienting employees about the questions or suggestions in order that interactions are quick enough to not frustrate the customer.

Next, 22 company cases will be introduced that are starting to stand out due to their actions in social networks. To facilitate the analysis, the cases are grouped according to the type of activity they exercise on the networks. They are: customer relations services, creating products, financial mediation, potential client identification, professionals and public service recruitment.

Case 1: Customer Relations Service - Satisfaction and Promotions

In April 2010, a volcano erupted in Iceland, which interrupted air traffic in Europe. Thousands of passengers congested the telephone Center of

air companies for information. The Brazilian operation of **Lufthansa** used Twitter as a means of communicating with the passengers, telling them information in real time (1,800 followers).

JetBlue uses Twitter to answer and suggest attractions at the destinations where it goes. Besides, it offers exclusive rates for people who follow them in Twitter. It is worth pointing out that executives from different areas were assigned to resolve customer questions (1,6 million followers).

Nike uses Twitter for two profiles: runner and soccer fans, for doing market analysis (15,000 followers).

Tecnisa do Brasil Construction has turned to Twitter for making promotions and sales. This company had used Twitter like a tool for composes a Web 2.0 strategy company to promote new releases, blog posts, modifications to the site and innovations. Knowing that their followers were buying and researching, in April 2009 Tecnisa articulated a promotion for users of Twitter, Facebook and LinkedIn creating a page within the site for disclosure and registration of interested users. In this month, the company was able to sell an apartment in Twitter for about 300 thousand dollars (5,200 followers). When someone buys, this person is identified as a potential client.

Nokia gathered about 500 fans (volunteers) of Nokia technology who clear up questions from other customer through Twitter. From these fans, the volunteer who resolves more questions can win anywhere from mobile phones to a visit to the company's technical center in Europe.

The profile of a Twitter user is a person who wants quick answers, so some companies hire teams dedicated to this function, like JetBlue.

Moreover, companies ask for help from their clients and potential clients to develop advertising, as a way of getting clients closer to the company.

Case 2: Creating Products

Nokia, Microsoft and Apple develop products to access social networks.

Nokia became a rival of BlackBerry's manufacturer, RIM, so that its new product would make it easier for Nokia clients to access social networks.

Microsoft created a service that gathers feeds from Facebook, MySpace and Twitter to the opening screen of the system (loop), allowing quick sharing of videos, photos, texts, websites, geographical position and status. Additionally, the service stores data in a "cloud".

Apple created software that uses a social platform for games, called the Game Center. Thus, iPhone and iPod Touch users can play in the multiplayer mode.

Case 3: Financial Mediation

A new challenge of social networks is financial relationships. There is Fairplace**,** a service created in May 2010 to bring together those who need money with those people who are willing to lend. For example, a person needs to make a loan for whatever reason. She puts on the site the amount she needs and explains what she intends to do with the money. Based on risk analysis, Fairplace makes the request public. Those interested in lending can make a proposal with a specific interest rate. If there are more offers, Fairplace calculates the best offer automatically. The advantage to who receives the loan is the lower interest rates. For the investor, the benefit is to build an application with more return than other application. It is worth considering that there is the risk of someone not paying the loan back (5,000 applicants).

In the US, where this is common, there was an interruption after Lehman Brothers went bankrupt, where the default rate was too big. In this case, the Securities and Exchange Commission (SEC), the organization that monitors the capital market, will allow the operation when new regulations are implemented. In the US the Prosper site had a portfolio of 1 billion dollars in loans (960,000 applicants).

A survey done by TerraForum consultancy in 101 financial institutions showed that 60%

of banks and insurance companies are reluctant to put their businesses on social networks, even though they represent a relevant part of companies that take part in social networks (Fogaça, 2010).

Case 4: Potential Client Identification

The Porto Seguros insurance company monitors Twitter to know who bought goods that need insurance.

Case 5: Future and Potential Client Prospection (13 to 17 Years Old)

Among social networks, the one which has captured the interest of teenagers is the Habbo Hotel, a kind of virtual world easier to manage than Second Life.

In Habbo Hotel, the companies share their brands and new products in an interactive way. The companies that are part of Habbo Hotel are Coca-Cola, Procter & Gamble, Kelloggs, Unilever, etc. In Habbo Hotel, the companies have virtual rooms for sharing their brand. The advantage of these companies is that the Habbo Hotel works as a marketing lab (1,200,000 visitors).

Case 6: Professional Recruitment

According to the interview of Serfaty, executive-president of the second biggest website of professional social networks, with Exame magazine (2010), in recession times, people visit social media networks looking for jobs. In this moment, access to networks like LinkedIn and Viadeo is bigger than Facebook. However, the use of social networks is even bigger to promote jobs. Companies like Ambev, Unilever, Vale do Rio Doce and Whirlpool promote jobs in social networks like LinkedIn, Facebook and Twitter. Even in the selection process there are tests that show ability to develop projects with social media.

Case 7: Public Service

In Brazil, public administration uses social networks to monitor citizen behavior, answering questions and launching promotions. Companhia do Metropolitano de São Paulo (Metro), Companhia Paulista de Trens Metropolitanos (CPTM), Polícia Militar (PM) and Companhia de Saneamento Básico do Estado de São Paulo (Sabesp) have designated employees to monitor social media.

Also, the São Paulo state government uses Twitter for promoting projects.

In United Kingdom the Twitter is used for public sector jobs. Wide range of public sector jobs on Twitter:

- Local Government;
- NHS Trust;
- Charity and Non-Profit;
- Armed Forces;
- Education/University;
- Police/Fire & Rescue;
- Housing Jobs;
- Quangos/Non-Government;
- Revenue and Benefits.

CONCLUSION

This chapter emphasized the importance of social media in the field of administration. Firstly, analyzed the basis of social media, through the 'media' concept has been developed in some fields such as philosophy, sociology, anthropology and organizational psychology.

Social networks have been expanding at an alarming rate. Scholars in the field of sociology, anthropology and psychology began to seek answers to this phenomenon. It has been concluded that this communication cannot meet people's deep emotional needs.

After, the social media on the internet was the focus, especially with information and communication technology expansion (ICT). The Internet has

become a meeting point of superficial contacts. The sociologist Robert Weiss wrote in the 70's, there are two types of loneliness: emotional and social. 'Emotional loneliness is a feeling of emptiness and restlessness caused by a lack of deep relationships. Social loneliness is the feeling of boredom and marginalization caused by a lack of friendships or a sense of belonging to a community. "Following this line of thought, it can be seen in the literature on the subject sites to reduce the loneliness of social relationships, but increases the emotional loneliness. It has been observed that the participants of virtual communities on the Internet are always surrounded by people, but cannot rely on any of them for a contact relationship.

The link between social networking and workplace is the architecture of the social networking which consists of categorizing enterprise communication modes based on the distinct characteristics of each communication need. It is emphasized the issues of functionality and applicability of social networking services to business purposes are just the beginning of a robust system design.

Finally, it was shown how social networks are working in the administration of organizations. The chapter selected any social networking cases in administration. They were grouped according to the type of activity they exercise on the networks. Such as: customer relations services, creating products, financial mediation, potential client identification, professionals and public service recruitment.

The cases show that companies use various areas of administration when using social networks. Among the cases reported, all initiatives on social networks were related to strategic planning of organizations. Furthermore, most cases presented as social networking tools for marketing and human resources. A set of special cases use social networks to develop and redefine its business model. One aspect that was slightly mentioned, but of significant importance to the citizen, are social networks in the public sector. Wide range of the public sectors are observed in Twitter and Facebook, if this sector were used appropriately and creatively these social networking probably would be easier to identify emerging issues, citizen satisfaction with public services and to find more efficient solutions to the problems of short and long term through partnership with citizens.

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KEY TERMS AND DEFINITIONS

Business Networks: A set of relationships among the actors mediated by a business media.

Network: A set of entities linked to each other that share a common theme.

Social Features: Including profiles, security, networking features, search, help/support, legitimate friend focus.

Social Media: An interaction between people by electronic media.

Social Networks on Internet: Sites that offer communication tools and services through the computer.

Virtual Communities are Social: A group of people who promotes public discussions forward for a period of time.

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Chapter 48
Understanding Shared Services:
An Exploration of the IS Literature

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ABSTRACT

In a competitive environment, companies continuously innovate to offer superior services at lower costs. 'Shared Services' have been extensively adopted in practice as a means for improving organizational performance. Shared Services are considered most appropriate for support functions and are widely adopted in human resource management, finance and accounting, and more recently employed as an information systems (IS) function. As computer-based corporate information systems have become de facto and the backbone of administrative systems, the technical impediments to sharing have come down dramatically. As this trend continues, CIOs and IT professionals need a deeper understanding of the Shared Services phenomenon. Yet, analysis of IS academic literature reveals that Shared Services, though mentioned in more than 100 articles, has received little in depth attention. This paper investigates the current status of Shared Services in IS literature. The authors present a detailed review of literature from main IS journals and conferences. The paper concludes with a tentative operational definition, a list of perceived main objectives of Shared Services, and an agenda for related future research.

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INTRODUCTION AND BACKGROUND

Organizations constantly face challenges to innovate their customer offering, improve the quality of their business processes and operate at lower cost. The current global financial crisis has amplified this need. Managers are looking to 'Shared Services' as one means of improving organizational performance (Wagenaar, 2006). While the notion of Shared Services is still under debate, it is broadly referred to as "*the concentration of company resources performing like activities, typically spread across the organization, in order to service multiple internal partners at lower cost and with higher service levels, with the common goal of delighting external customers and enhancing corporate value*" (Schulman et al., 1999). Shared Services has become increasingly popular within both public and private sector organizations[1] (Bergeron, 2003; Borman, 2008; Janssen & Joha, 2006b; Wagenaar, 2006), where it is mostly deployed in large organizations, with a predominant focus on support processes (Ulbrich, 2006). "*Since the late-1990s, the fast-spreading shared service concept has increasingly become popular as an organizational change approach, focusing on the theoretical potential for extensive improvements in support processes*" (Kagelmann, 2000; Schulman et al., 1999, cited in Ulbrich, 2006, p. 191).

Potential benefits of Shared Services have been extensively discussed in the commercial press e.g., "*promote efficiency, value generation, costs savings and improved service for the internal customers of the parent corporation*" (Bergeron, 2003). Cecil (2000), reports that 16 of the top 20 Fortune 500 companies have Shared Services Centres. Shared Services success stories such as General Electric (Lacity & Fox, 2008), DEC (Lacity & Fox, 2008), Reuters Asia (Lacity & Fox, 2008; Businessintelligence, 2005), Allianz (Lodestone, n. d), and Queensland Government (Queensland-Government, 2008), are many. Leading research firms such as Gartner provide a range of reports that describe the application of Shared Services in different industries, stating that "*Many enterprises are looking to shared services to support efficiency goals and to enhance business integration and agility*" (Gartner, 2008, p. 2).

Shared Services is considered most appropriate for support functions, and is widely adopted in Human Resource Management, Finance and Accounting (Cooke, 2006; King, 1998; McIvor et al., 2002; Peters & Silver, 2005; Webster, 2007). More recently Shared Services is being employed for the Information Systems (IS) function, and although not adopted as widely as by other functions, recent reports (Lacity & Fox, 2008; Peters & Silver, 2005) indicate that IS Shared Services is growing at a fast rate.

IS applications and infrastructure are an important enabler and driver of Shared Services in all functional areas. As computer based corporate information systems have become de facto and the internet pervasive and increasingly the backbone of administrative systems, the technical impediments to sharing have come down dramatically. As this trend continues, CIOs and IT professionals will need a deeper understanding of the Shared Services phenomenon and its implications; *"successful management of IT shared services was recently listed as one of the seven habits of effective CIOs"*(Lacity & Fox, 2008, p. 17).

As a *"discipline that is driven by rigour and relevance"* (Benbasat & Zmud, 1999; Davenport & Markus, 1999; Lee, 1999), IS academia has a vested interest in the growing phenomenon of Shared Services; a domain that warrants research in relation to the IS function, IS applications and IS infrastructure in organizations. In particular, IS as a discipline should be interested in Shared Services because they can drive radical change to the IS infrastructure and architecture (Curley, 2006; Ross & Beath, 2006; Weill & Vitale, 2002); IS can play a major role in identifying opportunities for Shared Services in other functional areas and in preparing the business case, as well as the IS strategy; IS can either internally or through

an external service provider, play a major role in transitioning to, and ongoing operation and evolution of the Shared Services environment. However, until now there has been no systematic study of Shared Services in the IS academic literature.

Therefore, a structured approached was devised and applied to systematically review the status of Shared Services literature in the IS domain. The driving research question being 'How is the notion of Shared Services perceived and reported by IS researchers?' This paper is specifically aims to report on how IS academia have defined the Shared Services notion and what objectives they have reported on. A better understanding of what Shared Services really are and why organizations deploy them, are important for the progression and success of Shared Services in practice and academia. Such results will, for example, help build a better understanding on what drives the interest for Shared Services (Hewlett-Packard, 2006) and form the foundation for deriving performance measures related to Shared Services (Boessenkool et al., 2006). It can also support the design and deployment of shared service structure and governance (Firecone, 2007); and help better understand the nature of Shared Services organizations (Kearny, 2004).

The contributions of this paper are threefold. First, we demonstrate the lack of academic IS literature on Shared Services; that same literature evidencing a need for better understanding Shared Services. Second, drawing from the limited existing IS literature on Shared Services, we provide preliminary definitions and objectives of Shared Services and present a potential research agenda for future research in the domain. Third, we detail a pilot literature analysis approach, developed and tested for the study of Shared Services in IS literature; to be extended to a broader range of academic disciplines, the results of the extended study expected to contribute to a stronger conceptualisation of Shared Services.

The remainder of this paper proceeds as follows. The next section presents the research strategy. Discussion of findings is in the following section. The paper concludes with a summary of the findings and recommendations for future research.

RESEARCH METHOD

This study is specifically devoted to searching and reviewing the literature on the Shared Services concept; predominantly the focus here is on how, the nature of shared service is perceived and reported by other researchers in Information Systems. Following Levy and Ellis (2006), the researchers followed a three staged method to extract, analyse and report the literature based findings. The first stage involved identifying the articles to be included in this review. The second stage comprised of designing and implementing an appropriate classification scheme to match with the study objectives. Finally, the third stage consists of synthesizing the coded details and analysing the literature to respond to the research objectives of this study. The following sections describe each phase in detail.

Extraction of Relevant Papers

In defining the research method for a comprehensive review of the IS literature on Shared Services, two main criteria have to be identified and clarified: (1) the sources, and (2) the search strategy (Cooper, 1998). The sources refer to which outlets are to be targeted, and the search strategy refers to what search terms to utilize during the article extraction process. The aim was to characterize Shared Services from an IS perspective and to review and depict the nature of Shared Services publications in IS. Thus, the primary search was limited to the IS domain.

Journals and academic conferences were considered. It was resolved to canvass the 40 IS journals listed at the 'ISWorld NET' web site[2]. These journals were identified after a comparison

of 9 published papers on IS academic journal rankings (as reported in the 'ISWorld NET' web site). To ensure that the literature reviewed was as current and inclusive as possible, the proceedings from major conferences were also examined. The IS conferences to target were determined based on those that were supported by the Association of Information Systems (AIS)[3]. Thus, the following IS Conferences were included within the scope; the proceedings of International Conference on Information Systems (ICIS), European Conference on Information Systems (ECIS), Pacific Asia Conference on Information Systems (PACIS), Australasian Conference on Information Systems (ACIS), and Americas Conference on Information Systems (AMCIS). Articles published from their inception to present (May 2009) were accessed.

The article extraction was conducted in multiple iterations. In terms of the search strategy, first, the key word 'shared service' was searched for, in the title, abstract, and key words of all papers in the target source list, through a database search. This yielded 4 from the IS journals and 4 from conferences (hereon, we refer to these 8 as the "principal" set of papers).

As this search only yielded very few articles, we extended the study to search for the key word 'shared service' in the body-text field as the next step. Ten selected IS journals[4] (based from those that yielded results in the high-level search, and a selected set from the 'IS world net' journal ranking list - based on topic alignment to Shared Services), and all 5 AIS conferences mentioned earlier were included in this second-staged search. The 10 journals were selected after eliminating those IS journals from the IS world net journal ranking list, that seemed less aligned with the notion of Shared Services (i.e., Artificial Intelligence). These were excluded from this full-text search, to sustain efficiency and feasibility. All papers in these sources were downloaded as full text pdf files. They were systematically indexed (by year and source) using the Adobe Acrobat professional tool. Adobe Acrobat professional's 'advance-search' facility was used to search the indexed papers. 99 papers (after removing duplications with the principal paper set) were identified through this effort, where they had mentioned Shared Services meaningfully, somewhere in the text of the paper (hereon, we refer to these as the "secondary" set of papers). Thus, the sample paper pool having a total of 107 papers (99 secondary and 8 principal) as we entered the pre-analysis planning phase.

Preparing for the Analysis

Two key aspects are of importance to mention when describing the preparatory phase for the analysis; the a-priori coding scheme and tool(s) used. They go hand- in-hand and are described below.

The goal of this paper was to derive a synthesized definition and identify the most commonly reported goals for Shared Services, based on literature. As mentioned earlier, what is reported herein is a sub-set of a larger study which had broader intensions. NVIVO 8.0 was used as a qualitative data management and analysis tool; to systematically code and analyse the data within one single repository. NVIVO has effectively been applied for analysing prior literature (Bandara, 2006; Gregorio, 2000), and this study adapted the coding and analysis strategies based on these prior studies.

Key areas of interest, in this case; 'Shared Services definitions' and 'objectives of Shared Services' (amongst others) were placed as main tree-level nodes within the NVIVO data-base that was created for this project. A tree-level node is a physical location within the tool, where you store the groups of ideas that would be coded. All the articles extracted were entered and saved within NVIVO as 'documents,' which are simply data that one analysis in the study. The aim was to conduct the analysis in two levels. The goal of the first-level-analysis was to capture the main details that related to each main theme – at a high level. In the second-level-analysis, these extracted

details will be analysed deeper to derive the intended findings. A detailed coding-protocol was devised by the researchers, to confirm the coding plan and scheme. A sample (3) of the papers (from amongst the primary papers) were coded by two of the researchers and the coding protocol was strictly followed, proving to assist in maintaining rigor and inter-coder reliability. The overall research findings and the analytical activities that supported these findings are presented in detail in the next section.

DATA ANALYSIS AND FINDINGS

This section presents the results of the literature-based analysis. First the extent of the academic IS literature on Shared Services is discussed and it is argued that more research is warranted. Next is presented a synthesis of definitions and objectives of Shared Services, as identified from the IS literature. This section concludes with a research agenda.

Need for Academic IS Literature on Shared Services

Our literature study shows that there is a lack of academic IS literature on Shared Services. Shared Services is an interesting area of research because of its impact on the IS function in organizations and the driving and enabling role of IS applications and infrastructure. It is also a very relevant area of research because of its growing importance in practice. We, therefore, argue that more academic IS research and publications are required discussing Shared Services in organizations, in particular in relation to the IS function.

Our literature study showed that only 8 papers are dedicated to Shared Services from a large pool of papers across 45 main IS outlets (this included all outlets as listed in the 'ISWorld NET' journal ranking and all the 5 AIS sponsored IS conferences - after searching them since their inception). Shared Services literature in IS is still very 'young', where the first main IS papers on Shared Services were those of (Ulbrich); (Veersteeg and Bouwman); and (Janssen and Joha) which appeared in Business Process Modelling Journal, Information Systems Frontier and Americas Conference on Information Systems in year 2006. However about a hundred papers (published since 1995) mention Shared Services in their articles, thus indicating a growing interest in and prevalence of Shared Services in IS, especially in relation to interest areas such as Sourcing (Accenture, 2006a; HRfocus, 2007; Kakabadse & Kakabadse, 2000), ICT Governance (e.g., Goh et al., 2007); E-Government (e.g., Janssen & Joha, 2006b; Janssen & Wagenaar, 2003; Janssen & Wagenaar, 2004); Public and Private Sector (e.g., Janssen & Joha, 2006b; Walsh et al., 2006); and University (e.g., Deloitte, Touche, & Tohmatsu, 2001). Therefore, to advance the academic IS body of knowledge with respect to Shared Services as a research topic and context factor, more academic IS research and publications are required.

The relevance of Shared Services is illustrated by extensive discussion of potential related benefits in the commercial press (e.g., reduce cost, accumulate intellectual and capital assets, provide services with customer and process focus, and deploy new technology) (Casiraya, 2001; Shah, 1998). Despite its apparent benefits, anecdotal evidence (Craike & Singh, 2006; Janssen & Joha, 2006b; Lawson, 2007; Shah, 1998) suggests that many organizations have difficulty understanding the context and details of Shared Services. Thus, evidence from Shared Services initiatives has been mixed, suggesting value from further investigation of the phenomena. While there have been industry-based research reports, these are typically limited to trend analysis (Accenture, 2005; Deloitte, 2007a; Deloitte, 2007b) or narrative description of the journey from Shared Services concept-to-implementation (Accenture, 2006b; Gartner, 2008).

Concluding, as an overall discipline, IS lacks academic research in Shared Services. This is supported by other researchers in the field (Borman, 2008; Craike & Singh, 2006; Ulbrich, 2006). This paper calls for addressing this gap; there is a need for better understanding the phenomena of Shared Services, its relation to the organization of the IS function, and its relation with other IT interests areas such as governance or enterprise systems. The next sections present an analytical review of the definitions and objectives of Shared Services as reported within the limited pool of IS literature. This section concludes with a set of propositions derived for this analysis that is the first formulation of a detailed research agenda for Shared Services in IS.

Defining Shared Services: A Review of IS Literature

This section reviews how IS research defines Shared Services. As mentioned earlier, a separate node was dedicated in the coding scheme of the NVIVO database to capture any 'definitions' introduced or referred to by the papers included in this analysis. Table 1 provides a summary of this analysis. Six papers offer some unique attempt to define Shared Services, at least partially, if not completely. Amongst these, 3 papers refer to the definitions provided by Schulman et al. (1999) and 2 papers refer to Bergeron (2003) which are from the management discipline. This could mean that shared service is a common terms that needs little explanation. However, as the phenomenon is very recent, it cannot be assumed that the broader IS community is that familiar with it. Alternatively, it could mean that while Shared Services are mentioned, it is not considered as important enough. This seems also hardly the case, as there are many direct statements in literature that refer to objectives of Shared Services in relation to the performance and organization of the IS function. Therefore, we argue that there has been a lack of attention and research of what Shared Services is and how familiar or different it is from other forms of the organization and sourcing of the IS function.

Shared Services can be perceived as a form of sourcing, and thus a clear description of what Shared Services is, and in particular how it differs to other sourcing arrangements should be made in order to define and clearly understand the scope of the notion. *"There is a need to integrate these concepts for a comprehensive view"* (Whitaker et al., 2006, p. 3249). "*Looking to the future, the large-scale changes to the business environment... are likely to tip the balance of factors associated with outsourcing toward... shared services*" (Davenport, 2000, p. 175). Thus, it is important to clearly understand what sourcing model is used and when it is best to change from one form to another. This is especially valid for Shared Services in the IS domain, as one needs to clearly position ICT related Shared Services amongst other ICT outsourcing options when considering Shared Services strategies and adoptions. However, only Ulbrich (2006) made any attempt to compare and contrast Shared Services to other sourcing arrangements. The author states that Shared Services is somewhat similar to outsourcing, and that *"the main difference is where the service provider is located organizationally and that internal resources are used rather than those of a contractual partner"* (Ulbrich, 2006, p. 197). Furthermore, Shared Services can be seen as *"... an enabler that helps to create a platform for business growth, flatten organizational structure, and support of general group strategy. It is often a step towards globalization, an enabler for cultural organizational change, or a step towards external outsourcing"* (Kagelmann, 2000, p. 79-81, cited in Ulbrich, 2006, p. 199).

In an attempt to analyse how IS academia has deemed to define Shared Services in several ways; the key words provided in the few definitions used in the pool of IS literature extracted (as explained earlier) were analysed. Both direct definitions (as presented in Table 1, and indirect

Table 1. Summary of all definitions of shared services found within IS literature

	Paper	Definition made
IS papers specifically defining Shared Services		
1	Lacity and Fox (2008)	*"the consolidation of support functions (such as human resources, finance, information technology, and procurement) from several departments into a standalone organizational entity whose only mission is to provide services as efficiently and effectively as possible."* (Accenture, 2005, cited in Lacity & Fox, 2008, p. 17)
2	Borman (2008)	*"...retains the core concept of concentration while avoiding prescriptive requirements to achieve specific objectives or operate in set ways."* (Longwood & Harris, 2007, cited in Borman, 2008). Other definitions referred by this author are Schulman et al. (1999, p. 9) and Bergeron (2003, p. 3).
3	Sedera and Dey (2007)	*"The concept is simple bring-together functions that are frequently duplicated across divisions, subsidiaries or operating units and offer these services more efficiently and at a lower cost."* (Sedera & Dey, 2007, p. 1). Another definition referred by the authors is Schulman et al. (1999, p. 9).
4	Ulbrich (2006)	*"... shared services gather a selection of common and well-defined services to provide these services to an organization's units, acting independently."* (Ulbrich, 2006, p. 197) Other citations referred by this author are Schulman et al. (1999, p. 9), Bergeron (2003, p. 3), Moller (1997), and Quinn et al. (2000).
5	Whitaker et al. (2006)	*"...consolidating IT and business processes throughout the firm into a single or small number of centers owned and run by the firm."* (Shah, 1999; Ulrich 1995, cited in Whitaker et al., 2006, p. 3249)
6	Gibson and Arnott (2005)	*"A shared service is the standardisation and consolidation of business functions, in order to reduce process duplication and at the same time centralise controls and processes."* (Gibson & Arnott, 2005, p. 9)
Other common definitions cited by IS authors		
Schulman et al. (1999) defines Shared Services as "*The concentration of company resources performing like activities, typically spread across the organization, in order to service multiple internal partners at lower cost and with higher service levels, with the common goal of delighting external customers and enhancing corporate value*" Bergeron (2003) defines Shared Services as "*Shared services is a collaborative strategy in which a subset of existing business functions are concentrated into a new semi-autonomous business unit that has a management structure designed to promoted efficiency, value generation, costs savings and improved service for the internal customers of the parent corporation* " Moller (1997) defines Shared Services as *"... a shared service centre (SSC) is an independent organisational entity which provides well defined services for more than one unit (which may be a division or business unit) within an organisation. The SSC is responsible for managing its costs and the quality and timeliness of the services it provides to its internal customers. It has its own dedicated resources and typically will have informal or formal contractual arrangements, often called service level agreements, with its customers."* Quinn et al. (2000) defines Shared Services as *"... shared services at a simple level refers to the practice of business units, operating companies and organizations deciding to share a common set of services rather than have a series of duplicate staff functions."*		

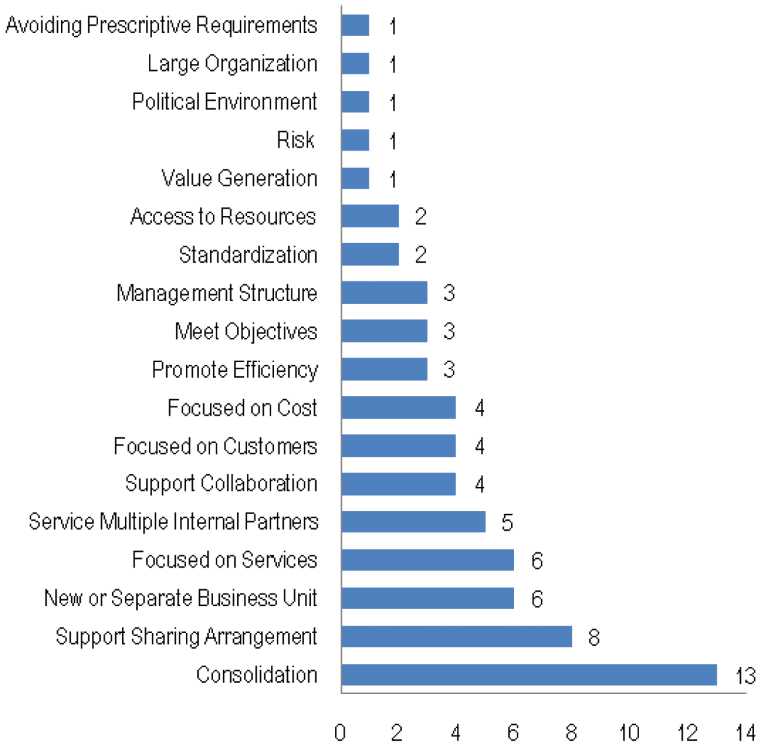
attempts to describe Shared Services, were used here from the principal and secondary set of papers). Figure 1 depicts these key words, graphed from least to most mentioned themes from 107 papers (indicated by the number of sources that have stated this as a key element when defining Shared Services).

While the data pool is very limited (as only a very few papers define Shared Services), it can be observed that 1) consolidation, 2) support sharing arrangement, 3) new or separate business unit, 4) focused on services and 5) service multiple internal partners are the most common themes used to define Shared Services within the IS literature. Deriving a clear definition for Shared Services within the IS context is a gap that has to be filled and this analysis provides a starting-point for proceeding with this. Within the context of the currently available academic IS literature, we define Shared Services as the internal provisioning of services by a semi-autonomous organizational unit to multiple organizational units involving the consolidation of business functions supported by a sharing arrangement.

Objectives of Shared Services: A Critical Review of IS Literature

An in-depth understanding of why an organization should consider shared-services is critical

Figure 1. Key themes identified from the shared services definitions provided in IS literature

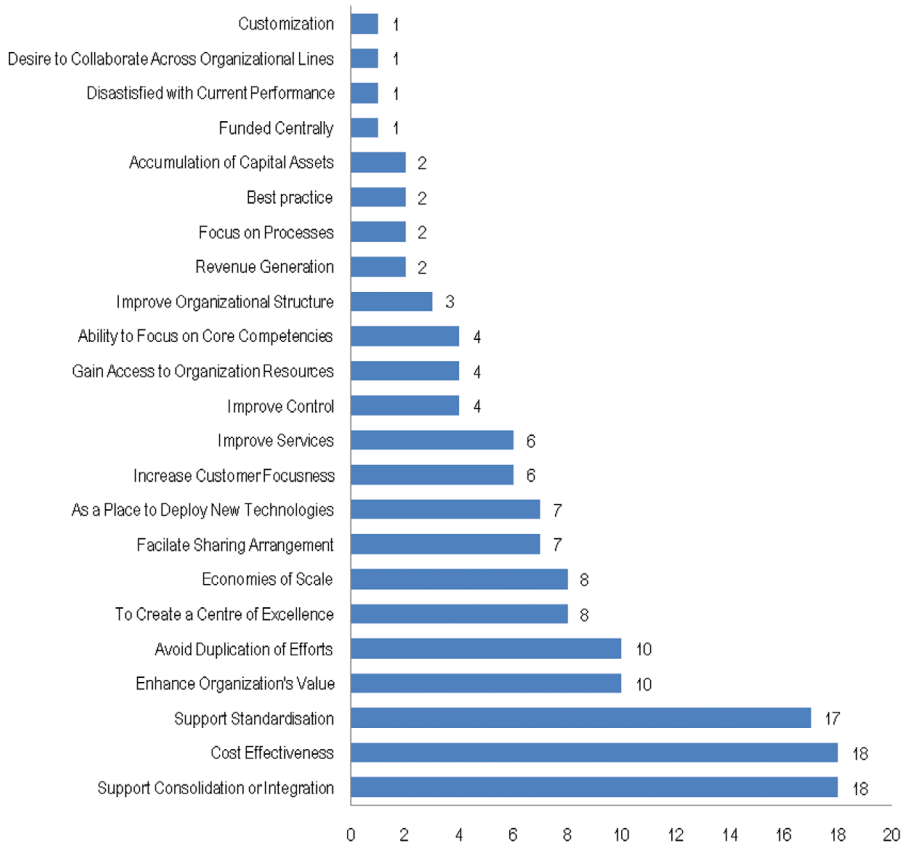


for its success; "*Make sure you know why you're implementing shared services*" (Gartner, 2008, p.1). Thorough understandings of its objectives are vital for the progression of the field and will be the foundation for its advancement in practice and research. For example, Shared Services objectives form the key input when designing a Shared Services decision-support framework or for benefits-realization and evaluation of Shared Services initiatives. This analysis systematically coded the different objectives of Shared Services as mentioned in the IS literature from 107 papers (8 principal and 99 secondary). Any direct or indirect mention of an objective was captured in the higher level node in the first round of analysis. The content captured in this node was then analysed to build a set of objectives bottom-up from the coded data. Figure 2 depicts the high level summary of the objectives identified through the literature (based on the number of sources that have stated each).

It can be observed from Figures 2 that the top three objectives of Shared Services that IS literature have reported on are; support consolidation and integration, cost effectiveness and support standardization.

When taking a closer look at the top five objectives, one can argue that there are two relatively more strategic objectives (enhance value and decrease costs), and three organizational objectives. Therefore, within the context of the currently available academic IS literature, the main objectives of Shared Services are enhancing the organization's value and decreasing its costs by supporting consolidation and integration, supporting standardisation, and avoiding duplication.

Figure 2. Shared services objectives as reported by the IS literature



A Potential Research Agenda for Shared Services Identified From a Critical Review of IS Literature

This section is dedicated to deriving a high level research agenda that has been motivated by this study on Shared Services definitions and objectives. The coded data was analysed further to identify potential propositions for future research. NVIVO's query functions were used to identify potential relationships and implied causality amongst the coded objectives. These are presented (with evidence from data) below.

The first observation is that IS academics must make a stronger attempt to define Shared Services, especially for the IS context. Research propositions to pursue are: 'What elements constitutes Shared Services (within the ICT context)?' and 'How does Shared Services in IS, differ in other sourcing arrangements related to ICT?' Of course this also requires addressing the underlying methodological question of 'How can one best derive and validate a Shared Services definition?'

Secondly, while Shared Services is deployed with the expectation of various benefits, a deeper review of what the actual intensions of Shared Services are (especially in relation to IS), is an area requiring further investigation. The data coded in the NVIVO database under 'objectives' was analysed further to identify such potential relations. A set of research questions (inspired by current literature), has been derived as a starting point for future research on Shared Services. Table 2 presents these propositions, together with supporting literature.

Table 2. Potential research to pursue in relation to Shared Services objectives

Research proposition	Motivating evidence from literature
1. Should organizations invest in technology first when deploying Shared Services? a. Is technology a key enabler for progressing with Shared Services initiative? b. Can organizations gain cost effectiveness through technology investments, when deploying Shared Services initiatives? If so, how? c. Is integration capability a key enabler for sharing within Shared Services initiatives? If yes, how can IT support integration capabilities?	"*Reuters found that technology was a critical enabler of its regional shared services*"... and "*This is worth investing in before anything else*" (Lacity & Fox, 2008, p. 22) *"The global ERP system drove process standardization and was the "engine" of the regional shared services."* (Lacity & Fox, 2008, p. 22) Cost effectiveness can be achieved by the organization through technology investment when deploying Shared Services. *"In 2001, the corporate CFO decided to significantly reduce finance costs by standardizing finance policies for global delivery (BPR), implementing standard, global enterprise resource planning (ERP) and workflow systems (technology enablement),…"* (Lacity & Fox, 2008, p. 19) In the literature, one of the goals adopting Shared Services is to deploy new information technology. Integration capabilities have been seen as an enabler for sharing arrangement in the Shared Services initiative. *"The ICTU processes are primarily aimed at creating coordination and integration capabilities to enable the sharing of services among as many agencies as possible in order to gain economies of scale".* (Janssen & Joha, 2006a, p. 2309)
2. Are organizations able to improve customer foci by centralizing all the similar activities or business functions in a Shared Services initiative? a. How/Can Shared Services improve the services to a company's internal customer?	The Shared Services approach has a focus on putting the customer first. *"According to them, business units inevitably become more comparable, when drawing together activities that have been performed similarly in various locations before. Furthermore, work can be handled quicker and more precisely, putting the customer in focus."* (Forst, 2001; Norling, 2001, cited in Ulbrich, 2006, p. 198) Shared services have been designed to improve the customer foci in the organizations. *"... designed to promoted efficiency, value generation, costs savings and improved service for the internal customers of the parent corporation"* (Bergeron, 2003, cited in Borman, 2008, p. 2)
3. How can organizations generate cost effectiveness through Shared Services initiative? a. Can organizations generate cost effectiveness by implementing Shared Services arrangement? b. What types of Shared Services arrangement can be utilized within the organizations in order to gain cost effectiveness? c. Can organizations realize the economies of scales when deploying Shared Services initiative? 4. How can organizations avoid duplication of efforts by implementing Shared Services?	Reuters found that financial cost can be reduce by *"standardizing finance policies for global delivery (BPR), implementing standard, ..."* (Lacity & Fox, 2008, p. 19) *"Services are more and more shared among public agencies to gain efficiency benefits."* (Janssen & Joha, 2006a, p. 1) *"Hospitals and physicians are also able to share the use of the systems for ancillary services such as payroll, budgeting, and general accounting. These types of shared services arrangements provide cost efficiencies for both the hospitals and physicians (Guiney, 1994)."* (Lockamy III & Smith, 2009, p. 7) *"Cost reduction is often a primary benefit and driving force for companies to implement shared services (Norling, 2001; Triplett & Scheumann, 2000). Shah (1998) and Triplett and Scheumann (2000) argue that shared services realize economies of scale, and thereby gain efficiencies that are normally reserved to centralized organizations. The main goal is to provide optimal solutions for the lowest possible cost (Funk, 2000; Joachim, 2001)."* (Ulbrich, 2006, p. 198) Reuters was able to reduce financial costs by *"...moving a significant amount of work from decentralized business units to six new regional services centers (organizational design)".* (Lacity & Fox, 2008, p. 19) *"Economies of scale through centralisation, the removal of duplication and being better positioned to secure funds to invest in the latest technology were the most common reasons given for establishing SSCs."* (Borman, 2008, p. 8)
5. What are the benefits of standardization within Shared Services and how can these be best arranged?	Shared Services benefits can be realize through standardization process. *"Cecil (2000) and Triplett and Scheumann (2000) see benefits in a standardization process. According to them, business units inevitably become more comparable, when drawing together activities that have been performed similarly in various locations before."* (Ulbrich, 2006, p. 198)

continues on following page

CONCLUSION AND OUTLOOK

Many organizations are adopting Shared Services and there has been a significant presence of Shared Services in the recent trade press. Shared Services are promoted in the commercial press as a powerful model for reducing cost, increasing quality and creating new capabilities. The

Table 2. continued

Research proposition	Motivating evidence from literature
6. Are Shared Services able to improve an organization's structure through consolidating processes? a. How/Can the consolidating process facilitates the shared service arrangement within the organizations? b. Are organizations able to generate cost effectiveness through the consolidation process within Shared Services initiative? c. Are organizations able to avoid duplication of efforts through consolidating processes? If so, how?	*"…, many firms have turned to a shared service model, consolidating IT and business processes throughout the firm into a single or small number of centers owned and run by the firm (Shah, 1999; Ulrich, 1995)."* (Whitaker et al., 2006, p. 3249) *"… taking the concept of consolidation and shared services beyond the organization's four walls by sharing applications, hardware or core business processes with other firms to further reduce costs."* (Davenport et al., 2004, p. 20) *"From a business and organizational perspective, the most obvious route to consolidation- related cost savings is the adoption of shared services."* (Davenport et al., 2004, p. 20) Organizations are able to avoid duplication in efforts when deploying Shared Services. *"By cutting out duplicate support processes and non-strategic activities, and organizing them as so-called shared services."* (Ulbrich, 1996, p. 196) *"… bring-together functions that are frequently duplicated across divisions, subsidiaries or operating units… "* (Sedera & Dey, 2007, p. 1)
7. Are Shared Services able assist organizations build a Centre of Excellence to gain access to organizational resources? a. Should organizations establish a Centre of Excellent to improve organization's control in Shared Services initiative?	Shared Services have several goals, which one of the goal is establishing Centre of Excellence. *"Establishing a centre of expertise is another goal that has been mentioned. Employees are more satisfied and their competencies can be better utilized and anchored in the organization, which contributes to improved knowledge management"* (Kagelmann, 2000, p. 77-8, cited in Ulbrich, 2006, p. 199) *"In this way, experts can be utilized by all business units for a comparable low cost."* (Ulbrich, 2006, p. 198). *""Expertise was scattered around the organizations and the departments were often not able to gain access to the expertise needed and to consolidate experiences." and "The municipalities decided to concentrate their ICT departments within one SSC, as they had similar objectives and ambitions."* (Janssen & Joha, 2006a, p. 2309) A centre of excellence (combination of Shared Services centre and a group of expertise) are able to improve organization's control. *"Since these SAP developments were performed by diverse groups of developers with different knowledge domains and specializations, a shared service center, together with an application management team was created to coordinate and monitor modifications to the SAP system. Through a systematic procedure of authorization and internalized payment for software modifications, the application management team was able to sift out unnecessary changes to the ERP system and reduce the impact of implemented changes across the organization."* (Lim et al., 2005, p. 142)

potential to leverage ICT related benefits through Shared Services has been recognised and more and more IT related Shared Services solutions are predicted to take place, to address calls for efficiency, reduced costs, quality improvement and innovation. While Shared Services in practice has been excelling, it has not gained enough attention and momentum from academia. From an IS academic perspective, our goal should be to: a) do strong, relevant research that informs the practice of Shared Services and related curriculum; and b) anticipate important roles our IS graduates might assume in relation to Shared Services, and insure we are preparing them to be preferred for these roles. Such roles might be in the business areas of Shared Services using organizations, in the IS function of Shared Services using organizations, with software or service providers involved in Shared Services.

This paper is the first attempt to investigate and report on the current status of Shared Services literature in IS academia. It consisted of a very detailed review of IS literature from all main IS outlets – which consisted of the 40 IS journals listed in the 'ISWorld Net' and all the 5 AIS sponsored IS conferences. All sources were searched for, since their inception. The resulting set of papers showed that the current body of knowledge is still very limited while there is a need for a better understanding of Shared Services.

This paper provided a preliminary understanding of definitions and objectives of Shared Services as reported in the academic IS literature, and derived a set of research propositions that can be investigated further.

Within the context of the currently available academic IS literature, we defined Shared Services as the internal provisioning of services by a semi-autonomous organizational unit to multiple organizational units involving the consolidation of business functions supported by a sharing arrangement. We identified as the main objectives of Shared Services; enhancing the organization's value and decreasing its costs by supporting consolidiation and integration, supporting standardisation, and avoiding duplication. Definitions and objectives are critical for the progression of the field, for example; to understand what drives the interest for Shared Services, to form the foundation for deriving performance measures related to Shared Services, to support the design and deployment of Shared Services structure and governance; hence providing a strong foundation for further research in Shared Services.

The content presented here was a segment of a larger study that attempts to characterise Shared Services via published literature. A three-staged systematic approach; for literature extraction, preparing for analysis and conducting detailed literature analysis, utilising the functionality of a range of tools (i.e. Adobe Acrobat professional, NVIVO and EndNote) was devised and applied here. This paper essentially pilot tested the methodology. This approach can be re-used to cover a broader range of academic outlets to derive a detailed characterization of Shared Services beyond the IS domain and to obtain a more in-depth understanding of Shared Services beyond definitions and objectives.

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ENDNOTES

1 for example, Borman (2008) who conducted a case study of shared services in the public and private sector; Janssen and Joha (2006b) and Wagenaar (2006) who conducted a case study of shared services in the public sector.

2 Available at: http://ais.affiniscape.com/displaycommon.cfm?an=1&subarticlenbr=432, last accessed March 6th, 2009.

3 The Association for Information Systems (AIS) founded in 1994, is a professional organization whose purpose is to serve as the premier global organization for academics specializing in Information Systems (see http://home.aisnet.org/ for further details).

4 These 10 journals were: MIS Quarterly (MISQ), IS Research (ISR), Journal of MIS (JMIS), European Journal of IS (EJIS), Information & Management (I&M), Communication of AIS (CAIS), Journal of AIS (JAIS), Information Systems Frontier (ISF), MIS Quarterly Executive (MISQE), and Business Process Modelling Journal (BPMJ).

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Chapter 49
Employees' Perceptions on Organisational Justice, Job Control and Job Demands:
Do Ownership and Human Resource Management Practices Matter?

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ABSTRACT

The issue to be addressed in this study is whether ownership and HRM practices are associated with employees' perceptions of organisational justice, job control and job demands. The study focuses on care personnel working in sheltered housing facilities for elderly people. Multi-level linear regression is applied to analyse the data. The results support the argument that an increased similarity between public, not-for-profit and for-profit organisations is emerging in HRM issues. HRM practices were found to associate with positive outcomes in organisational justice and job control. However, to be successful in the implementation of HRM, it is crucial that employees understand the justification for each procedure as well as find it a useful resource in terms of their own job.

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INTRODUCTION

The increasing proportion of old people and especially those over 90 has been suggested to result in an increasing demand for the care services and also an increasing need for workforce. The new capacity for the services is often purchased from private sector. Consequently private services providers are increasingly involved in the delivery of the publicly funded health care and social services. Moreover, while employers compete on young skilful employees they also need to sustain the working ability of the ageing workforce. To be successful in both of these quests employers need to understand the importance of appropriate and fair Human Resource Management (HRM) practices.

Public, not-for-profit and for-profit organisations have often been assumed to pursue different societal goals (Haley-Lock & Kruzich, 2008; Schmid & Nirel, 2004). It is, however, not evident whether this has to do with the organisations management practices or the wellbeing of the employees. The question of ownership and for-profit ownership is a highly debated subject. The arguments for and against public or private delivery of public services are, however, rarely based on valid research evidence (Øvretveit, 2003). In this paper we try to put some light on this matter.

The issue to be addressed in this paper is whether ownership and HRM practices are associated with employees' perceptions of organisational justice (Colquitt, 2001), job control and job demand (Karasek & Theorell, 1990). These factors reflect general leadership and management practices as well as psychosocial working conditions in an organisation. These have suggested resulting in positive outcomes for both the employees, but also for the organization (e.g., Laschinger, 2004). The focus of the paper is on the personnel working in sheltered homes for elderly people, which is the most rapidly extending segment in the field of elderly care in Finland. The term "sheltered housing facility" refers to care facilities offering accommodation and a certain set of services (e.g., care, meals, and cleaning) for elderly people. Eligible for sheltered housing are the elderly citizens who are not capable of living on their own and are in need of regular help. Residents pay rent as well as for the services they use. A cross-sectional survey data were used in the study and multi-level modelling was applied as a statistical method.

REVIEW OF LITERATURE AND STUDY HYPOTHESES

Organisational Justice, Job Control and Job Demand

Perceived organisational justice may be seen as a determinant of effective leadership (van Knippenberg & De Cremer, 2008). A perception of fairness of the procedures may be used as a means to evaluate leadership and its legitimacy in general (van Knippenberg et al., 2007; Konovsky, 2000). Furthermore, justice can be seen as one of the basic requirements for the organisation's effective functioning and employee satisfaction (e.g., Colquitt et al., 2001; Greenberg, 1990). It has been claimed that if employees perceive just treatment they will potentially be well disposed to their work, work outcomes, their superiors and the decisions made by the superiors (Barling & Phillips, 1992; Greenberg, 1990; Laschinger, 2004). Moreover, organisational justice has been shown to be associated with employee health and wellbeing (e.g., Elovainio et al., 2005; Elovainio et al., 2002; Kivimäki et al., 2003), productivity (Heponiemi et al., 2007) organisational behaviour (Moorman, 1991), job satisfaction and turnover intensions (Cohe-Charash & Spector, 2001). The perception of organisational justice has also been shown to have an effect also on the quality of care (Pekkarinen, 2007).

To define organisational justice we adopt Colquitt's conceptualization (2001) and divide the perceived organisational justice into four dimensions: distributive, procedural, interpersonal, and informational justice. Procedural justice refers to the perceived justice of the organisation's decision-making procedures. Interpersonal justice is related to the interpersonal treatment that employees receive when decisions are implemented in the organisation. Informational justice refers to the explanations on decisions and other information provided by employers. Distributive justice deals with the rewards the employees receive for their job (Colquitt, 2001; Colquitt et al., 2001).

Perceived job control and job demands describe employees' psychosocial working conditions. These have been suggested relating to sickness leaves, psychological distress, cardiovascular diseases, musculoskeletal disorders (Höckerting & Herenstam, 2006) and the quality of care (Pekkarinen, 2007). In this paper we adopt the Job Demand-Control model (Karasek, 1979; Karasek & Theorell, 1990). The model is based on the assumption that mental strain results from the joint effects of job demands and the freedom of decision-making to meet these demands (Karasek, 1979). Job demands can be defined as the work demands placed on the employee in their work, whereas job control is defined as the authority permitted to an employee to decide how to meet those demands (Karasek, 1979).

Career and skills development, participation in supplementary education (Meyer & Smith, 2000; Paré & Tremblay, 2007; Parry & Kelliher, 2009; Rodwell & Teo, 2007) and developmental performance reviews (Boswell & Boudreau, 2002; Rodwell & Teo, 2007; Tremblay et al., 2010) have been suggested to associate with different dimensions of organisational justice. Thus, perceived organisational justice, but also perceptions on job control and job demands may be seen partly as results of effective leadership (e.g., van Knippenberg & De Cremer, 2008). Thus, we conclude that organisational justice as well as job control, and job demands, are potentially influenced through HRM practices. Based on this assumption we state our first hypothesis accordingly:

Hypothesis 1: HRM practices, such as receipt of mentoring, participation in supplementary education and participation in the developmental performance review are positively associated with perceived organisational justice and job control as well as negatively associated with perceived job demands.

Ownership Status and Human Resource Management

In the field of health and social care, comparisons between organisations under different ownership have mainly focused on *access* (e.g., Amirkhanyan et al., 2008), *quality of care* (e.g., Comondore et al., 2009; Hillmer et al., 2005; O'Neill at al., 2003), *costs* (e.g., Deveraux et al., 2004) and *performance* (e.g., Rosenau & Linder, 2003). Human resource issues have, in turn, not been addressed to any large extent (see however e.g., Hansen et al., 2009). However, in a more general body of the leadership and management literature a number of public-private comparisons exist (e.g., Boyne, 2002; Budhwar & Boyne, 2004; Nutt, 1999; Perry & Rainey, 1988). The studies present rather controversial results leaving the question of the importance of the ownership open for further research. Moreover, most of these existing studies have focused on comparisons between public and private or between not-for-profit and for-profit organisations (e.g., Amirkhanyan et al., 2008). The studies acknowledging all of the three ownership types suggest that public not-for-profit and for-profit organizations are potentially different in respect to their management and leadership practices (Boyne, 2002; Budhward & Boyne, 2004; Höckerting & Härenstam, 2006; Nutt, 1999; Parry et al., 2005). It has also suggested that ownership has an influence on perceived job demands and

job control (e.g., Höckerting & Härenstam, 2006; Härenstam, 2008).

Public sector is increasingly turning to not-for-profit and for-profit organisations for the delivery of health and social services. It has been suggested that increasing contracting with public sector creates isomorphism between different ownership types making the traditional organisational boundaries blurry and changing (Cunningham, 2008). Public sector organisations have indeed started to increasingly emulate the HRM practices and strategies of for-profit organisations (e.g., Rodwell & Teo, 2007). Not-for-profit organisations, in turn, have been forced to make their operations more transparent and to professionalise their management practices in order to survive in the competition on contracts (Parry & Kelliher, 2009). Moreover, in the field of health and social care factors such as professional culture, education, and strict regulation, are likely to produce similarities and affect the processes taking place in the workplace (DiMaggio & Powell, 1983; Rodwell & Teo, 2007).

Some scholars have even argued that all organisations are public to some extent. Some are just more exposed to public control than others (Bozeman, 1987). This dimensional approach understands the public-private distinction moving along a continuum where pure private or public organisations are rarely found (Goulet & Frank, 2002). Drawing from this, it may be suggested that contracting with public sector increases the private organisations' degree of 'publicness' as they become more dependent on the funding coming from the public pocket. At the same time contracting increases the private nature of the public organisations as part of their operations are moved to the hands of private actors. Moreover, increased market orientation may undermine the special characteristics of not-for-profit organisations, while promoting the culture adopted from the business sector. Based on all the arguments above we state our second hypothesis accordingly:

As to the not-for-profit sector in turn, contracting with public sector has suggested to undermine employees' terms and conditions due to external cost pressures (Cunningham, 2008) as well as to create more unstable environment in which organisations are no longer able to offer secure long-term employment for their employees (Parry & Kelliher, 2009). Furthermore, it has been argued that contracting threatens the possibilities of not-for-profit organisations to maintain their traditional objectives and ideals, which, in turn, further interferes the employees' commitment to the organisation (Cunningham, 2010). Finally, there are scholars suggesting that increasing involvement in provision of public services has required not-for-profit organisations. This, for its part, has potential to develop the organisational culture and organisation of work towards the ones originating from organisation driven by pro-market ideology (Baines, 2004).

Based on the arguments above, we formulate our second hypothesis accordingly:

Hypothesis 2: The perceptions of organisational justice, job demands and job control are not determined by the ownership as such, but mediated through HRM practices.

METHODS AND DATA

Measures

Dependent Variables

The dependent variables describing organisational justice, i.e., procedural, interpersonal, informational and distributional justice, were drawn from the work of Colquitt (2001), while the variables addressing job control and job demand were adopted from the work of Karasek and Theorell (1990) and Karasek (1979). The values of the scale variables were calculated as the means of the values of single items. Responses to these

items were rated on a Likert-scale ranging from 1 ("totally agree") to 5 ("totally disagree"). The justice variable measuring procedural justice consisted of five items (e.g., 'We have influence over the decisions made in the workplace'). The three other justice variables consisted of four items. For interpersonal justice the respondents considered variables such as 'My supervisor treats us with respect'. To measure informational justice the respondents we asked to consider items such as 'My supervisor communicated the decision in a timely manner'. For distributional justice the respondents we asked to express their opinion on variables such as 'My salary and the respect I receive reflect the effort I have put into my work'. The job control variable consisted of nine items, such as 'I have a say in my tasks'. In the job demands variable three items, such as 'My work requires excessive work load' were included. Cronbach's alphas were calculated for each of the dependent variables to indicate consistency of each variable (Table 1).

Explanatory Variables

The detailed information of all the explanatory variables is provided in Table 2. Ownership status was coded into three categories. For-profits were defined as either independent private companies or as part of a larger private corporation. Not-for-profits meant units that were owned by associations or foundations. The public units were those that were run and owned by municipalities. In the analysis for-profit units were used as a reference group as they had the smallest number of respondents.

Perceived organisational justice, but also perceptions on job control and job demands may be seen as results of effective leadership (e.g., van Knippenberg & De Cremer, 2008). Career and skills development, participation in supplementary education and participation in developmental performance reviews have been suggested to associate with different dimensions of organisational justice (Boswell & Boudreau, 2002; Meyer & Smith, 2000; Paré & Tremblay, 2007; Parry & Kelliher, 2009; Rodwell & Teo, 2007;). Thus, participation in supplementary education and participation in the developmental performance review were chosen to describe HRM practices of a unit. As it has been suggested (Brown et al., 2010) that employees' experiences of performance review may play an important role as to employees' attitudes towards their job in general, perceived utility of the review was also included in the performance review variable. Finally also receipt of mentoring was included among the HRM variables, as the practice was considered important for the employees working in health and social services.

Of the individual characteristics, age, education, employment status, employment contract and job tenure were included among the explanatory variables. This choice was based on the literature addressing the determinants of perceived organisational justice, job demands and control (e.g., Ban et al., 2003; Cohen-Charash, 2001; Härestam et al., 2004; Höckerting & Härenstam, 2006; Manville, 2008; Mirvis, 1992; Titrek, 2009). In addition Mirvis (1992) has suggested that the three sectors differ at least as to their employees' level of education as well as to the proportions of part- and full-time workers. The structure and

Table 1. Dependent variables used in the analysis

	Number of items	Cronbach's alpha	Source
Procedural justice	5	0.86	Colquitt 2001
Interpersonal justice	4	0.92	Colquitt 2001
Informational justice	4	0.89	Colquitt 2001
Distributional justice	4	0.96	Colquitt 2001
Job control	9	0.63	Karasek & Theorell 1990
Job demand	3	0.78	Karasek & Theorell 1990

Table 2. Explanations and coding criteria for the explanatory variables applied in the multilevel linear regression models

UNIT CHARACTERISTICS		
Variable	**Explanation**	**Coding or explanation**
Ownership status	Whether the unit was owned by a private for-profit, a private not-for profit or a public agency	0=public 1=private not-for-profit 2=private for-profit (reference category)
Organizational structure	The size of the parent organization the unit belongs to	0=Small: private single-unit enterprise 1=Medium: 2-5 units in the same region/small municipality 2=Large: more than 5 units/large municipality (reference category)
Staffing level	The number of nursing staff / The number of residents	
In-patient days	The number of inpatient days in a unit / year	
Case-mix	Describes the need for staff time based on care needs of the client	Scale: 1 = average client <1 needs less care than average client >1 needs more care than average client
HRM CHARACTERISTICS		
Variable	**Explanation**	**Coding or explanation**
Developmental performance review	Whether the respondent had participated in a developmental performance review within a year and how they perceived it	1=Yes, useful 2=Yes, neutral 3=Yes, not useful 4=No (reference category)
Supplementary education	Whether the respondent had participated in supplementary education within a year	0=Yes 1=No (reference category)
Mentoring	Whether the respondent had received mentoring within a year	0=Yes 1=No (reference category)
INDIVIDUAL CHARACTERISTICS		
Variable	**Explanation**	**Coding or explanation**
Age	Self-reported age in years	
Job tenure	Years worked in the current position	
Education	The respondent's level of education	1= degree (i.e., polytechnic/ university) 2=secondary level (i.e., practical nurse) 3= no education (reference category)
Employment status	Whether the employee worked full-time or part-time	0=full-time 1=part-time (reference category)
Employment contract	Whether the employee had a permanent of fixed-term contract	0=permanent 1=fixed-term (reference category)

size of the overall organisation, as well as the size of the work unit, has been suggested to affect employees' perceptions on their psychosocial working conditions (e.g., Härestam et al., 2004; Höckerting & Härenstam, 2006).

The size of an organisation may indicate the organisations' resources allocated to HRM operations (Ban, Drahnak-Faller, & Towers, 2003; Rodwell & Teo, 2004). Units' inpatient days per year were used to reflect the size of the

work unit. The size of the overall organisation was addressed employing a categorical variable grouping small, medium and large organisations. Staffing level and residents' case-mix were used to describe employee workload, which has also suggested affecting perceptions of psychosocial working conditions (Höckerting & Härenstam, 2006; Pekkarinen, 2007).

Data

This study is a part of a research project exploring whether organisational ownership has an impact on the quality of care, cost of care and employee well-being in the context of elderly care in Finland. As part of the project a cross-sectional postal survey to assess employees' working conditions and job characteristics was conducted in 2008. Questions concerning perceptions of organisational justice, job demand and job control as well as questions on units' HRM practices and employees' socio-demographic status were included in the survey. Data on the units' modified case-mix were based on the RUG (Resource Utilisation Group) classification system for long-term care (Björkgren et al., 1999) and home care (Poss et al., 2009). The case-mix index reflects the relative resources needed to the care for different patient groups. The index is based on measurement of staff time. These data were obtained from the Finnish RAI benchmarking database (Finne-Soveri et al., 2006; Noro, 2005; THL RAI database, 2010). RAI (Resident Assessment Instrument) benchmarking database is a system for benchmarking elderly care in Finland. It aims to improve quality of long-term care for elderly, to integrate services and information flow over care providers, to improve national registers that follow use of health and social services, and to plan and develop financial and payment systems in long-term care (Noro, 2005).

The data were drawn from 128 sheltered home units in Finland, mainly comprising large cities in Southern Finland. The selection of the units was based on the invitation sent to all the sheltered home units that already participated in the RAI - quality-benchmarking project (Finne-Soveri et al., 2006; Noro et al., 2005; THL RAI database, 2010). The invitation was accepted by nearly all of the units, which then delivered the survey to their employees. In addition, for-profit units were recruited from the capital area and from the second largest cities in Finland in order to attain a sufficient number of for-profit units. The units were invited to participate in RAI – quality benchmarking as well as to answer the survey.

Altogether 959 employees completed the survey resulting in a response rate of 66.6%. The response rate did not differ between ownership types. Due to the small number of male respondents (n=25) only female respondents were included in the analysis. Responses with missing values for gender (n=5) were also excluded from the analysis. Finally the units (n=2) with missing values for all unit level factors were excluded. The final sample comprised 929 participants of which 20.5% worked in for-profit units and 36.1% in not-for-profit units. The units belonged to 62 different organizations ranging from large private organizations or large municipalities to small private single-unit enterprises. Of the units, 18% were for-profit and 39.8% not-for-profit. The median number of the respondents per unit was 9 (min=2; max=28). Descriptive statistics are reported in Table 3.

Statistical Analysis

Descriptive statistics (means, standard deviations) were used to describe the data. The relationships between the explanatory variables were tested applying Pearson's correlation. The Pearson correlation coefficients between explanatory variables ranged between -0.01 and 0.64. In the case of missing values for the explanatory variables the method of multiple imputation was used (e.g., Rubin, 1996; SPSS, 2007). The imputations were repeated five times for each individual case. The mean value of the imputations was then used to

Table 3. Means (sd) for justice measures and continuous explanatory variables, proportions for categorical explanatory variables in the whole data and according to ownership status

	For-profit	Not-for-profit	Public	Total
	N=190	N=335	N=404	N=929
RESPONSE VARIABLES				
Procedural	3.60 (0.77)	3.66 (0.76)	3.62 (0.72)	3.63 (0.74)
Interpersonal	3.70 (1.03)	4.03 (0.84)	3.87 (0.89)	3.89 (0.91)
Informational	3.53 (0.97)	3.67 (0.87)	3.66 (0.86)	3.64 (0.89)
Distributional	2.55 (1.03)	2.73 (1.10)	2.46 (1.04)	2.57 (1.07)
Job control	3.45 (0.59)	3.65 (0.56)	3.61 (0.54)	3.59 (0.56)
Job demand	3.08 (0.87)	3.31 (0.92)	3.41 (0.91)	3.31 (0.92)
UNIT CHARACTERISTICS				
Respondents from large organizations, %	53.3	34.7	77.2	56.9
Staffing level	0.65 (0.10)	0.70 (0.14)	0.51 (0.13)	0.60 (0.15)
Inpatient days	7 897 (2 760)	6 359 (3 535)	11 680 (7 713)	8 983 (6 6142)
Case-mix	0.87 (0.11)	0.88 (0.11)	0.81 (0.13)	0.84 (0.12)
HRM CHARACTERISTICS				
Participation in performance review/ useful, % respondents	33.5	36.1	38.9	36.8
Participation in performance review/ neutral, % respondents	18.8	17.3	17.5	17.7
Participation in performance review/ not useful, % respondents	9.1	8.7	7.5	8.2
Participation in supplementary education, % respondents	53.3	64.2	70.9	64.9
Receipt of mentoring, % respondents	46.2	50.9	28.1	40.0
INDIVIDUAL CHARACTERISTICS				
Age	42.1 (12.0)	42.2 (11.3)	44.0 (11.3)	43.0 (11.5)
Job tenure	5.2 (7.1)	5.5 (4.9)	6.6 (6.7)	6.0 (5.7)
Education: secondary level, % respondents	86.3	82.4	84.1	83.9
Education: degree level, % respondents	11.2	12.4	9.6	10.9
Full-time employees, % respondents	82.7	91.3	94.7	91.0
Permanent employees, % respondents	83.2	83.5	81.5	82.6

replace the missing value for each individual case. For the unit level variables the procedure was implemented at the unit level. As the analysis was done without imputed values the result did not differed statistically from those attained with the imputed data.

Multilevel linear regression was applied in the exploratory analysis, as it was assumed that the employees' responses might depend on both the unit they were working for and their individual characteristics (Colquitt et al., 2002; Leyland & Goldstein, 2001). Multilevel modelling was performed using SAS (Statistical Analysis System) version 9.1. The model was fitted applying the MIXED procedure (Singer, 1998). In all the analyses the level of statistical significance was set at 0.05. Interaction between HRM and ownership was tested but not found statistically significantly associate with any of the dependent variables.

The analysis was built in three parts. In the first model ownership variable was put in the model alone. In the second model ownership and all the variables except for HRM variables were added. In the final model HRM variables were added in the model.

RESULTS

Comprehensive regression statistics are reported in Tables 4 and 5. Participation in performance review was found to be a significant explanatory factor for all the dependent variables except for job demands. The respondents who had participated in the performance review and experienced it useful perceived more organizational justice in general and had a higher perception of job control. They also perceived lower job demands compared to those who had not participated in the performance review, even though the effect was slightly insignificant. By contrast, those who had participated in a performance review but found it not useful perceived lower levels of organisational justice as well as lower job control compared to those who had not participated at all. In addition, a neutral view on performance review was positively associated with the perception of job control. Participation in supplementary education was positively associated with the perception of interpersonal and informational justice as well as with job control. Receipt of mentoring had a positive effect on procedural and informational justice as well as on job demands. Thus, rather strong support was gained for Hypothesis 1.

Ownership was not statistically significantly associated with procedural, informational and distributional justice. For interpersonal justice, job demands and job control the effect ownership was statistically significant in all models and the effect did not change to any large extent in the models two and three. Employees in not-for-profit and public units perceived more job control compared to the for-profit units. At the same time, however, perceived job demands were also higher compared to for-profit units. Employees in not-for-profit units also perceived more interpersonal justice compared to the employees in for-profit units. Public ownership was positively associated with the perception of interpersonal justice in the first model, but the effect turned out to be insignificant after adding other variables in the model. Thus, Hypothesis 2 was not entirely supported.

Staffing level, case-mix and inpatient days were associated with perceived job demands. The more the residents needed care (i.e., the bigger the value of case-mix), the less there was personnel working in the unit and the bigger the unit was, the more the employees perceived job demands. Staffing level also had a positive effect on the perception of distributional justice, while case-mix was negatively associated also with the perception of informational justice. The level of hierarchy influenced perceived informational justice: employees working in single-unit private enterprises perceived lower levels of organisational justice compared to large organisations.

Table 4. Multilevel linear regression models for all the response variables, models 1 and 2

	PROCEDURAL		INTERPERSONAL		INFORMATIONAL		DISTRIBUTIONAL		CONTROL		DEMAND	
	Estimate	*P*	*Estimate*	*P*	*Estimate*	*P*	*Estimate*	*P*	*Estimate*	*P*	*Estimate*	*P*
Intercept	3.590	<0.0001	3.640	<0.0001	3.486	<0.0001	2.541	<0.0001	3.432	<0.0001	3.052	<0.0001
Unit characteristics												
Ownership												
Public *Nor-for-profit* *For-profit (ref.)*	0.033 0.064 0	0.690 0.443 -	**0.246** **0.399** 0	**0.046** **0.002** -	0.191 0.186 0	0.120 0.139 -	-0.082 0.198 0	0.490 0.105 -	**0.192** **0.218** 0	**0.001** **0.0003** -	**0.395** **0.255** 0	**0.002** **0.051** -
Intercept	4.001	<0.0001	4.539	<0.0001	4.297	<0.0001	2.106	<0.0001	2.674	<0.0001	1.222	<0.0001
Unit characteristics												
Ownership												
Public *Nor-for-profit* *For-profit (ref.)*	0.015 0.067 0	0.875 0.445 -	0.160 **0.442** 0	0.238 **0.001** -	0.085 0.2334 0	0.523 0.063 -	-0.034 0.169 0	0.797 0.173 -	**0.1761** **0.228** 0	**0.006** **<0.0001** -	**0.331** **0.265** 0	**0.011** **0.027** -
Level of hierarchy												
Small *Medium* *Large (ref.)*	-0.0893 0.060 0	0.383 0.421 -	-0.279 -0.006 0	0.065 0.956 -	-0.398 -0.081 0	0.007 0.447 -	-0.094 0.037 0	0.521 0.729 -	-0.088 -0.086 0	0.218 0.099 -	0.044 -0.034 0	0.753 0.743 -
Staffing level	0.116	0.691	-0.150	0.725	0.046	0.912	0.942	0.024	0.185	0.366	**-0.799**	**0.045**
Inpatient days	<0.0001	0.889	<0.0001	0.816	<0.0001	0.646	<0.0001	0.768	<0.0001	0.517	**<0.0001**	**0.044**
Case-mix	-0.334	0.249	-0.494	0.787	-0.762	0.065	-0.297	0.470	-0.019	0.924	**1.894**	**<0.0001**
Individual characteristics												
Age	0.001	0.803	-0.001	0.787	0.002	0.474	**0.009**	**0.007**	**0.007**	**<0.0001**	**0.006**	**0.026**
Education												
Degree *Secondary* *Other (ref.)*	-0.181 -0.193 0	0.168 0.087 -	-0.173 -0.135 0	0.253 0.297 -	-0.154 -0.096 0	0.298 0.450 -	-0.212 -0.284 0	0.254 0.075 -	**0.364** **0.212** 0	**<0.0001** **0.011** -	**0.349** **0.295** 0	**0.020** **0.022** -
Employment status												
Full-time Part-time (ref.)	0.007 0	0.935 -	-0.242 0	0.813 -	0.069 0	0.490 -	0.028 0	0.824 -	0.068 0	0.3012 -	-0.086 0	0.394 -
Employment contract												
Permanent Fixed-term (ref.)	-0.031 0	0.649 -	-0.147 0	0.059 -	-0.113 0	0.137 -	-0.078 0	0.416 -	**0.098** 0	**0.049** -	0.033 0	0.671 -
Job tenure	-0.002	0.674	-0.001	0.976	<0.001	0.998	0.001	0.905	0.001	0.814	**0.015**	**0.007**

Table 5. Final multilevel linear regression models for all the response variables

	PROCEDURAL		INTERPERSONAL		INFORMATIONAL		DISTRIBUTIONAL		CONTROL		DEMAND	
	Estimate	*P*	*Estimate*	*P*	*Estimate*	*P*	*Estimate*	*P*	*Estimate*	*P*	*Estimate*	*P*
Intercept	3.980	<0.0001	4.593	<0.0001	4.351	<0.0001	2.091	<0.0001	2.718	<0.0001	1.242	0.0095
Unit characteristics												
Ownership												
Public	0.031	0.662	0.149	0.241	0.078	0.515	-0.028	0.832	**0.144**	**0.017**	**0.328**	**0.001**
Not-for-profit	0.020	0.816	**0.364**	**0.002**	0.150	0.182	0.120	0.328	**0.181**	**0.001**	**0.250**	**0.035**
For-profit (ref.)	0	-	0	-	0	-	0	-	0	-	0	-
Level of hierarchy												
Small	-0.011	0.909	-0.198	0.157	**-0.310**	**0.019**	-0.016	0.909	-0.063	0.339	0.0286	0.838
Medium	0.113	0.123	0.043	0.673	-0.029	0.761	0.086	0.422	-0.062	0.201	-0.0321	0.753
Large (ref.)	0	-	0	-	0	-	0	-	0	-	0	-
Staffing level	0.159	0.574	-0.086	0.828	0.121	0.746	**1.012**	**0.014**	0.213	0.256	**-0.861**	**0.029**
Inpatient days	-4.41E-6	0.512	-7.61E-6	0.432	-0.00001	0.256	-5.91E-7	0.952	-2.17E-7	0.960	**0.000019**	**0.054**
Case-mix	-0.3627	0.1941	-0.5584	0.1531	**-0.8262**	**0.0255**	-0.329	0.419	-0.078	0.673	**1.8721**	**<0.0001**
HRM characteristics												
Performance review												
Yes, useful	**0.060**	**<0.0001**	**0.432**	**<0.0001**	**0.463**	**<0.0001**	**0.420**	**<0.0001**	**0.2255**	**<0.0001**	-0.1373	0.0543
Yes, neutral	0.345	0.865	-0.028	0.724	-0.116	0.131	0.010	0.316	**0.115**	**0.023**	-0.008	0.918
Yes, not useful	**0.093**	**0.018**	**-0.383**	**0.0004**	**-0.415**	**<0.0001**	**-0.274**	**0.040**	**-0.155**	**0.022**	0.096	0.383
No (ref.)	0	-	0	-	0	-	0	-	0	-	0	-
Supplementary education												
Yes	0.027	0.612	**0.136**	**0.024**	**0.129**	**0.027**	0.036	0.630	**0.194**	**<0.0001**	0.160	0.066
No (ref.)	0	-	0	-	0	-	0	-	0	-	0	-
Mentoring												
Yes	**0.054**	**0.022**	0.105	0.103	**0.125**	**0.044**	0.041	0.602	0.019	0.632	**0.121**	**0.010**
No (ref)	0	-	0	-	0	-	0	-	0	-	0	-
Individual characteristics												
Age	0.002	0.366	-0.005	0.073	-0.002	0.360	0.006	0.070	**0.005**	**0.002**	**0.006**	**0.028**

continues on following page

Table 5. Continued

	PROCEDURAL		INTERPERSONAL		INFORMATIONAL		DISTRIBUTIONAL		CONTROL		DEMAND	
	Estimate	*P*	*Estimate*	*P*	*Estimate*	*P*	*Estimate*	*P*	*Estimate*	*P*	*Estimate*	*P*
Education												
Degree	-0.176	0.173	-0.207	0.156	-0.184	0.192	-0.204	0.268	**0.307**	**0.001**	0.282	0.062
Secondary	-0.165	0.135	-0.131	0.297	-0.082	0.499	-0.256	0.105	**0.184**	**0.022**	0.245	0.058
Other (ref.)	0	-	0	-	0	-	0	-	0	-	0	-
Employment status												
Full-time	-0.019	0.827	-0.576	0.554	0.036	0.703	0.005	0.997	0.057	0.369	-0.088	0.387
Part-time (ref.)	0	-	0	-	0	-	0	-	0	-	0	-
Employment contract												
Permanent	-0.073	0.276	**-0.222**	**0.004**	**-0.187**	**0.012**	-0.141	0.144	0.024	0.620	0.027	0.775
Fixed-term (ref.)	0	-	0	-	0	-	0	-	0	-	0	-
Job tenure	0.0002	0.960	0.003	0.507	0.004	0.455	0.003	0.631	0.003	0.449	**0.015**	**0.006**

Age, education, job tenure and employment status were found to be significant explanatory factors for one or more dependent variables. Age was positively associated with job control but also with the perceptions of job demands. Education was positively associated with perceived job control: the higher the education, the more the employee felt control over their jobs. Job tenure, for its part, had a positive effect on job demands: the longer the employees had worked in their current jobs, the more demanding the job was perceived. Employment status also played a role: a permanent employment contract had a negative effect on perceived interpersonal and informational justice.

DISCUSSION

In this study we have tested two hypotheses concerning the importance of HRM practices and ownership as to employees' perceptions of organisational justice, job demands and job control. The results support the hypothesis that HRM practices are positively associated with perceived organisational justice and job control as well as negatively associated with perceived job demands. However, job demands seemed to be the less affected by HRM practices in this study.

The results for ownership confirm the complexity of the issue of ownership reported already by several scholars. The results support Hypothesis 2 to the extent that ownership was associated with interpersonal justice, job demands and job control, but it is not the only determinant behind the perceptions. However, its effect remained significant also after the HRM variables were added in the model. Thus, it may not be said that the effect of ownership is purely mediated by HRM practices applied in this study. It might be important to explore the issue in more detail also with other HRM practice variables as well.

Of HRM practices especially performance review seemed to play a highly significant role in all the dependent variables except for job demands.

However, it appeared that solely introducing a performance review in the unit does not guarantee better outcomes in terms of employee perceptions of the organisation and their own job, but that the quality of the performance review is an important factor. Similar suggestions can be found in the work of Brown and colleagues (2010). As to perceived organisational justice and job control, it seems that participation in the performance review is worthwhile only if the employees find the procedure a useful resource in terms of their own job. If the experience is negative (i.e., not useful) or neutral, the performance review may even have negative implications for the perceptions of the organisation and work in general.

The proportion of those who had not found the performance review useful was highest in the for-profit units, which scored lowest also in most of the response variables examined. We did not find interaction between performance review and ownership in this study and thus, we are not allowed to draw any conclusions about that in this paper. However, it might be interesting to examine the issue in more detail, as the results of our study somewhat contradict non-empirical suppositions of private, for-profit organisations' personnel policies, but also previous research on leadership in private for-profit organisations (e.g., Boyne, 2002; Walsh, 1995).

As to organisational justice, the results quite strongly support the literature suggesting increasing similarity and isomorphism between public, not-for-profit and for-profit organisations as to HRM issues (e.g., Antonsen & Jørgensen, 1997; Cunningham, 2010, 2008; DiMaggio & Powell, 1983; Koning et al., 2007; Rodwell & Teo, 2007). This has potentially to do with current developments of increased public sector contracting and tendering procedures (e.g., Cunningham, 2010, 2008). On the other hand that might have to do with the nature of health care and social service sector in which factors such as professional culture, similar educational background as well as strict regulation are likely to produce similarities and affect the processes taking place in the workplace (DiMaggio & Powell, 1983; Rodwell & Teo, 2007).

Ownership was, however, associated with job control and job demands. Employees in for-profit units perceived lower job demands, which may be explained, among other things, by staffing levels and the case-mix of residents: in the for-profit units the case-mix was rather heavy but also the staffing level was reasonable. As to job control the for-profit units compared lowest. This is somewhat against the preliminary assumptions of better leadership and higher job control in private organisations (Walsh, 1995.) However, it has also been suggested that working with the demand of profit may have a negative effect on perceived control as the valuation of the daily work may be more based on results or work outcomes (Höckerting & Härenstam, 2006).

The highest demands were perceived in the public units in which also the average staffing level was lowest but the number of inpatient days was highest. Perceived job control in public units was similar to the not-for-profit units, in which, however, the staffing level was comparatively higher. This does not allow us to draw any far-reaching conclusions, but it may be possible to assume that employees in public units may perceive more job strain than their counterparts in not-for-profit and possibly also in for-profit units (Karasek & Theorell, 1990).

In this study we have been able to compare public, not-for-profit and for-profit organisations, which has not been that common in the existing body of literature. However, the cross-sectional study design does not offer possibilities to compare stability of the differences or the changes in time. Collecting follow-up data is, however, something that will be done within next years. The organisations participating in the study represent mainly the large cities in Finland. However, the data may be said to present quite well the elderly care service structure in Finland, but also in other western countries with rather similar service

structure (e.g., Nordic Countries, Canada, New Zealand). Public and not-for-profit organisations still play a major role, but for-profit organisations are increasing their proportions of the total volume of the services. Of HRM practices we were able to investigate only three specific activities. To gain more comprehensive knowledge also other HRM activities like career management, rewards and other training activities should be included. Also the perceptions of the usefulness of HRM activities should be included, as it seems to matter as the successful of the activities are considered.

CONCLUSION AND PRACTICAL IMPLICATIONS

This study lends support to an argument about increased similarity between public, not-for-profit and for-profit organisations in HRM issues. Based on the results it may be assumed that it is the organisational procedures that potentially play a significant role as to employees' perceptions towards their work and superiors. This increases the importance of adequate HRM practices, which also in this study were found to associate with positive outcomes in organisational justice and job control. However, to be successful in the implementation of HRM, it is crucial that employees understand the justification for each procedure as well as find it a useful resource in terms of their own job. The results also suggest that for job demands structural factors, such as staffing level and case mix might be more important that HRM practices and thus, it is important to pay attention to these aspects of work as well.

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Chapter 50
Communicating in Multicultural Firms:
Boundary Creation, Fragmentation and the Social Use of ICT

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ABSTRACT

Based on a qualitative study of 14 knowledge intensive companies, this chapter suggests that multicultural and multilingual firms are faced with certain challenges in the attempt to fruitfully utilize the diverse background of their workforce. Firstly, through informal settings, the employees to create social boundaries within the firm use native languages strategically. Secondly, even though the introduction of English as cooperate language might solve some communication issues, it tends to render the communication less nuanced, thereby reducing the use of human resources within the firm. Thirdly, ICT does not necessarily solve communication problems within a given company. It can even be used as a social 'tool' to uphold social boundaries or social fragmentation. It is suggested that in order to address these challenges, the management should seek to reward not only individual employees, but also expand the notion of performance to include the collectivity of the workplace.

INTRODUCTION

ICT, or Information Communication Technology, has come to play a larger role in contemporary business communities due to the increased internationalization of companies worldwide (Griffith, 2002; Palmer-Silveira, Ruiz-Garrido, & Fortanet-Gómes, 2006). Much like all other human interaction, communication is at the center of ICT. And communication is what seems to be one of the major managerial tasks that companies working

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in globalized markets are faced with. Therefore, managing interaction across national and linguistic boundaries has become a daily issue for a growing number of managers (Maznevski & Chudoba, 2000; Welch, Welch & Marschan-Piekkari, 2001).

In the management of multicultural groups, the varied nature of the group has often been described as a competitive advantage in the creation of information and other human resources (Adler, 1997; Miller, Fields, Kumar, & Ortiz, 2000; Paulus, 2000). Nonetheless, the success of the diverse groups is not given, and managerial challenges should not be taken lightly (Leonard & Swap, 1999). A number of studies indicate that communication management is especially important (Distefano & Maznevski, 2000; Loosemore & Lee, 2002; Maznevski, 1994). And since ICT is the basis of much internal and inter-unit communication in multicultural firms, the relation between diversity management, communication and ICT is an important topic in the understanding of international business.

Communication is central to management since, in one way or another, challenges to communication have an effect on all managerial processes (Cheney, Thøger, Zorn & Ganesh, 2004). Furthermore, communication is the basis of all employee collaboration. In a multinational context, linguistic and cultural differences make communication even more of a concern (Beamer & Varner, 2005; Loosemore et al., 2002). In relation to this, the main managerial challenge of the diverse group is that efficient communication actually occurs (McDonough, Kahn & Barczak, 2001). If group members do not communicate well, cultural and linguistic diversity will most likely become unfavorable (Distefano et al., 2000; Hambrick, Davison, Snell & Snow, 1998). Therefore, the arguments presented in this chapter rely on the fundamental premise that communication is necessary in all coordination and organization of human resources. Accordingly, fostering a rich communication flow within a multicultural organization is an important source of competitive advantage, thus nurturing social and cultural sustainability within the company and society as a whole.

Language diversity is a theme that has received very little scholarly attention (Henderson, 2005). At the theoretical level, the impact of multilingualism has been examined mainly in relation to language management, which conceives of language as a facilitator providing for the acquisition and transmission of information through social interaction (Dhir & Góké-Paríolá, 2002; Feely & Harzing, 2003; Vaara et al. 2003b). In comparison, empirical studies have focused on the manner in which language differences create a complicated managerial situation, with great implications for the practice of intercultural communication (Marschan-Piekkari, Welch, & Welch, 1999a; Marschan-Piekkari, Welch & Welch, 1999b; Vaara et al. 2003a). With specific reference to culturally diverse groups, Distefano and Maznevski (2000) have found language differences to have a negative impact on relationship building. Furthermore, research by Lagerström and Andersson (2003) indicates that a condition of multilingualism may challenge the socialization of team members. Henderson (2005) proposes an alternative approach to language diversity, by examining possible sources of communication failure within the global workplace. The research relies on a distinction between problems relating to the transmission and reception of messages, and to difficulties in the area of interpersonal perceptions and attitudes, which arise from interlocutors' encounters with the unfamiliar practices of alien speech communities. Thus, Henderson (2005) argues that communication failure should be read as a socio-cultural rather than a purely linguistic phenomenon.

In this Chapter, language use is considered to be the way the linguistic medium is used in communication. To further define the concept, it is the main argument of the chapter that language use

should be understood as a dynamic and dialectical communicative process involving both relationship building and knowledge sharing between different groups and individuals (Cooren 2006, Vaara et al. 2005). In addition, language should be understood as socially and historically constituted in line with other human practices (Bourdieu 1977, Bourdieu 1991). Language, then, is not only a means of understanding and communication, but also an object of action (e.g. Austin 1975, Taylor 2006). The communicative process is then to be understood, in a broader sense, as the transfer of information as well as the organization of social relationships thought patterns and actions (Robichaud 2006, Wittgenstein 1996). The focus of this chapter is on expressed discourses on verbal dialogue as it happens in face-to-face interaction or by the use of ICT.

Cultural diversity is here generally related to variance of national affiliation as it is done by most authors in this field (e.g. Adler 1997, Distefano & Maznevski 2000). However, differences in nationality as such do not create differences between individuals. It is the variety of identifications, behavioral patterns, linguistic skills and bodies of knowledge linked to growing up in different regions that provide the potential for human diversity (Roberson 2006). This chapter attempts to explore discourses on communication processes as individuals describe them in culturally diverse organizations. Furthermore, we wish to direct attention to social processes linked to face-to-face and ICT communication that may affect the utilization of human resources. Finally, it is the aim of the chapter to include the language theme in the discussion as a novel contribution to the understanding of culturally diverse groups, communication and ICT. This will be illustrated by data from 14 multicultural 'knowledge intensive' Danish organizations.

USING THE RESOURCES OF HUMAN DIVERSITY

Human differences are a challenge to the academic community, and for the last fifty years researchers have struggled to develop theories and methods to conceptualize and study those differences (Williams & O'Reilly, 1998). While results have been far from reaching any consistent conclusion (Simons, Pelled & Smith, 1999), the interest in diversity has increased rapidly during recent years (van Knippenberg, De Dreu & Homan, 2004). Three dominating theoretical perspectives are relevant to the understanding of communication processes in organizations that consist of culturally diverse groups.

The Information and Decision Making Perspective

The literature on information and decision-making has a traditional functionalist view on cultural diversity - most often limited to static notions of national cultural differences. In this perspective it is argued that the potential advantage of diverse groups over homogeneous groups lies in the greater pool of distinct task-relevant information to which diverse groups may have access (Hambrick, Cho & Chen, 1996; Harrison & Klein, 2007; Page, 2007). Homogeneity, according to these authors, has been mentioned as being in danger of leading to 'groupthink', in which everyone assumes that since they all believe the same thing, it must be a good idea (Adler, 1997; Miller et al., 2000; Triandis, Hall & Ewen, 1965). As opposed to homogeneity, cultural differences are thus assumed to lead to differences with regard to information and perspectives (McLeod & Lobe, 1992; Watson, Kumar & Michaelsen, 1993). This, according to this research tradition, implies that multicultural groups, if managed correctly, should be more resourceful compared to more homogeneous groups (Distefano et al., 2000). In other words, the different cultural perspectives are believed

to foster innovation and creativity through constructive conflicts of perspectives, heuristics and knowledge (Fiedler, 1966; Millikin & Martins, 1996; Paulus, 2000; Richard & Shelor, 2002; Simons et al., 1999).

While such ideas on information and decision-making are intriguing, diverse groups in organizations, regrettably, often fail to realize the potential (Stewart, 2006). According to Klein and Harrison (2007), the weakness of the theory is related to the fact that the organizational reality of interpersonal and group processes is much more 'messy' than often accounted for in the literature (e.g. Page, 2007). In other words, social barriers may hinder the interaction processes.

The Social Categorization Perspective

Another theoretical perspective relevant to understanding communication in diverse organizations is more concerned with social categorization as a barrier that impedes cooperation and knowledge sharing in diverse groups (Tajfel, 1982; Tajfel & Turner, 1979; Williams et al., 1998). In this line of research, the difference of knowledge or perspective is not always enough to improve decision-making (Homan et al., In print; van Knippenberg et al., 2004). The distinct group member must also be able to win the approval of others with the new solution (Klein et al., 2007). It is argued that individuals tend to communicate mostly with those who are most similar to them (Zenger & Lawrence, 1989). Accordingly, Mor-Barak, Cherin, and Bergman (1998) maintain that dissimilarities are likely to be negatively related to group involvement because distinct individuals are in danger of being excluded from relevant information networks. In this way diversity can disturb communication processes, because the emergence of subgroups may hinder the use of available information (van Knippenberg et al., 2004).

In the literature of social categorization, the negative effects of diversity have often been explained as psychological processes of interpersonal attraction (Webber & Donahue, 2001). The similarity-attraction hypothesis asserts that similarity in attitudes is a major source of attraction between individuals (Byrne, Clore & Worchel, 1966). Consequences of high interpersonal attraction may include frequent communication, high social integration, and a desire to maintain group affiliation (Tsui, Egan, & O'Reilly, 1992).

While the socio-psychological approach to diversity does include the 'messy' reality of group processes, there is a tendency to explain those aspects of diversity only by the psychological needs of the individual. By focusing heavily on the role of the individual in the group, the literature avoids looking into the continuous struggle to obtain resources and recognition among different groups (Bourdieu, 2004; Konrad, 2003; Liff, 1996; Struch & Schwartz, 1989). Consequently, the socio-psychological explanation for the lack of communication is limited to the extent that it does not adequately include inherent power relations between different groups.

The Inequality and Power Perspective

Most of the literature on inequality and power relations in diverse organizations takes a political stance against liberal notions of the management of diversity, as a neutral improvement of information processing and decision-making (e.g. Essed, 1996; Kelly & Dobbin, 1998; Liff & Wajcman, 1996). Litvin (2002) argues that these diversity management initiatives should be perceived as an 'iron cage' that prevents real changes in the power distribution within diverse organizations. Similarly, Foldy (2003) argues that diversity initiatives often ignore the identity formation among employees, thus assuming that useful individual knowledge and perspectives can be applied without interference from group domination. In a

recent publication by Squires (2008) it is argued that diversity management which encourages employers to recognize cultural differences between employees may de-politicize social relations and contain equality objectives within a utilitarian market model. This, according to Squires, may bring only short-term benefits for some minority groups and entrench cultural stereotypes in the process by assuming, for instance, that nationality or ethnicity can be directly associated with certain characteristics. Authors working with organizational inequalities and power relations are concerned that the mainstream literature on diversity issues does little to give voice to or promote the problems of relatively powerless identity groups. They mainly conclude that differential rewards given to various groups form the material bases for group conflicts – which might prevent communication.

However, none of these studies are based on empirical evidence. Accordingly, this exploratory study provides an empirically based discussion of social obstacles to communication in culturally diverse organizations.

RESEARCH DESIGN

In Denmark, managing cultural diversity has become popular, especially after the arrival of a large number of immigrants and refugees during the 1990s (Hagedorn-Rasmussen & Kamp, 2003). These people now account for approximately seven percent of the Danish population. However, for the most part they have not been integrated into the knowledge intensive part of the labor market (e.g. Hedetoft, 2003; Hervik, 1999). As such, Denmark is still trying to create social and cultural sustainability for this group, and even though most of the immigrants and refugees living in Denmark are not integrated in knowledge intensive jobs, the rhetoric on the benefits of diversity management has been very positive, stating that "*the differences between people are an overlooked goldmine in Danish companies*" (Jacobs, Lûtzen & Plum, 2001: 5) (authors' translation). While the statements concerning the use of human resources through diversity management can be found in all types of organizations, large and small, public and private, the actual practices of using diversity constructively are more or less reserved to companies that employ foreign experts or expatriates from subsidiaries, as well as other individuals with non-Danish backgrounds who are living in Denmark for other reasons.

This chapter is based on data generated in a qualitative study of 14 Danish multicultural companies. The selection of the companies was based on the percentage of employees with a national background other than Danish, and they represent some of the most culturally diverse organizations in Denmark (e.g. Lauring, 2005). The chosen organizations were all internationally knowledge intensive, aiming to achieve an innovative and creative environment by the use of diversity management. All organizations used English as their corporate language.

The study has set out to provide an overall picture of expressed discourses on communication issues in culturally diverse Danish companies, and so, rather than an in-depth study of one or two specific sites, a broad range of organizations have been chosen. This enables the researcher to develop a taxonomy of the challenges faced by managers in the chosen organizations, which adds to the understanding of intercultural communication as a social practice. The limitation is that even though the researcher will gain a broad picture of the informant's conception of intercultural communication, in practice the actual interaction will only be observed to a limited extent.

The data for this study was generated through semi-structured research interviews. In cooperation with organizational gatekeepers, key informants were identified on the basis of their experience with cultural diversity (Bernard, 1995). Out of a total of 82 interviews with managers and employees, 43 of the informants were Danish,

while 39 represented other nationalities. Most non-Danish informants were living in Denmark on a more or less permanent basis. However, only five of them came from countries from which Denmark traditionally accepts refugees or immigrants. About 60 percent of the informants had managerial responsibilities. The interviews were performed in Danish as well as in English. With a single exception, all English interviews were conducted with non-native speakers. The native languages of these informants were Polish, Russian, Rumanian, Italian, Dutch, French, Mandarin, Hindi, and Arabic.

The interviews took the form of a dialogue between the researcher and the informants, in which questions were asked about the effects of cultural diversity on communication and knowledge sharing (see preliminary interview guide[1]). This way the main themes of the investigation were not selected before entering the setting. They slowly developed through the process of interacting with the informants. That also meant that the interview guide changed during the extent of the project. Some questions were added and others deleted (Alvesson, 2003; Fontana & Frey, 1994). At first, communication and language use were only two of a number of themes to be investigated. However, after a while it became apparent that especially language in one way or another seemed to be related to all other intercultural issues put forward by the informants. Initially, language use emerged from the data as a means to boundary creation. But in subsequent analyses and interviews, continuously the social fragmentation became more apparent. The study of ICT was not a part of the original research design. Nonetheless, ICT seemed to be important in the informants' conception of communication processes as they unfolded in the organization. In this way, the research project applied an iterative approach by processing incoming information in a circular fashion, allowing for the continuous integration of new questions in the interview guide (Kvale, 1996; Spradley, 1980). In this case, the perception of language used as the dominant obstacle to intercultural interaction and the role of ICT could not have been predicted from reviewing the literature on the subject of managing cultural diversity.

RESULTS

This section deals with communication issues linked to the social practices of the multicultural and multilingual organizations. Two kinds of social barriers can be described as formed by 1) boundary creation and 2) social fragmentation. Finally the use of ICT is related to the social practice of communication within the companies.

Boundary Creation

To most informants, the formation of social groups based on the national affiliation of the members constituted a central issue in the organizations. However, the introduction of an international environment and a common corporate language was, in all cases, implemented to counter the problems of communication between the different individuals and groups creating innovative knowledge sharing. Yet, sometimes the common language was not used consistently. As outlined by a French Canadian employee:

I was in a meeting and we were some English, some Canadians, and Swedes, and Danes, and within half an hour the Danes were speaking Danish and the Swedes were speaking Swedish. And after some time I said – I am leaving! And finally people started speaking English. After that, I actually found out that no one had actually understood each other before. The people from Aarhus didn't understand what the Swedes were saying and we didn't understand much of the Danish at all (Employee, North America).

Altogether, foreign informants frequently accused Danes of exercising exclusive behavior

because of their tendency to stay together in a Danish-speaking group and thereby isolate members of other groups:

People get together and speak Danish. If you do not, then you will not be invited. You will not be put in the active discussion. It is the social things that are the problem. It is very hard to become part of it. If you start a conversation in English, people cut you short. (Employee, Southern Europe).

This kind of boundary creation is particularly important in relation to the employees' social integration into the workplace, because employees with limited Danish language skills find themselves unable to participate in social events.

I don't think the technical side is a big problem. But if you don't know the language, you get put in a box. Some of my colleagues are put in a box. If I say no to learning or speaking Danish, the effect would be that I would be isolated. (Employee, Northern Europe).

Exclusion from informal settings is an important problem felt by non-Danish informants. They might find themselves shut out from social interaction when it is carried out in Danish. This may prove damaging to the use of their resources. Sometimes informal gatherings can be important contributions to the innovative capacity, because different viewpoints are shared in an unconventional fashion. A Polish informant describes the situation as follows:

The small talk is always in Danish. And sometimes the small talk gives a lot of information. It gives you an idea of what is really happening. It is something I really miss, to be able to really feel part of the conversation. I don't think my knowledge is used properly because I don't know the small talk (Employee, Eastern Europe).

A Canadian employee describes a similar experience, underlining how a lack of Danish language skills might unintentionally isolate foreign employees from social exchanges with colleagues. Returning one afternoon from an informal gathering, a group of colleagues confronted her to ask why she had not joined them for a beer, and she replied that she had not been invited. '*They said, but we were standing here speaking loudly and clearly about going… but it might not have been the right language'*. She concludes from this that non-Danish speakers risk developing weaker social ties to co-workers, thus limiting their involvement in knowledge sharing:

It is not just personal stuff you miss out on, but business relations too. If something is going on, if nobody directly tells you, you are not going to know. I would say yes, you could work here without speaking any Danish. You can do your job. But all the learning and what is going on around you, you would miss (Employee, North America).

As could be registered from interviews, more or less consciously, the dominating speech community limits the possibility of communication and, subsequently, acting and relating as well. Nonetheless, the Danish community may not be aware of the effect of their communicative practice. Often Danish organizations are represented as being much more tolerant and international than they actually are. This can sometimes lead to the disillusion of non-Danish organizational members:

When I came here I was so disappointed. We always heard talk about the Nordic countries and the expectations were very high. Like this company. I thought it was more international when I first came here. I asked them before – do I have to speak Danish and they said no, no, we are an international company and we speak English. But they cannot say that it is an international company and that English is the company language. It is

just a Danish company with a lot of foreigners (Employee, Southern Europe).

Exclusion from the sharing of ideas due to language differences could be found in many places. Thus, the creation of social boundaries linked to categories that are strengthened by language can be identified as an important obstacle to the use of human resources in culturally diverse organizations. Furthermore, the lack of social commitment noted by several informants points to a second obstacle that impedes the constructive use of cultural diversity. This will be explored further below.

Social Fragmentation

As indicated by some studies, the lack of social coherence can sometimes be the undesired result of cultural diversity (Bassett-Jones, 2005). This may be the effect of individuals who feel more comfortable when associating with others who are similar to themselves, sharing the same beliefs, values, language, and other traits (Miller et al., 2000). Communication in culturally diverse organizations is, then, different from communication among national peers. As one of the Danish managers tells the researcher: '*Communication has to be much more clear than if we were all Danes. We now have to formulate the orders in more plain and precise words*'. In this way, daily communication in a second language has an influence on interaction. As one of the Danish informants mentioned '*then one keeps to oneself the little remarks that would otherwise be more natural - for good or bad"*. In many cases, this resulted in less dialogue and more focus on getting the job done. As outlined by a Danish Manager:

Because of the diversity, you focus more on the professional. You don't think about from where people come, but only whether they contribute their best no matter how they feel among themselves. You don't focus on people's mindset but on the result. Whether people get on socially or not is unimportant. In that respect, only being together with Danes probably gives you more strings to play (Manager, Denmark).

Another Danish informant describes the situation of a company that has done well in establishing an internationalized environment by mainly using English for everyday communication. This manager has the impression that even though communication is conducted in English, it still results in the disappearance of some interaction:

There are a number of Danes who have actually left the organization because they find it is no longer the same place to work. There is no longer the same consensus. The culture has been shaken. I don't know if this is because of the market or because the company has grown or because of the foreigners. It may have something to do with the joking and the way we communicate (Manager, Denmark).

Other informants observe how foreigners conduct their everyday tasks without any knowledge of the Danish language and thus miss out on '*all the social stuff and all the small-talk across the lunch table*' (Employee, Northern Europe). Non-native employees often characterize their conversations as less detailed or 'deep', which may be due to the disappearance of humor from communication. As a result, communication becomes more formal and task-oriented. However, as a Canadian employee describes it, this does not necessarily improve communication:

One problem, though, is that if people tell you something, you often get a too neat version. You can't really function in this country without speaking and reading some Danish. We had a colleague from Canada who spoke only English, and I could hear that when people talked to her, it always came out in a too neat version (Employee, North America).

The formalization of communication endangers the social coherence and integration of the organization. As one Danish manager observed: *'Much of the informal interaction derives from a strong organizational culture that is valuable to us'*. When speaking to other nationalities, employees find that it becomes more difficult to uphold the same level of communication.

It is most often easier with only Danes. The meetings become more formal when conducted in English rather than Danish. There is less ping-pong across the table - less informal talking. That is a bit negative. It can be good to have the informal talk because it strengthens the group socially (Manager, Denmark).

The introduction of an international environment with a common language might prevent the kind of social categorization described in the previous section. In addition, according to the results of this study, communication tends to be more explicit, thus facilitating the integration of non-native employees in the working routines. Nonetheless, the internationalized environment does not solve all communication problems.

In this exploratory research project, two main obstacles to the use of human resources have been identified. On the one hand, cultural and social boundaries are created, which prevent communication between employees that are categorized as belonging to different groups. On the other hand, a social fragmentation may result in less effective communication with employees abstaining from informal interaction when speaking a second language. These obstacles to communication may have a vital impact on the possibility of using differences in human resources constructively. Furthermore, as will be elaborated in the following, the boundary creation and the social fragmentation that characterized the face-to-face contact of the informants was reinforced through the use of ICT in the companies.

ICT and the Construction of Group Boundaries and Social Fragmentation

As Welch et al. (2001) and Feely and Harzing (2003) propose, it could seem that ICT can minimize the impact of cultural barriers in the international business community, especially due to English as *lingua franca.* Many researchers closely link ICT to the rise of a knowledge based economy and globalization (Roberts, 2000). As such, ICT has enabled data and information to cross great distances, thereby effecting a movement from organizations physically contained single-sited units to multi-sited global networks (Hängst & Sol 2001). This has made researchers argue that ICT, due to stronger cross-national coordination and communication, enhances homogenization (Gabberty & Thomas 2006). Even though this might be the case on an inter-organizational and global level, our research suggests that ICT may have social consequences also on the local organizational level. In this way ICT could enhance the creation of boundaries and social fragmentation in everyday face-to-face communication of the work force.

This, we believe, has to do with the double-sidedness of the globalization process, in which we include ICT. As it has long been promoted by social scientist, the expansion of the capitalist mode of production whereby all economies have been included in the global economy, has led to a homogenization in goods and services. Nonetheless, this process has also led to fragmentation and national boundary creation on the group and individual level (Friedman 1994). That is, what is taken as signs of globalization, such as ICT, is used strategically on the local level as a counter reaction to uphold identity markers such as nationality. In this study what we found was that ICT seemed to be used as a 'social tool' for creating these group boundaries and social fragmentation.

The companies in this research were all heavily dependent on the use of ICT in the everyday

communication of the employees. Especially email seemed to have substituted a great part of what would formerly have been face-to-face interaction. As such, it was more common to send a joke via mail than to tell it face to face. Furthermore, some of the employees only referred to each other by their initials or 'user-names', and not by their real names:

Nobody has a name here, only initials [...] sometimes I feel not insulted but uneasy. It is a different style from what I am used to (Employee, Eastern Europe).

Our observations indicate that communication through the use of ICT did not remove existing barriers of communication. Rather, ICT - in this case the use of initials in face-to-face communication - was used strategically to uphold existing group boundaries, excluding the non-native Danes from participating in social interaction, and including the Danes. This way ICT further contributed to the creation of social boundaries in the multicultural companies. In addition, it is interesting to note how ICT affected the face-to-face interaction of the employees. The employment of 'user names' in everyday interaction created a feeling of uneasiness among certain non-Danish employees, which affected their willingness to participate and contribute to personal and professional discussions. As such, the strategic use of ICT by native Danes hindered the flow of information and communication between the culturally diverse groups within the workplace. When asked whether this was a deliberate strategy used to exclude non-Danes from the social group, an informant replied:

I have heard that some of them don't like it, but I really don't think about it. I just do it because I have gotten use to it and it's easier (Employee, Northern Europe).

As such, the study did not indicate that it was a deliberate and conscious strategy from the Danes; however, it seemed that this group was not willing to change their behavior in order to address the resentment experienced by the non-Danes.

In consequence, the national boundaries were upheld through an unwillingness to change behavior. Whether this led to an overall increase or decrease in communication, through the use of ICT and face-to-face communication, is not within the scope of this project to determine. Rather it should be noted that these perceptions of communication outline group boundaries in which the employees either feel included or excluded, and that these perceptions have an impact on workplace behavior.

ICT seemed also to create an environment in which there was less space to create personal relations and networks. As argued, this form of social fragmentation is especially problematic in knowledge intensive industries, since 'ping–ponging' seems crucial in the development of new ideas. The use of email and phone in the workplace seemed to create a certain perception of what was considered effective working time;

Even if you sit next to someone, you would send them an email. I even do it myself (Employee, Denmark.)

The employees would rather use their computer as the primary tool for communication, especially because sitting at the desk signalized that they were working, and they therefore seemed more effective. One could argue that the use of ICT created a work environment and a form of communication that was more fragmented and individualistic than would otherwise be the case. Such a perception of work might be suitable for traditional industrial firms, but it is less suitable for knowledge intensive corporations in which innovation is a hallmark for survival in a globalized economy. One of the problems with communicating through ICT has to do with knowledge transfer. Robert (2000) agues that communication through ICT favors knowledge, which can be codified and reduced to data. Tacit knowledge, which is crucial in creating

an innovative workplace, might be problematic. Especially where face-to-face interaction is actually possible, since the employees are physically located together.

We found that even though ICT is crucial in multicultural firms, there may also be some problematic consequences. It can be used to uphold existing linguistic and national barriers, thereby reducing communication between these groups. Furthermore, it might individualize the workplace, thus reducing the transfer of tacit knowledge that is crucial to more knowledge intensive industries. In other words, ICT seems to enhance certain elements of social behavior as exercised in multicultural firms.

DISCUSSION

Cultural diversity has often been described as providing an important constructive potential to firms. This potential, however, cannot be activated without the mutual interaction of the different groups and individuals in the organizations. Accordingly, communication across cultural boundaries becomes one of the basic preconditions for the development of a resourceful environment. Unfortunately, communication in multicultural firms is often a complicated matter.

To handle daily collaboration, diverse groups need to have a good flow of communication. When describing obstacles to communication in multinational teams, most studies refer only to differences in language and national culture as leading to misunderstandings and group conflict (e.g. Beamer et al., 2005; Hambrick et al., 1998). However, in this study we suggest that communication practices may be a more complex matter than some studies of culture diversity and communication have indicated. We have argued that certain social elements in communicative behavior have great effect on the use of differences in human resources. And in addition to that, we argue that ICT can enhance some of the observed problems.

This research project has outlined how the perceptions of communication can affect two social processes, which, on the one hand, may create boundary formation, and, on the other hand, social fragmentation. Furthermore, ICT may not solve these problems, but can instead be used as a social 'tool' that reinforces the dominant social categorization and fragmentation within the company, thereby upholding existing structures of social difference.

Three different theoretical perspectives have been mentioned to contribute to the understanding of communication in multicultural firms.

Firstly, the literature applying the information and decision-making perspective puts emphasis on the variety of differences in bodies of knowledge (Distefano & Maznevski, 2000; Page, 2007). However, as our case showed, information does not always flow undisturbed in organizations. Human resources may be embedded in particular social communities. Brown and Duguid (2000) argue that communities of practice enable people to communicate the more implicit elements of knowledge on how to act successfully in the organization. This implies that the membership of these communities can be essential to communication. The notion of communities of practice could provide further inspiration for researchers dealing with communication in multicultural firms from an information and decision-making perspective. This perspective is also highly relevant to understand the social use of ICT that allows communities to span physical settings.

Secondly, researchers operating in the social categorization paradigm put emphasis on boundaries between groups created along lines of similarity attraction. The argument is that similar individuals interact more with each other than with non-similar organization members (Tsui, Egan, & O'Reilly, 1992). However, the case material shows that focus should not only be put on group boundaries, but also on the socially fragmented internationalized environment where individuals have less in common and speak different natural

languages. Turner (1987) argues that if the group membership is unsatisfactory, members will attempt to leave that group. And if that is not physically possible, individuals may engage in other forms of reduced attachment, such as psychologically withdrawing from the community. Such reduced group attachments are difficult to detect if much of the communication takes place by use of ICT. Social fragmentation should therefore be of particular concern for researchers and practitioners working with communication and ICT in multicultural firms.

Thirdly, the literature focusing of inequality and power relations stresses the importance of recognizing that some identity groups tend to dominate others. In our case it was obvious that the Danes were in a dominant position. This also affected communication when applying ICT. Here the dominating Danish styles seemed to exclude members of other nationals groups.

The argument of this chapter is that perceptions of communication and language use is intertwined with other social practices, and that cultural and linguistic diversity increases the complexity of interaction. The results of these processes are difficult to predict, and when ICT is added it becomes even more complicated. Consequently, managing communication in diverse environments by use of ICT should depart from a locally grounded notion of interaction patterns.

While practical implications for multicultural organizations wanting to improve the utilization of diverse human resources by means of improving communication may be somewhat premature due to the exploratory character of the study, some initial guideline can be provided.

To encourage communication in multinational organizations, managers not only need to reward measurable individual performance, they also need to expand the concept of performance to include contributions toward strengthening the collective human resources of the organization. One way of promoting communication is for management to make official the contribution to collective knowledge as dispersed by ICT or other means. Thereby, individuals will start to see communication as valuable and as a valued contribution to the organization's productivity. This has to be backed by unequivocal messages from the management regarding the value of interaction and teamwork. Furthermore, ICT can be used positively if it is not only seen as a simplified solution to the communication issues that are dominant in multi-cultural companies. While the use of ICT provides a different platform for communication compared to face-to-face interaction, this form is not detached from social processes. And some uses of ICT may create problems that can affect the social environment and subsequently the constructive use of differences in human resources. Hence, managers should make a clear statement about which forms of communication are suitable for ICT, and which should be handled on a face-to-face basis.

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APPENDIX

Semi-Structured Interview Guide, Diversity Management in Denmark

Subject Time

1) Work background

Employed by Years of employment

Position

2) Personal background Prior cross-cultural experience

Language experience

3) What expectations did you have before entering the organisation?
4) What does cultural diversity mean to your everyday work assignments?
5) In which ways have you adapted to the situation?
6) Is there anything you would like to change?
7) What formal guideline does your organization have with regard to diversity?
8) Do other rules or guidelines affect the role of cultural diversity?
9) What effect does cultural diversity have on the social environment?
10) What characterizes a valuable employee?
11) In which ways are human differences employed in the organization?
12) What problems do human differences lead to in the organization?
13) How do human differences affect communication?
14) How do you feel when different languages are spoken in daily work situations/social situations?

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Chapter 51
The Human Factor in Quality: Examining the ISO 9000 and Business Excellence Frameworks in Selected Greek Organizations

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ABSTRACT

The aim of this chapter is to theoretically investigate the implications of ISO 9000:2000 and EQA on HR issues in selected Greek industrial organizations in their road to quality improvement. The study sample consists of two selected industrial organizations that were judged as normal, ordinary, and representative. The data gathering was carried out through extensive and in-depth interviews in the two organizations asking several multiple informants. The study shows that organizations approach to quality is of great influence to effective human resource utilization. There is a tendency to avoid the involvement of HR department on either certification or the EQA and also it is clear that HR department status and role is still very traditional. The small sample does not allow making any generalizations for the majority of Greek organizations in all sectors of the economy. This is the first step towards an understanding of the current context and content of HRM in organizations moving towards total quality management implementing ISO 9000:2000 or EQA model. However, further studies needed to investigate similarities and differences in an international basis. The chapter provides a basis for understanding the present status of HRM implementation under ISO 9000 implementation and EQA model of selected Hellenic organizations and the results can be helpful for academics and practitioners. The author suggests that in order to have a reliable and objective depiction of the effect and influence of ISO 9000:2000 and EQA to the context and content of HRM, a thorough examination and analysis of relevant studies should be conducted which will include all the various approaches, practices and perceptions recorded so far in the literature -some of them based on empirical data and some deriving from rhetoric and "good-stories" or "how things ought to be" perspective.

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INTRODUCTION

The word quality in recent year is becoming very popular among organizations and academics and it is widely used in annual reports, in advertisement and even in government initiatives all over the world. However, although the true meaning and the value of quality is gaining ground in all over the world, the figures said a different story. Organizations are facing enormous quality problems in production (defects, scrap), in marketing (customer satisfaction), in logistics (response time, reliability), in finance (quality costs) and in most of their functions, even though the "Quality Revolution" has started according to many authors long time ago.

Having that in mind it is obvious that there is an oxymoron in the quality literature. Some authors argue that quality is about rhetoric and good stories in order for organizations to promote sales and create a "customer-orientation" profile. In United States and in Europe awards were established to promote awareness and provide a basis and a model for TQM implementation. However, the organizations both in US and in Europe were not so enthusiastic about the awards and the numbers are very small in all categories. On the other hand the certification with the new ISO 90000:2000 series of standards is gaining ground and especially in Asia the increase in certified organizations is beyond expectations. But still, many authors state that ISO 9000 is not equal to Total Quality Management but is just a third part quality audit that is not related to final product quality mainly used by organizations as a commercial tool. So what is "right path" to quality improvement and to customer satisfaction? Why quality is so desirable but very few organizations are willing to be involved in the quality journey?

In Greece, according to Dervitsiotis (1999) quality "had been of paramount importance in Greek culture since antiquity often mentioned as "areti (virtue) by Aristotelians and was at the center of all cultural and political activities in the ancient Greek civilization. Over the last twenty years the efforts of Greek industrial organizations for quality improvement were simply focused in the use of statistical methods in the production area and the introduction of quality assurance systems certified by third party (ISO 9000 series). However, the "technical" and "process-oriented" approach seems that does not provide the basis for the establishment of company-wide quality culture that covers all functions of the organization and focus on internal and external customer satisfaction. (IPM, 1993 Blackburn&Rosen, 1992).

On the contrary, moving from a traditional quality assurance system to a new philosophy of continuous improvement in which responsibility for quality is at the hands not of quality professional but all people within the organization is a challenge for Greek Industrial organizations that external and internal conditions will force them to implement.

The new ISO 9000:2000 and the Business Excellence movement through the American and European Quality Awards are the prevailing approaches to quality improvement according to the majority of Quality academics. Both seemed to provide a basis for the implementation of a TQM philosophy, which provides a unique way of improving organizational performance and attaining competitive advantage. The TQM rhetoric calls for a cultural shift, emphasises self-control, autonomy and have a significant effect in the way people are managed. In the context of these awards and the new ISO 9000:2000, new realities and perspectives emerge for the effective utilization of the organization's human resources. In the literature, aligning Quality Improvement programmes and initiatives with human resources effective utilization requires radical changes in the way the organizations perceive their "human capital" and the way the organizations' HR function operate (Hart&Schlesinger, 1991; Blackburn&Rosen, 1993). In the quality literature the importance of the "human or people element" in the quality improvement efforts are often been overlooked

and according to Wilkinson, et.al (1991) organizations are often engaged in a "production-oriented" perspective of Total Quality. Until recently, academics and practitioners seemed to be preoccupied with the study and implementation of the "hard" elements of quality improvement (mainly ISO 9000 certification), and the evidence is on the few books and articles published in the 90's and the following years. Only recently a number of authors suggested that the shift on thinking about quality has major implications for the management of labor and has occurred in parallel to a shift in thinking about Strategic Human Resources Management (Hart&Schlesinger, 1991; Blackburn&Rosen, 1993 Beaumont, at.al, 1994; Baruch, 1997; Vouzas, 2004; Conti, 2002; Soltani, 2003; Soltani, et.al, 1994). It has been argued that TQM cannot be applied in isolation. TQM is a total philosophy involving all organizational members and has high personnel content.

THE NEW ISO 9000:2000 AND BUSINESS EXCELLENCE (QUALITY AWARDS)

Since the introduction of ISO 9000 fifteen years ago there were a series of controversies and doubts over the role and the significance of ISO 9000 series on improving product and service quality, achieving internal and external customer satisfaction, and improving performance (Tsiotras&Gotzamani, 1996; Dick, 2000; Van der Wiele et al., 2000; Withers and Ebrahimpour, 1998; Magd & Curry, 2003; Stevenson and Barnes, 2001;Kartha, 2002.) According to Douglas, et.al (2003) "ISO 9000 is a multi-million-pound industry with many individuals and organizations reliant on it for their livelihood, including quality consultants, lead auditors, internal auditors, supplier auditors, quality representatives/managers and software designers/sellers as well as the numerous training companies and certification bodies and their employees". However, other authors and among them Kartha (2002) argues that the new standards main purpose is to assist organizations to "identify mistakes, streamline their operations, and be able to guarantee a consistent level of quality".

The new revised standard was launched at the end of 2000 and according to Beckford (2002), is "an attempt to harmonize all the standards and remove the manufacturing bias. Several authors stated that the new ISO9000: 2000 is directed towards performance rather than conformance (Najmi&Kehoe, 2000). Coleman&Douglas (2003) argue that organizations in order to achieve the new ISO 9000:2000 should demonstrate that have quality processes and procedures in place, but they are skeptical about what happens after ISO 9000 certification. Casadesús &Karapetrovic (2005) studying the relationship between the "new" and the "old" ISO found that "the evaluation of the new ISO 9001: 2000 standard is generally positive". Vouzas&Gotzamani (2005) argue that there is no really negative impact but mention that the perceived benefits are less than the previous standard and that the level of reported benefits of ISO 9001/2/3: 1994 decreases with time, evidenced by two empirical studies conducted in 1998 and 2002. Overall argue that there is "an erosion of the perceived usefulness of ISO 9001: 2000 in the future, especially in terms of short-term benefits". Martínez-Lorente & Martínez-Costa (2004) further argue that organizations certified by ISO 9000 "may have gone a part of the way to TQM. However, the authors claim that it is only the "first part of the way, not its end, because there is a large amount of TQM requirements that ISO 9000 does not satisfy". Research on ISO 9000:2000 all over the world is still going on and the perceived benefits and its integration to other quality initiatives is expected to clear the picture and provide a basis for further improvement of the standard (Laszo, 2000; McAdam& Jackson, 2002; Najmi & Kehoe2000,).

According to Vouzas&Gotzamani (2005), "careful analysis of the ISO 9000:1994 standards'

requirements compared to the basic principles of TQM and the requirements of the two most representative business excellence awards, the European Quality Award and the Malcolm Baldrige National Quality Award, reveals several main shortages of the ISO 9000:1994 standards. The authors stated that lack of strategic quality planning, absence of top management commitment; lack of focus on customer satisfaction, lack of systematic training in quality. Furthermore HR competitiveness, benchmarking, and quality cost measurement are absent, as well as issues related to health, safety and the environment in a study in Greek EQA awarded organizations. However, many authors believe that the new revised ISO 9000:2000 series of standards is a significant improvement on the previous version in terms of its conceptual simplification, its process-based vision and its acknowledgement of the importance of customer satisfaction as a key requirement for verifying the effectiveness of the quality system (Conti, 1999). The basic principles on which the new standards' requirements are based (as found in the ISO 9000:2000 document) are much more TQM oriented.

On the other hand, Business Excellence literature is mostly based on rhetoric and "good stories" on EQA and MBNQA awarded organizations in Europe and USA. Bohoris (1995) in a comparative analysis of the two main awards stated that "Quality Awards' assessment procedures seem to be the only comprehensive means available to date by which TQM initiatives can be thoroughly monitored and assessed, providing any business with a competitive internal mechanism necessary to face the imposition of future new barriers to trade in the form of technical or quality standards requirements. However, the criticism over "excellence models and awards" is growing (Dale, et.al, 2000; Laszlo, 1996; van der Wiele, et, al, 2000; McDonald, et.al, 2002; Hewitt, 1997; Steventon, 1994) According to Dale,et.al (2000) the EQA "acted in response to the perceived tarnished image of TQM, whilst the consultancies sought to address the diminishing demand and increasing competition for their services".

QUALITY IMPROVEMENT AND "HUMAN RESOURCES": A LITERATURE REVIEW

As mentioned earlier, only recently quality experts, researchers, academics and practitioners realized that "human resources" issues can be at the core of the quality philosophy and that employee involvement and commitment is essential for the successful introduction and implementation of quality initiatives, programmes or practices and techniques (Blackburn&Rosen, 1993; IPM, 1993; Hart& Schlesinger, 1992;Soltani, et.al, 2004;Soltani, 2003 Boselie & van der Wiele2002). It is widely accepted that Total Quality Management has a high human resource context and that quality movement recognizes the importance of human resources utilization and states a conceptual and well-defined image concerning human behaviour and motivation (Pfeffer, 1994). Wilkinson et al., (1991) state "putting human resources issues in the top management agenda is a prerequisite for the effectiveness of all quality improvement efforts". Research evidence suggest that as TQ improvement efforts proceeds, a change in the corporate culture occurs, resulting in the establishment of a work climate in which participation, trust, responsibility for goal achievement and employee involvement takes place (Lawler, 1994).

ISO 9000 Series Implementation and Human Resources

The literature on Human Resources utilization and quality improvement efforts is rather limited, especially when the focus is on the relationship and the impact of the implementation of the ISO 9000 series. The majority of these studies is descriptive in nature, with many generalizations, and basically put the basis for a better understanding

of the role of the personnel function in quality improvement efforts. TQM is often confused with quality initiatives, short-term projects and ISO 9000 series certification (Soltani,et.al, 2003; Hill&Wilkinson, 1995; Ho, 1994).

The launch and implementation of the new ISO 9000:2000 series of standards increases even more the companies' expectations and the likelihood that the new systems will bring firms one step closer to TQM and Business Excellence Vouzas&Gotzamani (2005). The introduction of the five building blocks and the introduction of the process-based approach are an attempt by ISO to reduce the amount of documentation required. Even more, the new elements that it introduces to the certified companies belong to the "soft elements" of TQM, that have been proved to be the fundamental ones in the TQM system, with a very strong effect in improving company results (Costa & Martinez-Lorente, 2003). However, up to now there is no major research done on the effects and impact of the new ISO 9000:2000 series of standards in Strategic HRM. The relationship between SHRM and ISO 9000 series certification is often seen as part of the HR function involvement in the design, introduction and implementation of a quality assurance system certified by an external evaluator. Wilkinson, et, al (1991) and the IPM (1993) study suggest that HR function actually plays an important role in the design and implementation phase of a quality assurance system. On the other hand, there are cases in which a quality assurance system had been implemented within the HR department.

Furthermore, in the literature, it was found that in many organizations the human resource function plays an important role in the design and implementation of a quality assurance system (Blackburn and Rosen, 1993; Wilkinson et al., 1991). On the other hand there are cases in which a quality assurance system had been implemented within the human resource department. Its integration with human resource management is increasingly recognized as all level managers' and employees' commitment is a major component of success. Another striking finding is that HR professionals are willing to digest and implement the fundamental principles and practices of quality into their HRM practices. They also strongly believe that quality improvement efforts and the ISO 9000 series certification is one of the major challenges in their job (Lawler, 1994).

Research evidence shows that when quality management evolves from quality control or quality assurance, it tends to focus on the "process" (technical) aspects of quality rather than on the "human" aspects (IPM, 1993; Kufidu&Vouzas, 1998). Thus, organizations being engaged in a quality assurance approach to quality improvement, do not usually allow sufficient room for staff contributions, and training is targeting only towards people involved in the production process. The personnel department usually is a peripheral function with a very traditional role. The IPM study shows that organizations placing emphasis on a ¨process¨ approach to quality tend to exclude human resource department from the design and implementation of quality assurance system such as ISO 9000 series. In most of the cases its role is limited and oriented towards increasing the awareness of the quality standard and handling the administrative aspects of quality efforts (IPM, 1993). Human Resources professionals seem to participate in the various phases of quality initiatives and play a vital role (usually a facilitator role) in these efforts. Overall, the involvement of HR function in quality improvement efforts usually is materialized in three ways a) by participating in the design, introduction and maintenance of various quality initiatives b) by changing traditional personnel practices in order to support a total quality culture and c) by establishing a quality orientation within the function itself. However, we have to consider that the quality stage or level an organization is, instantly influences the embodied organizational changes, which in turn affect the way human resources considerations are formed in relation to strategic quality goals.

The Excellence Movement and the "Human Resources" Element

Hendick&Triplett (1989), suggest that implementing Total Quality initiatives requires continuous adjustments of every facet of work environment and corporate culture and the effective utilizations of organization's human resources through the HR department can play an important role in TQM assessment, planning and implementing process as well as in annual monitoring and review. Furthermore, improving quality, meeting customer's needs according to the literature is part of everybody's job and everybody should feel responsible. Quality efforts should be based on a long-term perspective and be part of the overall business strategy including people-related issues such as education and training, performance appraisal, employee involvement, recognition and improving quality of work life. Absolutely necessary is also a quality policy that is understood and easily applicable by organizational members through a use of a common language.

It is widely suggested that successful TQM implementation changes the dominant values, organizational structures, the way people work together and the way they feel about participation (van Donk&Sanders, 1993). The above support the argument made by many authors stating that quality improvement efforts should become part of everybody's job and everybody should feel responsible. Quality improvements should be based on a long-term perspective and be part of the overall business strategy. In this context people should be considered as assets rather than as additional cost upgrading that way the role of the human resource function. Research in the US shows that in organizations, which were awarded the MBNQA, the human resource function's role was essential, but the overall rating on the HR utilization category was not satisfactory. In these cases the personnel professionals were part of the top management team and fully participated in the design and implementation of the organization's quality strategy. (Blackburn&Rosen, 1993).

There are limited studies concerning the HR element of the European Quality Award and the reason is that in the academic community the EQA framework is not considered synonymous with Total Quality Management but rather such as a business audit approach and a technique within TQM. (McAdam&O'Neill, 1999; Mc Donald, et.al, 2002) A study in Denmark shows that "Danish companies are acting in order to improve the use of human resources in the company and to keep up with competition in the market. The increase in the resource score reflects that companies are also more focused in 1996 on the effective use of non-human resources in such a way that company goals and strategies are supported" Kristensen & Jørn Juhl (1999). Hamzah & Zairi (1996) in a study of British organizations winning the EQA give the following statement concerning people in one of the organizations studied " LL Bean Inc. is about people and respect for people. This is a way of respecting the talents within the organization. A lot of companies see people as the problem. We saw people as part of the solution" Xerox a winner of the European Quality Award uses extensively benchmarking for HR in the areas of "management development, recruiting, compensation and other personnel processes with the world class competitors" *(*Sherer, 1995). Vouzas& Gotzamani (2005) in a study in Greece found that "EQA seems to provide a new platform for introducing new practices and upgrading the role of the HR function. Management and utilization of people is at the core of the EQA and it seems that the sample organizations are striving to focus on specific issues and measures, covering all HR-related activities.

In some organizations the strategic role of people is still not dynamic. It is considered to be very costly and complex, while respondents realize that there were still high opportunities for improvement in this area. It is obvious that human resources issues were not at the center of the

quality strategy formulation and implementation within the sample companies."

QUALITY IMPROVEMENT AND HUMAN RESOURCES ISSUES IN GREECE: A LITERATURE REVIEW

Quality Improvement Efforts and the Greek Industry

The quality movement in Greece started in the late 80's with the organization of a series of conferences and seminars on quality and followed in the early 90's with the introduction of the first "quality year" from the former Ministry of Development in the year 1993. In modern Greece, quality is still in an infant stage, but there are exceptions and Greek organizations and quality managers are at the top of Europe in terms of quality awards. In the past three years (2001-2003) the European Quality Manager of the year was Greek and one Greek medium-sized, family-owned organization was awarded the European Quality Award. On the other hand, ISO 9000:2000 certification awareness is growing due to government and EU initiatives and quality is at the lips of almost all Greek general managers.

Dervitsiotis paper "Quality in Greece" published in 1999 in the TQM Magazine is the only paper portraying the overall quality picture in Greece. There are of course a number of academic papers on quality but all of them focused on specific industry sectors such as textile (Vlachos, et, al, 2000), construction (Zantanidis &Tsiotras, 1998), food (Efstratiadis, et, al, 2000), and Tsekouras,et,al (2002) on a number of industry and service organizations. Furthermore there are also some "quality specific" papers addressing ISO 9000 series certification (Tsiotras&Gotzamani, 1996; Gotzamani&Tsiotras, 2002; Lipovatz, et, al, 1999), EFQM and ISO (Vouzas& Gotzamani, 2005) leadership and quality (Lipovatz, 1998), financial performance and quality (Dimara, et, al, 2004; Tsekouras,et,al (2004) and human resources and quality (Kufidu&Vouzas,1998; Vouzas2004; Dimitriades,2000,2001)

According to Stavroulakis (1997) "The dominant form of business is the small-sized family enterprise, co-existing with a ubiquitous public sector; both suffer from absence of flexibility, of entrepreneurial spirit and of a long-term perspective". The basic philosophy and principles of quality improvement as well as its significance and its context were almost unknown in the majority of the Greek Industrial organizations up to the 1960's. According to the Stafilidis (1995) although quality was perceived as a major element of each business partnership, no specific techniques or practices were used in order to assure quality of raw material or semi-final products among manufacturers and suppliers. The use of extensive and systematic implementation of quality procedures and use of statistical methods were rarely used.

During that era, organizations' customer orientation was focused in domestic markets, while the customer's demands for quality products and services were not a primary concern of the company. The same period competitive pressures were minimal, and price was the basic criterion for the acquisition of products, and finally the "sense of" householder was the one that determined the appropriateness of product and the "degree of" quality. In the mid 1970's the lack of quality specifications became obvious. Industrial organizations produced products applied Quality Control principles and methods initially with high complexity and high cost. A Karvounopoulos (1994) report that in the early 80's the significance of quality in the Greek industry was closely related with the significance of standardization. The pioneer industries of that era - mainly subsidiaries of foreigner multinational enterprises - saw the challenges and the opportunities of quality improvement and began to adopt specifications in order to ensure final product quality. In 1978 the Greek Organization for Standardization (EL.O.T) was founded, aiming at the development of specifica-

tions, the guarantee of quality of Greek products, and the support of export activities" (Booklet ELOT, 1991). The focus on bigger markets at international level, the sensitivity of consumers on quality issues, and the surge of products from European and other countries forced Greek industrial organizations to come out from their "quality sleep" in which they had fallen. The big foreigner enterprises were the leaders in that effort followed by Greek not-traditional industrial enterprises. Tsiotras&Gotzamani (1996) state that in Greek industry, companies first began to develop quality assurance systems in the 1990s. Most of these companies were subsidiaries of foreign organizations with certified quality assurance systems, and were forced to follow the quality strategy dictated by their mother company. The main reason for this was the inclusion of ISO 9000 certification within the EC procedures for the certification of industrial products, and the demand of already certified companies to their suppliers (domino effect).

On the other hand, Lipovatz et.al (1999) argue that the most important reason for the introduction of quality assurance systems in the Greek enterprises refers to the external, (i.e. the adjustment to the demands of the international and/or domestic market) and not to the internal impact of certification (i.e. the improvement of the organisational structure and the reduction of the production costs). According to Dervitsiotis (1999) "Performance improvement with quality management in the new tradition, using the guidelines of the European Quality Award, has been receiving increasing attention in Greece at the highest levels of government, industrial organizations for most sectors, universities and others". Lipovatz (1998) argues that Greek leadership has generally not embraced the principles of quality so as to be able to drive the process of change towards total quality

Quality and HR Utilization in Greece

It is argued that the majority of the Greek enterprises have neglected the human resources issues (Kufidu&Vouzas, 1998; Papalexandris, 1993; Kanellopoulos, 1990). Only recently SHRM issues have been thoroughly examined by academics. Studies conducted in the 80's and 90's revealed that in Greek industrial organizations, well-organized personnel departments is a recent phenomenon, and consequently personnel managers seemed to be a rare breed, appearing only over the last fifteen years. The investigation of the current level of SHRM implementation in Greek organizations was mainly covered by the Cranfield survey covering several European countries including Greece (Papalexandris, 1993). The survey was conducted three times (1993,1996 and 1999) and the sample was 150 organizations, which employed more than 200 employees. According to that survey, during the 90's, Greek organizations tried to adopt methods and techniques already successfully applied by multinational. The main emphasis was on the increasing importance of training, the effort to link training to the firm's strategy, the higher involvement and collaboration with line managers. Furthermore, the Cranfield study argues that there is a tendency of Greek organization to adapt their HRM practices to international trends (Papalexandris&Chalikias, 2002).

The literature on the Total Quality Management/ISO 9000 and its relationship to Strategic HRM is rather limited and is focus on commentaries from academics and practitioners and in a few studies. The reasons for such lack of interest can be traced as mentioned above to the small number of certified organizations and the lack of organized HR departments in the majority of the certified organizations. Furthermore quality professionals seemed to ignore or depreciate the "human" elements of the new ISO 9000:2000. The majority of studies shows that the main approach used by the majority of Greek industrial organizations were the adaptation of a quality

assurance system through the ISO 9000 series certification (Lipovatz, 1998; Vouzas, 2005; Vouzas&Gotzamani, 2005;Deligianakis, 2000). Kufidu&Vouzas (1998) in the first attempt to investigate these issues found that "concerning quality improvement efforts, emphasis also seemed to be given to the "system" side of TQM in the majority of the Greek industrial organizations and the reason for that could be traced in the ISO 9000 series certification campaign in Europe and recently in Greece - in many cases reinforced by European Union - and to the fact that most Greek organizations are moving from a quality control phase towards a quality assurance phase.

SURVEY OBJECTIVES AND METHODOLOGY

In this paper, the author suggests that in order to have a reliable and objective depiction of the human resources element in the Business Excellence and ISO 9000:2000 quality improvement frameworks, a thorough examination and analysis should include all the various approaches and perceptions recorded in literature -some of them based on empirical data and some deriving from rhetoric and "good-stories" or "how things ought to be" perspective. The sample consists of two selected industrial organizations (one Greek and one multinational company) that were judged as normal, ordinary, and representative, one being certified with the new ISO 9000:2000 series and the other took the EQA award of the EFQM. The data gathering was carried out through extensive and in - depth interviews in all two organizations asking several multiple informants i.e. the plant manager, the production manager, the personnel manager, using a semi-structured questionnaire with open - ended questions. The main purpose was to collect data and produce basic information, enabling qualitative observations concerning organizations' Quality and HRM efforts, the role and the status of Quality and HR professionals, and the implementation of various human resource initiatives from people being directly involved. Each site was written up as an integrated case study, with the focus on drawing out the commonalties of meaning and understanding each site. The data analysis provides some ground for generalizations, even though subjective judgments were also made from the analysis of the cases (see Table 1).

FINDINGS

Excellence Company A

The company A is the only Greek organization that had won the European Quality Award in the past five years. Company's A journey to quality started through ISO 9000 and ISO 14000 series

Table 1. Successful Greek organizations in the Categories of the European Quality Award 2004-2005 (Source: EFQM)

European Quality Award Categories	Number of organizations	Sector	Award Year	Size	Ownership
Committed to Excellence	16	Service: 11 (in which 2 public) Manufacturing: 5	2004: (8) 2005: (6)	Large: 7 SME's: 9	Foreign: (1) Greek: (18)
Recognized for Excellence	2	Service Organizations	1 in 2004 1 in 2005	SME's	All Greek
Award Winner	1	Manufacturing	2004	SME	Greek
Prize Winner (same company)	1	Manufacturing	2004	SME	Greek

certification and continued with the EQA (first attempt was on 1997). The main reason for going for the EQA was the organization's effort to establish a very good brand name domestically and abroad and to move a step forward on its quality improvement efforts. The ingredients of success according to quality manager were the high top management commitment and the participative approach used to design, implement and communicate the various elements and requirements of the EQA framework. However, emphasis was also on improving competitiveness and increasing productivity mainly through financial management techniques (cost reductions). The organization is on a spectacular development stage and a very strong export orientation and establishing strategic supplier alliances abroad.

The organization is a champion in providing Equal Employment Opportunities (70% of personnel are expatriates from the former Soviet Republics and there is also a large amount of disabled employees). Some of the organizations best practices concerning HR issues are the continuous encouragement for employee involvement through suggestion and improvement plans, the open and sincere communication between employees and top management in monthly meetings, employee satisfaction surveys on regular basis, competence-based training, zero accidents (SAFE award from the EU) and family working environment. The HR function implements a series of non-financial rewards such as financial support (loans), Sunday trips, and flexible working hours for disabled employees, special awards and happenings and recognition schemes to valuable employees (see Table 2). Based on the above policies and practices the organizations display a spectacular improvement in many areas. According to company data ninety five percent (97%) of employees consider working in a safe and pleasant working environment, the working hours lost in last two years decreased significantly, career opportunities and career development had been more systematic, almost ninety percent (90%) of employees believe that the products they produce are of highest quality and finally expressed happiness and satisfaction form the training and development programs participated in. The HR function is involved in annual employee attitude surveys aiming at improving working conditions and enhancing employee morale and commitment. However, top management is reluctant to upgrade the HR function and the HR manager role and this is due to the small size of the organization and the predominant role of the owners of the company in all aspects of business activities.

The involvement and the role of the HR function in quality efforts and especially in the European Quality Award was essential for achieving the award and for setting a new standard for improvement in the issues related to management of people. A series of HR practices were re-evaluated, documented and measured such as performance appraisal and rewards and others were better utilized i.e. internal communication methods, recruitment &selection and employee training. The most challenging task for the HR was the to support the organization toward building quality awareness for all functions and changing the existing corporate quality culture by incorporating HR issues to all quality procedures and by creating a climate of trust and commitment.

ISO 9000:2000 Company B

Company B is a multinational organization operating in Greece for many years with a very recognizable brand name and a big market share in its sector. Its main approach to quality improvement is ISO 9000:2000 and is considered very successful in achieving high quality products and increasing productivity. The main reason for ISO 9000:2000 certification was firstly the pressure from the "mother" organization and the increased competition and secondly quality improvement and efficiency in operations. Speaking with the quality manager, the HR manager and the Managing Director it was clear that all considered

Table 2. Profile of sample organizations

	Quality Approach	HR Philosophy, Goals and Vision	HR practices	HR dep't Involvement to Quality
Company A	EQA Winner ISO9001:2000	HR vision and goals part of the corporate strategy embedded in line management	▪ Corporate Social Responsibility ▪ Performance-based pay ▪ EEO ▪ Employee development plans, ▪ employee participation ▪ strong people-driven culture	▪ Education and Training for EQA ▪ Awareness Building ▪ Team design and support ▪ Internal and External communication ▪ HR Processes justification and measurement
Company B	ISO9000:2000	Absence of a written policy and Vision for HR Not quantitative long-term HR goals	▪ Traditional/bureaucratic HR practices ▪ HR function plays peripheral and supportive role	▪ Minimal, training program ▪ Awareness building ▪ HR manager not in quality steering committee

employees to be very valuable resource and that played a key role in achieving strategic quality goals and objectives. This of course is contradictory with the overall picture of the organization's HRM practices, the role of the HR department and the lack of a vision and mission for the personnel.

Formal written HR strategy, policy or quantitative goals regarding the management of human resources were absent and this was due to the focus of the organization to other "strategic" areas such as marketing, operations, and public relations. The involvement of the HR manager to the design and launch of ISO 9000 certification was minimal and covered only the development of training programs for quality and awareness building. The HR manager had no authority to review and adjust HR procedures in order to support ISO 9000:2000, to analyze and re-examine past job descriptions, to evaluate previous performance standards for employees, to suggest training methods and learning activities and ways to increase motivation. The HR manager mentioned that he took part in meetings regarding ISO certification (after certificate granted) and received information regarding quality strategic orientation, but he was not part of the quality steering committee. The quality manager claimed that a written policy or quantitative goals for personnel is not prerequisite for ISO 9000:2000 certification and considered as unnecessary and costly. A serious obstacle to the involvement of HR department to ISO 9000:2000 certifications was also the existence of serious interdepartmental communication problems as well as internal disputes and conflicts. Having that in mind it was extremely difficult for the HR professional to develop a sound, clear and integrated HR policy that can support the certification process and the establishment of an "ISO culture".

The HR department role in the organization can be characterized as a "peripheral" or "supportive" representing the average small and medium Greek enterprise. The HR department had only two employees, one secretary and one accountant and its most common HRM practices were administrative in nature such as, data filling, employee payroll, employee complaints, disciplinary action, and traditional HR practices (such dismissals, demotions, transfers, working hours and shift patterns). There were no major indexes and matrixes for HR issues (turnover rates, employee satisfaction, evaluation of education and training programs, induction, labor productivity, etc) and core HR practices like performance appraisal system, rewards and recognition schemes were absent for employees at

the shop floor. The above come to support research evidence that when "hard" approach to quality is adopted combined with a weak HR department with no strategic orientation, then "people" issues are often neglected and the quality improvement efforts are partially satisfied. The argument is more realistic since top management commitment in ISO certified organizations is poor and furthermore top level management is probably not aware of the advantages the "new strategic HRM" practices and the effect these practices might have to the organization's overall quality effectiveness and efficiency. Furthermore, in the organization studied the existing organizational HR culture and generally the overall corporate philosophy of human resources utilization seemed to promote quality improvement efforts through ISO 9000 series in a rather bureaucratic manner in which there is no innovation, promotion of new ideas, opportunities to be gained and best practices to be implemented.

CONCLUSION AND FUTURE TRENDS

It is quite obvious from the above analysis that there is an enormous distance between the HR requirements of the awards and those of ISO 9000. The ISO 9000:2000 is no more than an "audit of procedures" with not substantial HR context and content and on the other side the awards are concerned with HR both in relation to people management and satisfaction/results. The ISO 9000:2000 seemed to represent the minimum effort on HR practices and policies an organization should present in order to achieve third party certification but quality award and specifically EQA award requires proof of systematic design and implementation of HR policies and practices. However, many argue that a company cannot win one of the quality awards without first being able to satisfy the requirements of the ISO 9000.

It seems that ISO 9000:2000 certified organizations although are aware of the fundamental principles and tools of continuous quality improvement but still are in the early stages of a company-wide approach to quality improvement. The author believe that one of the most prevailing factors contributing to the delay of the establishment of a "quality-based" culture and a move towards strategic Total Quality Management are the short period of systematic implementation of quality assurance systems and the preoccupation with the so-called "hard" aspects of quality.

The existence of vision and a mission for Human Resources followed by systematic design and implementation of Strategic HRM practices seemed to be the main issues that differentiate ISO 9000:2000 organizations from EQA organizations according to the literature. However, according to other studies EQA organizations problematic area is that of Human Resources (Vouzas&Gotzamani, 2005; McAdam&O'Neill, 1999). The prevailing HR practices absent from the ISO 9000:2000 organization are the communication to employees of the corporate quality mission, designing and implementing programmes for employee empowerment and developing or applying TQM principles, practices and techniques within the HR function.

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KEY TERMS AND DEFINITIONS

Business Excellence: The use of quality management principles and tools in business management. It is the systematic improvement

of business performance based on the principles of customer focus, stakeholder value, and process management

Corporate Social Responsibility (CSR): Also known as corporate responsibility, corporate citizenship, responsible business and corporate social opportunity is a form of corporate self-regulation integrated into a business model. Ideally, CSR policy would function as a built-in, self-regulating mechanism whereby business would monitor and ensure their adherence to law, ethical standards, and international norms.

Equal Employment Opportunity (EEO): Some use it as a descriptive term for an approach intended to provide a certain social environment in which people are not excluded from the activities of society, such as education, employment, or health care, on the basis of immutable traits.

European Quality Award: Is now referred to as the EFQM Excellence Award. This distinction is awarded annually by the European Foundation for Quality Management to the organization that is the best proponent in Europe of Total Quality Management.

Human Capital: Refers to the stock of skills and knowledge embodied in the ability to perform labor so as to produce economic value. It is the skills and knowledge gained by a worker through education and experience

Human Resource Management (HRM): Is the strategic and coherent approach to the management of an organization's most valued assets - the people.

Human Resources Strategy: The Human Resources Strategy sets out plans to ensure the recruitment, development and retention of the best quality staff in all staff groups, in order to fulfil the organization's Mission and thereby meet its strategic aims and objectives.

ISO 9000 Certification: A company or organization that has been independently audited and certified to be in conformance with ISO 9001 may publicly state that it is "ISO 9001 certified" or "ISO 9001 registered". Certification to an ISO 9000 standard does not guarantee any quality of end products and services; rather, it certifies that formalized business processes are being applied. Indeed, some companies enter the ISO 9001 certification as a marketing tool.

ISO 9000: Is a family of standards for quality management systems. ISO 9000 is maintained by ISO, the International Organization for Standardization and is administered by accreditation and certification bodies.

Quality Assurance System: A quality assurance system comprises assessment and remediation action in a closed circle

Quality Improvement: There are many methods for quality improvement. These cover product improvement, process improvement and people based improvement. In the following list are methods of quality management and techniques that incorporate and drive quality improvement

Quality: The common element of the business definitions is that the quality of a product or service refers to the perception of the degree to which the product or service meets the customer's expectations. Quality is a perceptual, conditional and somewhat subjective attribute.

Strategic Human Resources Management: Is a general approach to the strategic management of human resources in accordance with the intentions of the organization on the future direction it wants to take. It is concerned with longer-term people issues and macro-concerns about structure, quality

Total Quality Management: (TQM): Is a new management philosophy aimed at embedding awareness of quality in all organizational processes.

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Chapter 52
Assessment of Web 2.0 Applications Employed by Human Resource Departments in U.S. Cities

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ABSTRACT

This chapter argues cities are not realizing the vast potential of Web 2.0 applications to increase the efficiency and effectiveness of their HR departments.

The chapter reviews the websites of the 50 most populous U.S. cities in terms of Web information available regarding human resources. This review found cities were generally not utilizing Web 2.0 applications. Additionally, the study found Web 2.0 applications, when available were predominately in English only, ignoring Spanish, the largest and fastest growing minority population.

Most local governments employ an intranet within the organization, to assist in human resources. A telephone survey of local government officials (n=17) found these intranet sites employ few Web 2.0 applications. The survey found most cities have plans to increase their use of Web 2.0 applications for human resources management. However, the recent economic recession has adversely impacted these plans. The chapter forwards recommendations to improve local governments' use of Web 2.0 applications while maintaining cost efficiencies.

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INTRODUCTION

This chapter fills a significant void in the literature focused on local government Human Resources (HR) practices in the United States. Specifically, to what degree are HR departments in large cities employing Web 2.0 applications to make their practices more efficient, effective, and inclusive. Inclusiveness was measured as a function of the digital divide, to what degree have these cities expanded their content offerings beyond English, to Spanish speakers, the largest and fastest growing non-English speakers in the U.S.

BACKGROUND

Human Resources: A Brief Review

HR is one of the essential organizational functions. Its focus is human capital, one of several types of capital, including for example: finance, equipment, and land. Both private sector and public sector organizations employ capital to maintain themselves and to provide goods and/or services. Since HR deals with humans, it is one of the most complex of organizational functions. Most simply, HR is charged with ensuring an organization has the right people at the right place with the right skills. Specifically, HR links performance standards to rewards, and provides individuals with authority commensurate with their responsibilities (Guy, Klay, & Coursey, 2004; Zeidner, 2008b). The realm of HR is broad and complex, and includes recruitment; retention; skill development (training); morale; rewards (salary, benefits, and others); performance evaluations; communication with current and potential employees; outplacement (retirements and lay-offs); and compliance with federal, state, and local laws and regulations; among other functions. (Bohlander & Snell, 2010)

Human Resource Function in Local Government

The USGAO reports the three enablers of public sector management are: people, process, and technology and of these enablers, Doug Baker (2005) concurs with GAO that people are the most significant organizational asset. (USGAO, n.d.) According to Doris Wong, Vice President of Peoplesoft, appropriate application of technology is an essential contributor to human resource management (Inside View, 2008). A decade ago, choice of technology implied hardware and basic software. Today, key technological decisions surround use of the www and implementation of Web 2.0 applications (Inside View, 2008). Increasingly, HR links two key organizational assets, people and technology.

Expanding upon the above definitional assets, the complexity of HR comes to light:

- **"The right people":** recruitment and retention, and outplacement (lay-off and retirement).
- **"The right place":** geographic, organizational, and temporal location (access).
- **"The right skills":** employee development (i.e. training and career ladders).

These three assets are impacted by innovations associated with Web 2.0, and in turn impact an organization's ability to effectively employ the many potential advantages presented by Web 2.0 applications.

Public Policy and Human Resources

Public policy interests impact HR, possibly more than any organizational function. For example, affirmative action and the Americans with Disabilities Act greatly expanded diversity within the workplace and made hiring and promotion practices more transparent and possibly more complex. The HR function in the public sector

shares many commonalities with the private sector. However, the public sector is clearly different (Bronson, 2009; Harel & Tzafrir, 2001) and overlays additional complexities such as Civil Service, political appointments with implied periodic forced turnover at executive levels, critical employment sectors such as public safety, and access of diverse portions of a community, among other complexities. President Obama on 11 May 2010 sent an unprecedented memo to his Cabinet and other agency heads directing them to "overhaul the way they recruit and hire" the civilian workforce (Grant Thornton, 2010). The President's observation can be applied to almost any unit of government. Grant Thornton, a multibillion dollar accounting and consulting firm with high levels of expertise in HR, forwarded several recommendations to support the President's memo. Their key recommendations centered on applying more technology to the HR system, in short, using Web 2.0 features in governmental HR practices.

Technology and Human Resource Management

When most people think of HR, they seldom consider the linkage between HR and technology. Surprisingly, HR has a close association with technology. In fact HR needs have often been a major pull factor in the development of new technologies. The importance of technology to HR may be reaching higher levels than ever before (Schramm, 2006).

If one doubts the linkage between HR and technology is critical, a few examples should suffice. IBM and other hallmark corporations of the pre-digital age and the early digital age owe much of their existence to the needs of HR. IBM's 80 column card punch, reader, and sorter originally a tool of the U.S. Census, soon found its way into HR management. One of the most vulgar times in the management of human resources is linked to the Nazi use of IBM equipment to identify and monitor individuals, and to deport persons to work and death camps. (Black, 2001) The IBM 360 and the mainframe revolution received considerable impetus from payroll and benefits management among other organization needs. The IBM PC (and clones) revolution extended the benefits of the mainframe revolution to smaller organizations, introduced real time benefits and salary data to organizations, and enabled job applicants to tailor resumes to a specific position.

Web 1.0 brought a communication revolution. Job announcements were now on-line and applicants submitted credentials *via* e-mail. Web 2.0 offers an even wider array of HR management opportunities. For example, Web 2.0 offers the potential for real time forms, including applications, and enables organizations to search an incredibly wide range of sources for applicant information; how many applicants never hear back from a prospective employer because of some embarrassing picture on *Facebook*? While not the focus of this chapter, it is likely Web 3.0 will further impact the way in which HR does business (Gray, 2009; Rea, 2010).

There have been many successful applications of Web 2.0 in all levels of government: federal, state, and local (Azyan, 2011; Chickowski, 2009; Moore, 2010; Monroe, 2009; Warner, 2007). These case studies, while informative and interesting are largely outside the focus of this chapter. However, experience has demonstrated that for Web 2.0 to be an organizational success, the focus must be first on people and only second on technology (Kreitzberg, 2009).

Web 2.0 and Human Resources

Web 2.0 with its enhanced communication opportunities, is the subject of an expanding literature within the private sector (Towers Watson, 2010c; Ballenstedt, 2010) and a component of many corporate case studies including firms such as Best Buy (Brandel, 2008), Capital One (Zeidner, 2008), IBM (Brandel, 2008) and SAS (Roberts, 2007) to name a few. In short, Web 2.0 applica-

tions have been found to impact organizational culture (Roberts, 2007; Randstan, 2010), communications throughout the organization (Towers Watson, 2010c; Ballenstedt, 2010), and employee relations (Sronce, 2009) as well as cutting edge management practices such as telecommuting (Sronce, 2009; Aon Consulting, 2009). Human resource departments are generally behind the curve with regard to adopting Web 2.0 applications (Zeidner, 2008a), however a rapidly expanding body of literature is focused on how Web 2.0 strengthens specific human resource functions such as recruitment (Sronce, 2009; Roberts, 2007; Schramm, 2007; Overman, 2009; Taylor, 2009), retention (McLean, 2008; Technology aids the human touch, 2010; Giordani, 2009), and training (Christensen & Horn, 2008; In the News, 2008; Baron, 2010; Accenture, 2010; Roberts, 2008a). Web 2.0 offers HR distinct efficiency advantages, for example self-service benefits where employees can take control and manage their own benefits when they want and from a location of their choosing (Franco, 2010; Human Resources 2.0, 2008; Towers Watson, 2009; Towers Watson, 2010b). In addition to improved efficiencies, Web 2.0 applications can support more effective (Corporate Leadership Council Recruiting, 2011; Ingham, 2011; TrendWatcher, 2009) and inclusive (Beaman, 2008; European Commission, 2007; Microsoft, 2010) HR operations. While Web 2.0 has great efficiency, effectiveness, and inclusiveness potential, there is also a substantial literature focused on potential difficulties with expanded use of Web 2.0 applications, namely: Americans with Disabilities Act impacts (Gurchiek, 2008a), bullying (Zeidner, 2008a), privacy (Gross & Acquisti, 2005), security (Wright, 2008), various legal matters (Sronce, 2009; Roberts, 2008b), addiction to pornography (Wright, 2009), and workers communicating negative messages about the organization (Overman, S, 2010).

A well developed portion of the Web 2.0 HR literature is focused on generational differences (i.e. a divide between the expectations of employees and job applicants and management with regard to technology). The literature shows that Generation Y expresses concern over controlled access to the Internet (Thornburg, 2009; McLean, 2008; Bronson, 2009; Gurchiek, 2008b). The expectations and concerns of younger generations often are not appreciated by management (Wright, 2008; Wright, 2010; It is about…, 2008). These same managers are unlikely to recognize that Generation X and Generation Y often hold differing perspectives of the www and technology (Aon Consulting, 2009).

While Web 2.0 HR success stories abound, it is clear that success is not automatic. Web 2.0 HR return on investment is a function of adapting systems to the local environment, most notably local culture; one size does not fit all (Martin, Reddington & Kneafsey, 2009a; Kreitzberg, 2009). Martin, Redding, & Kneafsey (2009b) provide several case studies that illuminate the benefits and challenges of Web 2.0 in HR.

Human resources, as noted above, has adopted Web applications to support many functions. Almost all local governments, beyond the smallest, support a website, and ordinarily the HR department is one of the main components found on any government website. Each of the 50 largest US cities supports at least one website. The first web based function most HR departments adoapt is job postings, especially internal postings. While a website and job postings are Web 1.0 applications with almost 100 percent market penetration, we felt their inclusion within this study was important to judge the relative penetration of Web 2.0 applications. The selection of which Web 2.0 applications to include in this study was based on our review of literature pertaining to Web 2.0 in HR departments. Since the literature is dominated by private sector experiences, and private sector organizations tend to be ahead of their public sector counterparts, we relied on private sector case studies and broader analyses to select applications for this study. Martin, Reddington, & Kneafsey (2009a) identified blogs, wikis, media

sharing, social networking, blogs, and wiki as key Web 2.0 applications suitable for HR functions. To this list we added micro blogs, like *Twitter,* which was identified as a potentially important HR application (Frauenheim, 2009).[1]

The Public Sector Lags

Relatively little literature is focused on Web 2.0 in the public sector, sometimes referred to as Government 2.0, probably due to broad implementation failures (Baumgarten & Chui, 2009). This is a likely explanation why the public sector lags behind the private sector in adopting Web 2.0 applications (Human Capital Institute, 2010). With governments facing deficits, reductions in expenditures, and hiring freezes, we are not likely to see significant increases in areas perceived to have uncertain payoffs, such as Web 2.0 (Pulliam, 2007). Several of the survey respondents noted that they had plans in place for developing their HR intranet site, but budget crunches have caused the plans to languish, a key difference between public and private sectors (Towers Watson, 2010a). Facing a resource-constrained environment fraught with uncertainty, one might argue, why not simply apply the lessons of the private sector to the public sector. While, undoubtedly there is opportunity to borrow lessons learned, there are significant differences between the two sectors. These differences limit the direct transference of private sector experience however the public sector will eventually find opportunities to borrow from the private sector. Governments will undoubtedly increase their use of Web 2.0 applications as Generation X's cultural impact on HR departments strengthens and as awareness of the efficiency and efficacy of the applications expands. Fully 94 percent of the survey respondents to are planning for greater use of Web 2.0 applications.

RESEARCH DESIGN

With little prior research beyond case and other anecdotal research studies, the present research was necessarily exploratory to identify trends within local governments (Babbie, 1998). We opted for the largest cities under the assumption that with their larger budgets, they would be better able to embrace Web 2.0 in the HR function. A two stage mixed methods research design was employed similar to that discussed by Yin (2003). The first stage was a quantitative review of each city's website similar to that employed by McDonald, Merwin, Merwin, Morris, & Brannen (2011) for their study of county websites. The first (quantitative) stage, conducted in September, 2010, reviewed the external (internet) website for each of the 50 most populous U.S. cities (See Figure 1). The second stage, executed in September – October, 2010, employed a follow-up telephone interview, gathering both quantitative and qualitative data from a smaller sample (n= 17, 33%) of officials, usually webmasters or information technology managers, knowledgeable of their city's internal (intranet) site. A phone survey was employed for two reasons. First, we needed to qualify each survey respondent, to ensure he/she was knowledgeable regarding human resources and web applications. We found that a respondent's position title gave little insight into whether or not they were the right person to respond to our queries. Secondly, telephone surveys tend to provide a higher response rate than on-line surveys (Hamilton, 2009; Kaplowitz, Hadlock, & Levine, 2004; McCarty, House, Harman, & Richards, 2007; Porter & Whitcomb, 2003) Additional data were gathered on each city's technology plans for the future. At both external and internal levels, data were gathered regarding the non-English (i.e. Spanish language accessibility of the site). The brief telephone instrument could be administered in as little as four or five minutes, however, some interviews went as long as 60 minutes as

Figure 1. 50 largest US cities, 2009

Rank	City	State	Population
1	New York	New York	8,391,881
2	Los Angeles	California	3,831,868
3	Chicago	Illinois	2,851,268
4	Houston	Texas	2,257,926
5	Phoenix	Arizona	1,593,659
6	Philadelphia	Pennsylvania	1,547,297
7	San Antonio	Texas	1,373,668
8	San Diego	California	1,306,301
9	Dallas	Texas	1,299,543
10	San Jose	California	964,695
11	Detroit	Michigan	910,920
12	San Francisco	California	815,358
13	Jacksonville	Florida	813,518
14	Indianapolis	Indiana	807,584
15	Austin	Texas	786,382
16	Columbus	Ohio	769,360
17	Fort Worth	Texas	727,575
18	Charlotte	North Carolina	704,421
19	Memphis	Tennessee	676,640
20	Boston	Massachusetts	645,169
21	Baltimore	Maryland	637,418
22	El Paso	Texas	620,447
23	Seattle	Washington	617,334
24	Denver	Colorado	610,345
25	Nashville	Tennessee	605,473
26	Milwaukee	Wisconsin	604,133
27	Washington	DC	599,657
28	Las Vegas	Nevada	567,641
29	Louisville	Kentucky	566,503
30	Portland	Oregon	566,141
31	Oklahoma City	Oklahoma	560,332
32	Tucson	Arizona	548,555
33	Atlanta	Georgia	540,921
34	Albuquerque	New Mexico	528,497
35	Kansas City	Missouri	482,299
36	Fresno	California	479,921
37	Sacramento	California	466,687
38	Long Beach	California	466,520
39	Mesa	Arizona	462,486
40	Omaha	Nebraska	454,731
41	Virginia Beach	Virginia	433,575
42	Miami	Florida	433,136
43	Cleveland	Ohio	431,363
44	Oakland	California	409,184
45	Raleigh	North Carolina	405,791
46	Colorado Springs	Colorado	399,827
47	Tulsa	Oklahoma	389,625
48	Minneapolis	Minnesota	385,542
49	Arlington	Texas	380,084
50	Honolulu	Hawaii	375,571

Source: U.S. Census, 1 July 2009 estimate.

respondents volunteered information far beyond that requested by the instrument.

Population

The study employed the 50 largest U.S. cities represent a very diverse group in terms of population, ranging from 8,391,881(New York) to 375,571 (Honolulu) with a median size of approximately 605,000, as displayed in Figure 1. The cities are geographically diverse representing 31 states and each of the nine U.S. Census divisions as displayed in Figure 2. Most states (n = 20) have a single city on the list while California has 8 and Texas 7. Other than Arizona (n=3) no state had more than two cities.

Sample

The second stage involved several steps. Each city's external website from stage 1 was searched for contact phone numbers for the Human Resources department. The department was contacted, and the individual answering was asked to identify the individual(s) (along with phone number) most knowledgeable of the city's internal HR site. Sometimes this contact referred us to a more knowledgeable party. This individual was then telephoned. If the individual was reached, the interview was conducted. If the individual was not available, a message was left. We made up to four contacts (with messages). The knowledgeable party (respondent) was found either in HR or more likely in information technology (IT). This often resulted in an internal gulf between those that knew the issues—HR, and those that knew the technology—IT. In all but one case, the contacted individual completed the survey. The authors as a group and individually, have conducted hundreds of telephone interviews; they were surprised by the enthusiasm of the respondents who were, with very few exceptions, delighted to talk about this

Figure 2. Number of top 50 cities by US census regions and divisions

Region	Division	Number of Cities
Northeast		
	New England	1
	Middle Atlantic	2
Midwest		
	East North Central	6
	West North Central	3
South		
	South Atlantic	8
	East South Central	3
	West South Central	9
West		
	Mountain	7
	Pacific	10
Sum		50

Based on U.S. Census Bureau estimates, 1 July 2009.

subject. We were also struck by the embarrassment cited by most respondents who felt their organizations were grossly behind in their Web development efforts. They noted that their limited resources have been directed at the external web efforts and the local intranet has languished. Almost every city had plans for substantial development, but these plans were either shelved or were far behind schedule due to budget cuts.

There may well be other impediments to expansion of Web 2.0 in HR. Most significant among these is a cultural divide. There is clearly a generational divide; younger workers get Web 2.0 while many of their older managers and decision makers don't. The value of Web 2.0 might simply escape many managers and decision makers or the technology might even threaten them. One author goes so far as to describe this as a *generational war* (Roa, 2008). We know if a decision maker doesn't understand a new paradigm, and Web 2.0 is a new paradigm, they will resist it. At least two of the cities we studied face a situation in which the decision makers are suspicious of Web 2.0, feeling that greater accessibility to the internet will result in employees wasting time surfing the web, watching movies, and the like.

A response rate of 33% (n=17) was achieved. The sample was, like the population, diverse, with a median of approximately 605,000, and representative of the 50 cities as a whole as displayed in Figure 3.

Figure 3. Sample cities—telephone interview (n=17)

Rank*	City	Population Estimate**
1	New York	8,391,881
4	Houston	2,257,926
7	San Antonio	1,373,668
8	San Diego	1,306,301
12	San Francisco	815,358
13	Jacksonville	813,581
14	Indianapolis	807,584
18	Charlotte	709,441
22	El Paso	620,447
25	Nashville-Davidson	605,473
26	Milwaukee	604,133
27	Washington, D.C.	599,657
29	Louisville-Jefferson Co.	566,503
33	Atlanta	540,921
34	Albuquerque	528,497
45	Raleigh	405,791
46	Colorado Springs	399,827

* Rank of top 50 cities (see Table 1).
** U.S. Census, 1 July 2009 estimate.

CITY EXTERNAL WEBSITE REVIEW

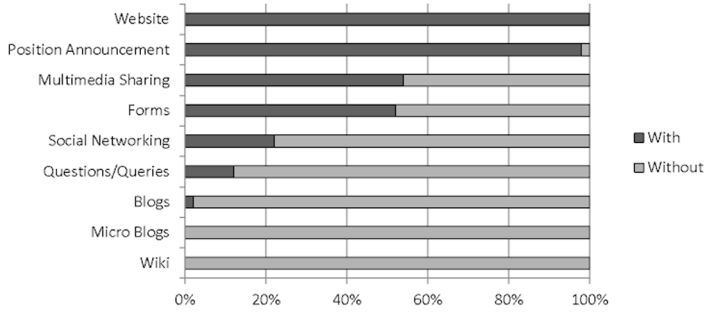
Each city was analyzed to see if it exhibited any or all of nine applications as shown in Figure 4. Two of the applications were not Web 2.0, a website and position announcements on-line could be accomplished without Web 2.0, but since they were essential to an on-line human resource presence, no distinction is made herein if these applications are 1.0 or 2.0 in nature. Including these two applications allows comparative assessment of differential penetration between the more fundamental applications, website and position announcements and the seven Web 2.0 applications.

Figure 5 displays the percentage of cities exhibiting each application. As expected, each of the 50 cities had a website and almost all (98%) had position announcements on-line. Approximately one-half had multimedia sharing and on-line forms. At this point the drop off was precipitous, with only 22 percent having social

Figure 4. Web 2.0 applications

1 website
2 position announcements on-line
3 multimedia sharing
4 on-line forms
5 social networking
6 question/queries enabled (beyond e-mail)
7 blogs
8 micro blogs
9 wiki

Figure 5. Percentage of cities with Web 2.0 application(s) (n=50)



networking, 6 percent enabling questions/queries, and only 2 percent having one or more blogs. No cities displayed a micro blog or wiki.

The study also sought to measure to what degree cities' on-line offerings were available in Spanish, spoken in approximately 12.2 percent of American households and the fastest growing language in the U.S (McDonald, Merwin, Merwin, Morris, & Brannen, 2011). Figure 6 displays the proportion of each application available in Spanish. For example, of the 50 cities with a website, 26 percent (n=13) have portions of the site available in Spanish, while of the cities enabling questions/queries, 3 of 6, or 50 percent, are available in Spanish. Most sites with content available in Spanish, use Google or another program for translation. While these program translators are free for use, they leave a lot to be desired and generally are of lower quality than translations produced by native or near-native speakers. City respondents stated Google was preferred, not for its quality, but because it was free.

Figure 7 presents these data from a different perspective, application availability by language. The table displays the general lack of Spanish language services available on city websites.

The number of applications available on a particular city's website ranged from a low of one (every city had a website) to six. Three cities out of the fifty most populous U.S. cities had a website and five other applications as shown in Figure 8. The figure displays that almost three in four (72%) of websites contain no Spanish content. For the 14 (28%) other cities, the majority (18%) have one, two, or three applications available in Spanish, with only 10% having four or five applications in Spanish.

Figure 6. Percentage of cities with one or more applications in Spanish (n=50)

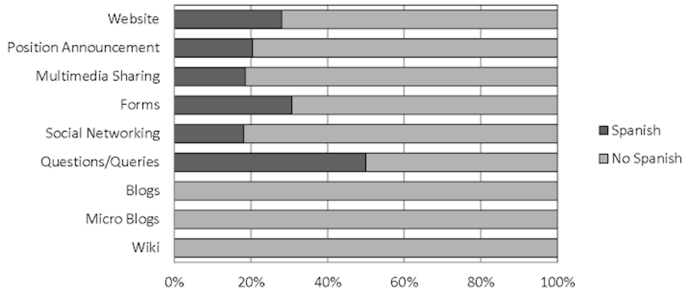


Figure 7. Application availability based on language (n=17)

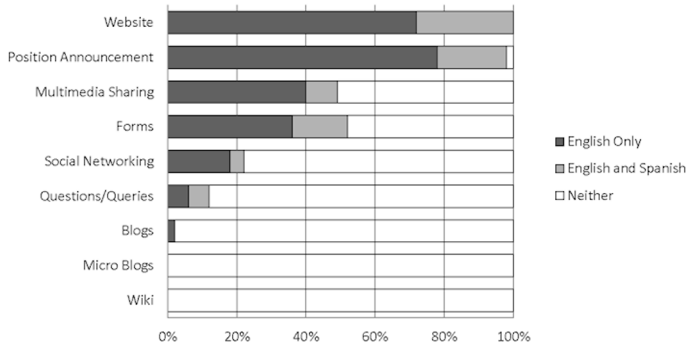
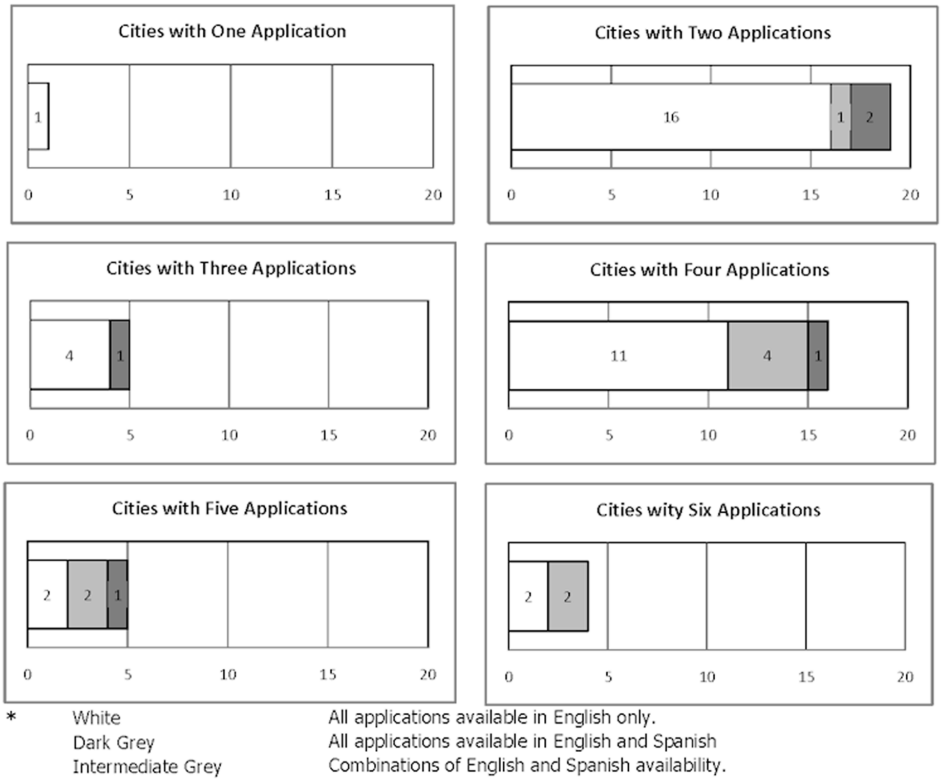


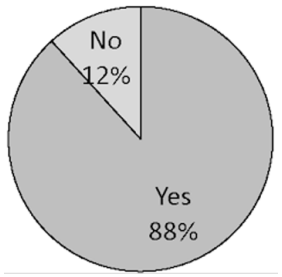
Figure 8. Cities by number of applications and language availability



HUMAN RESOURCES INTERNAL SITES

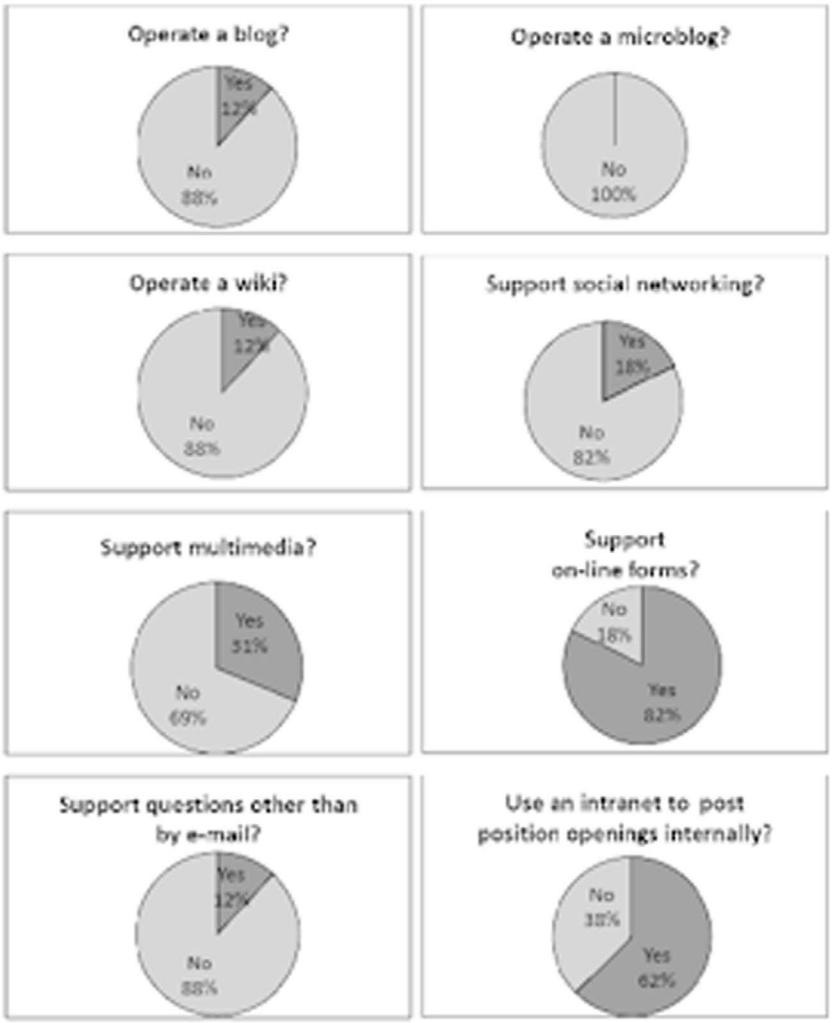
One-third (17) of the 50 largest cities completed a telephone interview seeking information regarding human resource intranet applications available within the government and not available to the general public. As displayed in Figure 9 approximately 9 in every 10 cities operate an intranet for human resources purposes as displayed in Figure 9. There were no discernable differences between the 14 cities that an intranet and the 2 that did not.

Figure 9. Does the human resources department operate an intranet accessible from inside the government? (n=16)



The interviews queried respondents regarding eight Web applications and the availability of the following: blog, micro blog, wiki, social network, multimedia support, interactive on-line forms, questions and answers by other than e-mail, and position postings. The results are displayed in Figure 10. Only two of the eight applications: on-line forms (82%) and internal position postings (62%) were utilized in more than one-half the cities. Each of the other six applications were utilized in less than one-third of the cities. Clearly, there is considerable potential for expanding the use of Web 2.0 functions in city government.

Figure 10. Internal web applications (n=16)



Growth will take more than fiscal resources. It will also require efforts to convince those who control the budgets that HR Web 2.0 investments have substantial payback for the community. While the private sector has found substantial savings in converting much of HR to Web 2.0 applications, two respondents noted that their city councils would not fund multimedia sharing because they feared employees would spend time watching movies.

We sought to determine if Web 2.0 are widening the digital divide with regard to language. As Figure 11 indicates, relatively few city HR departments (12%) have on-line applications available in Spanish. Clearly, the digital divide remains wide with respect to city HR departments.

Cities have considerable potential for increased use of Web 2.0 applications. Not surprisingly, almost all cities (94%) responded they had plans to expand their usage of Web 2.0, as shown in Figure 12. The majority of respondents who plan to increase Web 2.0 usage, noted the plans are on hold due to the recession and declining revenues. However, as Franzel (2010) states, this may be a false economy since e-Government, and especially Web 2.0 options may in fact save money.

SUMMARY, CONCLUSION, BEST PRACTICES, AND FUTURE RESEARCH

Large city human resource departments are not recognizing the considerable potential of Web 2.0 applications. However, existing Web 2.0 technologies are highly popular among employees and very useful tools for management and HR departments. The two applications employed by the majority of cities, support for on-line forms and internal job posting, are generally dependent on older technologies. And, it is reasonable to assume the 50 city websites reviewed and the 17 (33% of 50) respondents are a best case scenario in U.S. city government. These larger cities are more likely to have the resources, including professional talent to support Web 2.0 development. Unfortunately like most matters in government, resources are constrained, and when financial resources are constrained, technology budgets tend to suffer. This may be particularly tragic because human capital resources may be the most important of all organizational resources.

What is clear, based on the private sector literature, is that Web 2.0 presents considerable opportunity to make HR departments more efficient and effective, and very possibly to restrain costs. Since government was behind the curve when the recession set in, the principal recommendation is straight-forward; as budgets recover, direct resources to HR departments to realize the potential of Web 2.0. Since we do not know what Web 3.0 holds for human resource departments, HR must be attentive to technology. They may be able to

Figure 11. Are any of the human resources departments' on-line applications available in Spanish? (n=16)

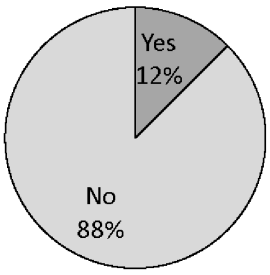
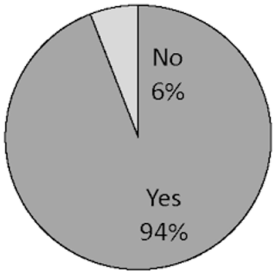


Figure 12. Does the human resources department have plans to increase the use of Web 2.0 applications? (n=16)



Skip Web 2.0, save a generation of resources and investments, and realize the advantages of Web 3.0.

Frustration levels among city HR directors and intranet managers are high. They recognize the opportunities but have diminishing hope to capture the potential offered by Web 2.0 technologies. Leadership is essential to help Web 2.0 gain traction in city government HR departments. While employees and HR professionals often appreciate the advantages of Web 2.0 applications, political leadership remains unconvinced and distrustful. Administrative leadership (e.g. city managers, administrators, and HR directors) will need to educate and change the negative or uninformed predisposition of many decision makers.

Web 2.0 in HR has not shrunk the digital divide. If anything, the divide has expanded as English speakers benefit from the new applications and Spanish speakers are left out.

Since Web 2.0 technology is relatively inexpensive it is clear that budget constraints may not be the most significant factor hindering Web 2.0 in HR. The private sector found leadership was essential to implement Web 2.0, and that leadership needed to be enlightened regarding the potential benefits of Web 2.0. Undoubtedly there is an important role organizations such as the International City and County Managers Association and the National Conference of Mayors can play to highlight success stories and the potential Web 2.0 holds for local governments.

The impact of Web 2.0 on local government HR warrants a good deal more research. Case studies are needed to investigate how particular organizations have grappled with Web 2.0 implementation and the impact of specific applications on HR operations. Additionally, research is needed to better understand the impact of Web 2.0 on other units of local government, for example counties and school systems.

Based on the findings of this study, five best practices are suggested:

1. Public sector HR departments ought to continue to borrow from the private sector since businesses have many years head start using Web 2.0 applications in human resources. The private sector has successfully shown that Web 2.0 can help HR department to expedite some of the clerical functions and free up HR staff to focus on strategic matters.
2. Public sector HR departments need to pursue Web 2.0 with all due haste as resources become available during recovery from the economic recession.
3. The language barriers evident in Web 1.0 seem to expand with Web 2.0. City HR departments must be aware of the expanding digital divide and address this to the best degree reasonable. As private sector organizations have relied on consultants for HR support, cities may find consulting organizations or consortiums with other governments a way to expand language offerings while maintaining cost control.
4. Change agents, must be identified and cultivated. Those individuals with the knowledge, motivation, and courage to lead must be rewarded for efforts that may go against present organizational culture.
5. Finally, HR departments need to keep current with technological advances in Web 2.0 and potentially Web 3.0.

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ENDNOTE

[1] A substantial case literature focuses on the implementation and advantages of various Web 2.0 applications. Cases can be readily found at the Society for Human Resource Management (SHRM) (www.shrm.org) and the International City and County Management Association (ICMA) (www.icma.org) sites.

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Section 6
Managerial Impact

This section presents contemporary coverage of the social implications of Human Resources Management, more specifically related to the corporate and managerial utilization of information sharing technologies and applications, and how these technologies can be extrapolated to be used in Human Resources Management. Core ideas such as motivation, gender equality, recruiting, and other determinants that affect the intention to adopt technological innovations in Human Resources Management are discussed. Equally as crucial, chapters within this section discuss how leaders can utilize Human Resources Management applications to get the best outcomes from their employees and customers.

Chapter 53
Managing Professions for Knowledge Management

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ABSTRACT

In the last years, Knowledge Management (KM) studies have focused on the foundations of this "new managerial discipline". Today, there is an increasing need to transform the theoretical speculations into managerial tools, and to find solutions to practical questions concerning daily KM activity. A key issue that still requires investigation regards the management of human resources devoted to KM. The paper analyzes this topic by means of an in-depth investigation of the relevant experience of some leading companies. In particular it examines the problem of managing new roles and tasks for KM, the issue of developing structured KM units, and the question of evaluating KM activities. A discussion of the possible implications for research and management is carried out in the conclusion.

INTRODUCTION

From its origin, Knowledge Management (KM) has been attracting the interest of the leading US and European companies that have rapidly implemented KM programs (Grossman, 2006). Hence, KM is becoming an essential ingredient of management practices, and it needs to be integrated with the other well established management functions.

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One issue that deserves explicit consideration concerns the links between Human Resource Management (HRM) and KM (Edvardsson, 2008; Gloet, 2006). Actually, human resources are involved in KM in many ways, and broadly speaking the relationship between KM and HRM can be seen under two different perspectives. The first one considers employees as the ultimate users of the knowledge an organization possesses (Oltra, 2005). Accordingly, the link between HRM and KM is seen in relation to aspects such as the

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organization of training activities, the provision of knowledge-based services, the facilitation of employees' interaction, etc.

The second perspective focuses on the fact that a successful implementation of KM requires personnel specifically employed and trained for managing such initiatives (Burstein et al., 2010; Edvardsson, 2008). This view argues that the adoption of appropriate knowledge-related HRM practices can influence the effectiveness of KM activities (Burstein et al., 2010; Cabrera & Cabrera, 2005), and the practical implementation of KM requires changes in the way people are managed, for instance with the aim of influencing individuals to assume a knowledge-sharing attitude.

This paper especially focuses on this second aspect, which has been relatively less considered in the literature. In particular, it investigates the challenges posed to HRM by the emerging KM-related activities. The recent literature and the empirical evidence are surveyed with the aim to underline important issues, relating to the nature and the contents of the new professions, the staffing policy, the performance appraisal, the rewards system. Based on this analysis, we discuss the main practical aspects of HRM in KM programs, and make some important points for a future research agenda.

THE ROLE OF PEOPLE IN KNOWLEDGE MANAGEMENT

Setting the grounds of KM as a managerial discipline has proven to be a difficult task that is still challenging researchers and practitioners. This is certainly due to the youth of the field and to the fact that several disciplines are contributing to its development (Baskerville & Dulipovici, 2006). In addition, it is the term knowledge itself that can be confusing. In the KM literature, knowledge is often defined in comparison with the notion of information. According to Holsapple (2003) information consists of data that have been organized for a particular use (i.e. qualities or measures of phenomena or facts, like, for instance, prices, sales, inventories, etc.), while knowledge is a combination of information, ideas, experience and insights that guide actions and decisions. Therefore, although knowledge is based on information, deriving knowledge from information requires human judgment, and is based on context and experience.

According to Holsapple and Joshi (2006), KM can be defined as the deliberate and organized efforts made by individuals or organizations to expand, cultivate and apply available knowledge in ways that can add value to their activity. To put it in a nutshell, KM consists of a set of techniques and tools to make the right knowledge available to the right people in the right moment.

A recent study (Heisig, 2009) aimed at comparing 160 different KM frameworks around the world shows that KM is generally seen as a set of main activities (knowledge creation; knowledge storage; knowledge sharing; and knowledge application) whose effectiveness is based on a proper mix of human, structural, cultural, and managerial factors.

In the past, two main approaches to KM have been followed by companies, one associated to a hard technology-oriented notion, the other to a more human-oriented vision (Lee & Choi, 2003; Newell et al., 2006). The technology-oriented view derives from Information Systems scholars: knowledge is considered to be an object that can be detached from its holder, and can hence be stored and transferred by means of a technological device. Conversely, the human-oriented approach considers knowledge as inseparable from the mind of individuals and as a result of social processes. Thus, although both views ascribe an essential role to computers and ICT systems, while in the technology-oriented approach technologies are the cornerstone of KM and they are seen as a way to automate cognitive tasks, in the human-oriented approach they are considered a set of enabling

tools that may or may not be of use to human beings for facilitating their cognitive activities.

The experience seems to confirm that the effectiveness of KM projects depends on both technical and non-technical elements. The large majority of initiatives carried out by companies resort to a mixed set of solutions, which include both technical tools (e.g. knowledge repositories, knowledge portals, web directories) and organizational arrangements (e.g. teams, communities of practice, meetings). KM can therefore be seen as a socio-technical issue, where both technological and human/organizational aspects must be adequately combined. But while the former have been widely discussed in the literature, the latter still deserves a thorough investigation. Specific issues regard people involved in KM activities. First, there is the need for new competencies and dedicated organizational structures to manage KM initiatives. Secondly, employees can be asked to perform new KM-related tasks, which require capabilities, skills, and attitudes they may not have. Such new activities also need motivation, especially when they are seen as mere distraction from the usual business. Hence, implementing KM programs has an effect on HRM, and it is necessary to investigate how to properly manage people involved in KM in order to obtain their best.

METHODOLOGY

Aims and Scope

As previously said, the issues of HRM in KM require an effort of exploration, systematization, and rationalization. With the purpose to contribute to this effort, we analyzed and compared some relevant case-studies of important companies that developed significant KM programs. The aim of the investigation was to shed light onto how companies manage employees involved in KM staff and what are the related issues. In detail, the main questions addressed were as follows:

- What are the new roles and profiles involved in KM programs? How are they managed? What are their tasks and responsibilities?
- How are KM units organized? What are the relationships with the existing organizational structures?
- How are KM tasks evaluated in companies? What mechanisms of incentive and reward are adopted to improve the effectiveness of KM programs?

Data Collection

Data collection was primarily based on secondary sources. Indeed, considering that there are several case-studies of KM programs reported in the literature, we thought that it would have been easier to examine this literature instead of making new case-studies of the same companies. The literature emphasizes that in some cases the resort to secondary sources can be fruitful (Barbour & Eley, 2007) for doing extensive comparative research, and for exploring specific aspects that were not explicitly analyzed in the original cases. The data collected from secondary sources were integrated with additional information that we could collect directly by mean of case studies that we conducted in a selected number of companies.

The decision to consider multiple case-studies and not just one was justified by the goal to identify common or recurring issues and comparing the adopted solutions within a significant sample of KM programs.

Sample Selection

The selection of the sample was preceded by the identification of a number of cases of relevant KM initiatives that were well documented in the literature. Table 1 clarifies the features of our study. Almost all the surveyed companies are multinationals, whose organization is complex and HRM is complicated as well. In addition,

Table 1. Outline of the cases considered

Company	Industry	KM programs	References – sources
Accenture	Business Consulting	Knowledge Exchange	Ash (2006); Falk (2005); Hill et al. (2005); Meister & Davenport (2005); Paik & Choi (2005)
Allianz	Insurance & Finance	KM at the international level	Spies et al. (2005)
ENI	Oil & Energy	KM in the E&P Division	Scarso et al. (2009)
Ernst &Young	Business Consulting	Centre for Business Knowledge	Akhavan (2005); Dellow (2005); Lara et al. (2002); Lee & Valderrama (2002); Scarso et al. (2010, 2011); Wang & Ahmed (2005);
Caterpillar	Construction and mining equipment	Knowledge Network	Ardichvili et al. (2006); Boehle (2007); Glynn (2007); Powers (2004)
PWC	Business Consulting	KM in Financial & Banking sector	Reina (2009)
Daimler	Automotive	TechClubs, EBok	Ackerman et al. (2003); Kannan et al. (2005); Tschirky (2009); Wenger et al. (2002)
Eli Lilly	Pharmaceutical	AskMe	Ghicuru & Tobin (2004); Wenger et al. (2002)
HP	Electronics	Worldwide KM program	Akhavan et al. (2005); Junnarkar & Levers (2005); Kohlbacher & Muchai (2007); Knowledge Street (2006); Lin & Kwok (2006); Martiny & Tobin (1998)
McKinsey	Business Consulting	Practice Development Network	Ghosh (2004); Wenger et al. (2002)
Shell	Oil & Energy	Turbodude, ShellWiki	Boyd (2004); Gorelick et al. (2004); Kemper (2008); Wenger et al. (2002)
Siemens	Automation	ShareNet	Akhavan et al. (2005); Franz et al. (2002); Gartner et al. (2002); Gibbert et al. (2010); Müller (2007); Nielsen & Ciabuschi (2003, 2005); Voelpel & Han (2005); Voelpel et al. (2005)
Unilever	Food	CoPs	Pos et al. (2005); Rumyantseva et al. (2007)

multinational companies have to deal with different cultures. In those corporations, there are well-structured practices and procedures, and HRM absorbs significant resources. Secondly, the cases show a significant range of situations, issues, and approaches to HRM in KM.

The sample includes companies of various sectors. This certainly confirms that KM is recognized as a key activity by leading firms, independently from their business area. In addition, it allows exploring a broad variety of situations. Generally speaking, it is very difficult to classify the various KM programs that companies have been implementing. Here, since we focus on the relationship of KM with HRM, we can roughly identify the KM programs analyzed into two main categories, namely:

- "Soft" programs, i.e. focusing on the key contribution of people. A widely used soft approach is that of Communities of Practice (CoPs), formed to facilitate knowledge sharing between employees facing similar problems or involved in analogous operational activities (Wenger et al., 2002). Computer technologies may be of great help here, but are, generally, not the core question;
- "Hard" programs are chiefly based on the essential support of information technologies, named Knowledge Management Systems (KMS). Several computer technologies are currently used to automate (or, at least, facilitate) knowledge storage, retrieval, transmission, and sharing (e.g.

document systems and repositories, intelligent search engines, interactive communication tools, enterprise portals, web knowledge maps).

In reality, as stated, the soft and the hard approaches are generally mixed to one another. Empirical evidence shows that KM programs are often not just a matter of technology, but rather of people, which means that HRM can be crucial, also when technology plays a significant part.

Data Analysis

The investigation was mainly based on qualitative data, directly drawn from the case-study reports: descriptions of KM programs and management solutions adopted, characteristics of the KM units, profiles of KM staff, etc. In particular, the problems faced by companies, the adopted solutions and the explanations of these choices were analyzed when their descriptions were included in the case-study reports. Qualitative data (when available) were also considered, but especially to understand the dimension of KM programs and explain the consequent problems.

Possible Points of Weakness

Clearly, the reader must be aware that the use of secondary sources has some limitations. Specifically, the connection between the research questions of interest and the data available in the case study may be weak, because the research was designed by others with different purposes. In addition, there may be a temporal misalignment between the data related to the various cases. However, in our specific situation, the use of secondary sources was functional to our research aims that were mainly: drawing an essential picture of the applications of HRM to KM, providing food for thought to researchers and managers, highlighting possible critical points, and exploring the solutions adopted to face them.

The selection of the sample has also some criticalities. The cases investigated are all well documented in the literature, and they are generally considered success stories. Furthermore, the KM programs investigated refer to large corporations: investments in KM are therefore high, and there is a significant commitment of top management. Consequently, the findings of our analysis can be biased. However, since our aim was to identify the core issues of HRM in KM programs, we thought that it was important to analyze the companies that lead the way, whose solutions and problems can provide food for thought.

HRM IN KM PROGRAMS: LESSONS FROM EXPERIENCE

Roles and Responsibilities

This issue is examined in relation to two categories of employees (Maier, 2007): a) employees whose task is the efficient and effective performing of KM activities and processes, and b) personnel that work in other business units but, at the same time, participate in and are affected by KM initiatives.

The presence of KM employees in organizations derives from having realized that the systematic and rational exploitation of knowledge as a corporate asset implies that KM processes have to be managed explicitly and directly. KM jobs are peculiar compared to the more traditional ones. While the first experimental KM programs often engaged few part-time or occasional people, today this is not possible any longer, especially considering the current dimension of many KM initiatives. The creation of structured and dedicated units (namely, teams explicitly devoted to KM activities) is the way generally followed by companies.

This has important implications for HRM. First, several job profiles have been created that have no correspondence to the traditional roles. Many KM profiles and titles tend to be used more

frequently (Maier, 2007; Ruth et al., 2003), but tasks and responsibilities are still unclear. Formal descriptions of KM jobs are still missing, are ambiguous, or can be confused with other activities. Actually, some KM roles are re-alignments or extensions of existing roles, while others are newly created (Burstein et al., 2010). For example, it may happen that KM duties are assigned to IT or HRM people, i.e. to departments whose activity involves organizing people, processes, and information technologies and are expected, by their nature, to entail KM tasks. This especially occurs in companies where KM is seen as a set of hard computer-based programs.

Even the titles used to identify the new roles change from a company to another. For instance, the functioning of CoPs requires two main tasks, i.e.: a) the management of KM tools that underpin knowledge sharing (e.g. IT applications, document management, organization of meetings, contacts keeping), and b) the development of knowledge domains (e.g. identification of relevant knowledge contents, their formalization, developing taxonomies, leading discussions, facilitating the delivery of best practice). In the various companies, such roles may however correspond to different terms and, not rarely, to different task profiles. At Caterpillar *community managers* boost and assist the processes of knowledge sharing among the members of a CoP. But the same roles, in Siemens ShareNet program, are indicated as *facilitators*. These tasks concern KM support rather than knowledge domains. On the contrary, in PricewaterhouseCoopers's (PWC) communities, the leading role is played by *subject matter experts*, that are not full-time KM employees but senior professionals that are experts of particular fields, dedicate just part of their time in managing the community, and put their competence at the service of the others. Their KM task is, consequently, more involved in the development of knowledge domains, while they are assisted by full-time KM personnel in resolving day-by-day practical problems (called generically knowledge managers). At ENI (Ente Nazionale Idrocarburi) facilitators are often senior experts that act as a sort of primus inter pares among the other members of a community, and are supported by a full-time KM staff, named *enabling team*, led by a *coordinator*.

A popular role is that of *knowledge brokers*. At sd&m, a large German software company, they are responsible (for a limited period) for collecting material and developing reports in specific areas and topics; reports are then delivered to the *technology managers* (term notably used, in that company, as a synonymous of *knowledge manager* – Brössler, 1999). Conversely, at PWC, knowledge brokers are seen as facilitators of knowledge transfer processes. Their activity mainly consists in stimulating the potential users of knowledge to access document repositories, join in CoPs, consult matter experts, etc. Therefore, they are KM support people rather than domain experts. At Siemens, instead, knowledge brokers are at the same time KM people (that help supporting knowledge exchanges within the CoPs) and partly experts of a specific knowledge domain as well. A similar function is played at Hewlett-Packard (HP) by *knowledge advisors*, who are responsible for helping users search for information, making people and community connections, training users in the use of KM tools.

Other ways to name KM roles can be found in other firms. At DuPont (Davis et al., 2005) there are four roles: high level *synthesizers* (experienced R&D managers responsible for monitoring technological developments); *librarians* (whose duty is to gather, assimilate, index and store copious amount of information, and to provide timely assistance and service to other employees); *knowledge engineers* (acting as knowledge interface between R&D, marketing and customers); and *knowledge operators* (typically front-line employees that accumulate and transmit operational knowledge and work very closely with knowledge engineers); and finally *domain experts* (who test the validity of the knowledge assets collected). At

Accenture the knowledge incorporated into their KMS is assessed by *editors* who are responsible for the synthesis, repackaging, organization, and categorization of knowledge.

A key role is that of *Chief Knowledge Officer* – CKO – or similar names. This is probably the most popular KM role, as testified by the literature (Awazu & Desouza, 2004; Maier, 2007; McKeen et al., 2003). According to Wenger et al. (2002), the objectives of a CKO's include: maximizing the firm's knowledge assets, designing and implementing KM strategies, effectively exchanging knowledge assets internally and externally, and promoting the use of KMS.

A clear leadership is considered critical for the success of every KM initiative (Anantamula, 2008), and, for this reason, the CKO should be a senior executive. But this is not the rule, and the situations can be very different. CKOs are not always senior executives or, when they are, they can be just part-time CKOs. At PWC, for instance, the *Global Knowledge Manager* is the director of a business division. He is mainly a sponsor of the program, represents the link with the top management levels, and has budgeting responsibility. More specific aims and implementation strategies are the duty of lower level managers that, however, do not have the same authority in the company chart.

The CKO profiles and their duties also depend on the existence of an independent KM unit. At Accenture, for example, a specific manager, called *Chief Information Officer*, initially headed the KM program. When the unit was incorporated into a wider organizational division, there was a change in roles, tasks, and responsibilities.

The picture is made even more complex by the fact that there are people somewhat involved in KM activities while working in their business units. The issue of *double tasks* and roles derives from the fact that each employee can be considered both a potential source and user of knowledge. This situation is typical of CoPs. For instance, in TechClubs - the CoPs at Daimler – engineers wear two hats: as tech club members, they improve their competence, co-ordinate standardization of practice, and share knowledge with colleagues; however their main affiliation is still at the car plant, and focuses on the design of new models. This double role can cause several problems. At Shell the conflicting priorities of managers reduce their motivation to actively participate in the Turbodude community. At Unilever the most strategically relevant communities proved to be not necessarily the most active ones, primarily because the experts that worked in an area that was of high strategic value were too busy with their local tasks to share their knowledge.

Formal KM Units and Overlapping With Existing Structures

This issue arises once KM programs switch from simple additional activities, performed by existing organizational functions, to highly strategic goals that require structuring, as happened in most firms. Formal KM units are often created to seek efficiency and control over KM activities, which implies specific solutions in terms of setting organizational charts, budgeting, fixing (economic) goals and measuring them, establishing authority and responsibility, planning careers and wages, etc.

The overall picture is, again, very complex. Lara et al. (2002) contrast two opposite situations: strictly formal KM units (e.g. American Management Systems, where the organization of KM activities is aligned with the formal culture of that company) and substantially open environments (for instance, the World Bank KM programs with a certain degree of non formalization). The majority of situations lay in the middle. These intermediate solutions may mean, for instance, that KM units are placed under the responsibility of other divisions, or that KM tasks just represent one part of the staff's current activities. KM initiatives at ENI, even though they involve the entire corporation, are considered part of the Exploration and Production Division that, at the same time, has

several other tasks. At Accenture, KM and learning management have been integrated into the same unit. This reflects the view that the two activities are considered similar and complementary.

Sometimes, this can lead to unclear situations as regards to responsibility and authority. At PWC, a Global Knowledge Manager is in charge for budgeting and general KM strategies, but KM people are subordinate to another director for their daily work. Things can be even more complicated in case of complex multinational KM teams, with the existence of independent but linked KM units. This confusing picture can be seen somewhat typical, given that KM is a substantially new activity that still needs accepting and economically justifying by managers. It is what happened to other management functions (see, for instance, IT departments) that are, now, an established formal part of companies.

However, another important reason has to be mentioned: the nature itself of KM. Since the purpose of KM is to facilitate the sharing and exploitation of knowledge across the entire organization, it requires an active participation by many people that do not necessarily work in the KM unit. A good example is that, again, of CoPs that are generally designed to overcome hierarchical, linguistic, cultural, and geographic barriers that exist in an organization. Since people working at the same project, plant, or market tend to develop idiosyncratic "knowledge islands", CoPs are put as bridges over islands thus enabling companies to exploit the valuable intellectual capital scattered in their dispersed organization. For instance, Siemens Knowledge Community Support was explicitly aimed to network internal knowledge embedded in the distinct parts of the firm. The Shell Turbodude networks were created to facilitate knowledge sharing among colleagues of distinct deepwater exploration teams. At Daimler, engineers working on new models at different plants participate in inter-company TechClubs, where they can share knowledge of specific problems.

This transverseness can cause conflicts with the existing organizational structure. For instance, the development of a new CoP can require the transfer of power from the line management to the community itself. But this may be perceived as an internal element of competition. In ENI's CoPs, experts and facilitators are subordinate to their hierarchical line for usual business operations and to the KM enabling team coordinator for the time they devote to KM activity.

The question of whether and how KM programs can coexist with existing structures is thus critical, especially when they assume a formal configuration and are recognized as a part of the system. In the KM view, knowledge sharing cannot be intended as a mere informal activity that is almost invisible to the formal organization. Structuring and formalization are especially required when KM practices have a directly recognizable business goal. At Unilever, a formal framework has been put in place to help ensure the effective and efficient operation of KM activities and to establish appropriate links to the rest of the organization. At Shell, the conflicting priorities of managers reduce the motivation to actively participate in the community.

In any case, KM structures have peculiar social and organizational functioning, compared with the traditional ones. Especially in the case of CoPs, the involvement of several people, well beyond the boundaries of the KM office, suggests that those programs do not respond well to a usual control. Based on their analysis of Caterpillar, Ardichvili et al. (2006) point that managerial efforts should be devoted to remove barriers and create favorable conditions for individuals' participation. In other words, rigid hierarchies and mechanisms based on authority can prevent the contribution from the other parts of the company, which may be fatal for KM.

When KM programs grow, and their scope extends across departments and multinational sites, the question of local vs. centralized management arises as well. As the Accenture experience shows,

although a central standardized policy may provide common practice and facilitate the flowing of knowledge, locally-managed communities can favor effectiveness and stricter focus on specific issues of interest. Similarly, at Caterpillar and Siemens, differences in culture, values, business approaches, sense of authority, and preferred modes of communication suggest that KM practices should be tailored to the single area of application. On the other hand, the development of distinct environments raises the issue of integration. For instance, when CapGemini merged with Ernst & Young, adapting and integrating KM approaches and structures became a difficult task.

Value of KM

This issue involves two main aspects. Firstly, measuring the economic worth of KM is essential for budgeting resources and for fixing wage schemes. One essential point is that KM should create value for business, and a crucial question here is how costs and benefits can be effectively measured. This is still a puzzling problem in the current practice (Scarso et al., 2011). Due to the intangible nature of KM, proving the absolute validity of the business case, and evaluating costs and contributions to profit are very difficult, and sometimes nearly impossible (see e.g. Glynn on Siemens' KM programs). In addition, the most significant contribution of KM probably arises in a long-term perspective. At Daimler TechClubs, KM communities help to solve day-by-day problems which mean short-term value; but are also deemed to develop expertise of members, which means long-term value. Similarly, Procter&Gamble's KM practices are explicitly declared as a key component of the innovation and technology strategy. Also, McKinsey reports advantages in developing new customer-oriented strategies. All those examples show that the real contribution of KM is seen in terms of strategic value associated to the development of internal knowledge assets. But this contribution is clearly very difficult to estimate.

Different methods of KM measurement have been adopted in distinct cases. For evaluating the benefits, a frequently used approach is the measurement of tangible elements (i.e. documents delivered, reports written, information packages provided, accesses to knowledge repositories). Such solutions are used frequently, but while they provide information about the *quantity* of knowledge exchanged, they do not indicate its *quality,* which is clearly essential for measuring the business value. Based on that, most companies implemented a system for monitoring the satisfaction of company users, i.e. how much knowledge resources are seen as valuable contribution to everyday work. The solutions are, however, very different, and still based on a trial and error approach. At McKinsey, the measurement of satisfaction of KM efforts was initially left to the single user, while in a second time systematic measures were developed. Both at PWC and Ernst & Young qualitative measures through periodic questionnaires and interviews to users were implemented. All this proves that a standard solution has not been found yet to this key problem.

The second important question is that, to create business value, KM programs need the direct involvement of the entire company. In other words, the more the KM system is used and fed by all the company's employees, the more KM is valuable for business. It is thus important that the entire staff of a company – and not only the KM employees – accepts to contribute to KM, as sources or users of cognitive resources.

Several attempts have been made to promote the participation in KM. One way is to establish economic incentives. For instance, potential sources of valuable knowledge (i.e. experts of some particular field) may be asked to share their knowledge having in return an economic benefit. This approach was adopted by Siemens' ShareNet community: while, initially, knowledge

contributions to KM resources were based on the voluntary efforts of *evangelists* that led the way, then a more formal mechanism of economic incentives was established. Anyway, since knowledge can be considered a precious capital by the experts who possess it (i.e. they are paid based on their capability to solve problems or provide new ideas), in some cases there is an attempt to protect the "copyright" on knowledge contributions. We can mention the interesting example of a large advertising company's website, that collect new ideas from professionals and "put their stamp" on such ideas.

Non-economic incentives can be based on public recognition of the most valuable contributions, thus their sources can be recognized as experts in a particular field. The HP's IT Resource Centre program used a mechanism of credit rating of personal contributions. The experience however shows that while this mechanism is effective in environments where peer reputation is important (e.g. in the software developers community, or among R&D people) it can be less important in other contexts. Non-economic incentives can consist of prizes and bonuses, which represent more tangible forms of reward, but the problem is how to link prizes with real value.

Also, to increase the value added, it is necessary that the KM system is really exploited by the company. Convincing users to utilize the knowledge retrieved or exchanged by means of the KM program is essential for the long-term justification of the program itself. Indeed, the question here is that it may be difficult to convince people to use a system or a method whose utility is not taken for granted, and with which they are not familiar. In Siemens' ShareNet efforts to facilitate the use of KM programs include providing knowledge contents adapted to the specific goals of each individual, and implementing an ergonomic interface with KM repositories. McKinsey adopted a very articulated approach, that includes e.g.: increasing the visibility of experts that share their knowledge (to raise the credibility of the KM approach); monitoring knowledge contents provided by experts (so that only good contents are provided to users); and establishing incentives to users.

CONCLUSIONS: IMPLICATIONS FOR RESEARCH AND MANAGEMENT

This section summarizes the main lessons that can be drawn from the study in relation to the main issues treated, namely: the development of specific roles and responsibilities in KM; the setting up of formal KM units; the overlapping with existing organizational structures; and the economic value of KM tasks.

New Roles and Profiles

An effort of codification and standardization of KM workers appears to be a vital element for the development of KM initiatives. This can give order to the KM activities of a company by implementing career plans and wage schemes that can be recognized by both KM employees and the rest of the organization. Also, job profiles are an important reference for identifying the competencies that are needed for each task, and arranging adequate training programs. Another indirect (but important) result of standardization can be the creation of a category of professionals, independently from the specific company where they are employed.

It should be remembered that companies have different views of KM, so specific variations can't be eliminated. Nevertheless, a description of KM jobs can at least include some general qualifications that help to understand if a person is eligible for a particular KM position. These qualifications can firstly include the particular KM tasks or processes performed and their relationship with other organizational activities. Also, since KM jobs are strictly intertwined with the rest of the company, the main goals of the KM activity expressed in business terms and the hierarchical

interdependence with other units or offices should be clarified. It may also be important to explain that a job position has or hasn't the responsibility for a specific budget. As regards the required educational background or experience, a special attention should be devoted to ICT skills. This does not mean that a person must always be a recognized expert of sophisticated computer systems. But since ICT applications are basic components of KM programs, an applicant should at least have essential notions of the potential use of these systems in KM. This facilitates the recruitment process, makes the transfer of professionals easier from a firm to another, and creates a more efficient and transparent job market.

Attempts to classify KM roles and profiles have already been made by scholars (Burstein et al., 2010; Maier, 2007; McKeen, 2003; Oltra, 2005; Ruth et al., 2003). This can be a good starting point, but should not remain confined within the academic environments. The diffusion into the business practices is the crucial work that still has to be done, and requires the direct involvement of company managers and trade or professional associations. Also, the competencies needed for KM are still ambiguous, and subject to a continuous change. There is a general shift from the pure IT skills, which denoted the first KM tasks, to broader managerial, organizational and even sociological competencies.

Training and learning programs are increasingly vital for resolving recurring problems like for example:

- Providing the essential background for specific KM tasks; although there is flourishing of courses on KM in business schools and colleges, the tradition of a "KM school" has not been established yet;
- Standardizing concepts, terminology, and approaches to KM, for helping KM employees that come from other areas and don't have specific training in KM (this appears to be the norm even in the major companies);
- Disseminating general knowledge of the fundamental elements of KM as an ingredient of managerial skills, so that the entire company can understand the KM language; as an example, people should be familiar with terms such as knowledge transfer or community of practice, the same as they are with notions like budget or organizational chart.

Formalization of KM Activities

Building a formal unit for KM requires several actions, such as: clearly defining roles and processes, budgeting and allocating resources, fixing economic goals and monitoring them, establishing authority and responsibility, planning careers and wages, and so on. The question of whether a KM unit should be a formal or informal environment is subject of debate. On the one hand, formalization is required when efficiency is sought. Indeed, as in other activities, KM has a number of tasks that represent procedures and routines, whose systematic organization can be beneficial. On the other hand, too strictly formal rules can hinder the process of knowledge sharing that is still based, at least in part, on flexible participation and voluntary contributions. Also, formalization can help KM employees to gain recognition by the rest of the company (Lara et al., 2002), but can give rise to conflicts with the other well established managerial functions.

As the case studies show, KM units often overlap the existing organization, which raises problems of multiple roles, conflict of authority, etc. Very often, KM roles are part-time tasks: most people, especially in new projects, work in KM activities while doing the usual business practice at the same time. Clearly, this reduces the effectiveness of KM actions and raises conflicts with the other operators. From a HRM perspective, the management of such conflicts is a critical

task that is still largely based on a process of trial and error experimentation.

Evaluation of KM Activities

KM activities have often intangible contents and thus, by nature, are hard to measure. Furthermore, the scope of KM functions extends across the entire organization. This makes the evaluation of costs and benefits of KM for each business unit more difficult. Currently, there is no formal or standard practice for the measurement of KM activities. As shown, firms are now arranging their peculiar methods of auditing, based on a mix of qualitative measures but, at the moment, there is no best practice emerging. What should be noted is that companies are acting based on their specific experience, rather than on systematic or conceptual approaches. Here, fields of study such as Intellectual Capital and Economics of intangible assets might provide good reference for KM practice as well.

A second important issue that our analysis allows to highlight regards the role of incentives and rewards systems. Since the success of KM depends on the active contribution of people scattered in the company, this issue is under the attention of KM practitioners. However, companies are not yet capable of providing measures of the economic benefits of KM in a way that can be accepted and recognized universally. Consequently, the active participation of individuals in KM programs is often based on personal evaluations of their potential benefits. This can be vital at the launching stage, but the further development of a KM program requires other forms of incentives. The survey shows that the various companies have creatively implemented several forms of economic or non-economic incentives, and there is no best practice of reference. A useful contribution of HRM studies can be the systematic analysis and comparison of the reported experience, to help identifying the solutions that have already been experimented, their advantages, and benefits.

Conclusive Remarks

No longer exclusive domain of philosophical speculation, today knowledge is referred to as an essential and concrete element of firm's competitiveness. The current economic climate, with the difficulties it brings, represents an additional motivation to invest resources in the production, management and delivery of knowledge, in the hope that this can help to keep on progressing. This is the reason why KM has now a well-established place in the research community.

In spite of this, there is still a long way to go. As our investigation on HMR issues in KM testifies, managing knowledge in companies not only calls for theoretical concepts and technical solutions, but also requires proper organizational arrangements and managerial capabilities. Like other managerial disciplines, KM would benefit from a converging development of formal notions, applicative models, and organizational practices.

On the one hand, knowledge can't be treated in the business arena as an object of pure speculation. In particular, each company shows peculiar problems and needs, and a direct connection with the day-by-day activity is essential for implementing effective KM programs. On the other hand, a strong conceptual formalization of models and approaches is important for allowing comparisons between KM and other managerial activities, as well as between KM programs of different companies. Budgeting, allocation of resources, and managerial control would become easier. In short, as our study shows, the balance and effective combination of theory and practice represents today's challenge for both scholars and practitioners involved in KM.

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Chapter 54
Managing and Motivating:
Pragmatic Solutions to the Brain Drain

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ABSTRACT

It is now more than a decade since the acknowledgement of the health human resources crisis that exists in many low-income countries. During that decade much attention has focused on addressing the "pull" factors (e.g. developing voluntary international recruitment guidelines and bilateral agreements between recruiting and source countries) and on scaling up the supply of health professionals. Drawing on research conducted in two sub-Saharan African countries, we argue that a critical element in the human resources crisis is the poor working environments in these countries that not only continue to act as a strong "push" factor, but also impact on the motivation and performance of those who remain in their home countries. Unless attention is focused on improving work environments, the human resources crisis will continue in a vicious cycle leading to further decline in the health systems of low-income countries.

INTRODUCTION

Much has been written in the past decade about the health workforce crisis that is crippling health service delivery in many middle and low-income countries (Hagopian, Thompson, Fordyce, Johnson & Hart, 2004; Ntuli, 2004; McAuliffe & MacLachlan, 2005; Padarath et al., 2003). High-income countries with high salaries and attractive living conditions are drawing qualified doctors and nurses from these countries to fill gaps in their own health human resources pool. The emigration of skilled labour in search of better returns on knowledge, skills, qualifications and competencies is depleting human capital in many

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developing countries (Lowell & Findlay, 2001). The UN Commission for Trade and Development estimated that each migrating African professional represents a loss of US $184,000 to Africa (Oyowe, 1996). While low income countries have limited resources for training healthcare professionals, the migration of those who are trained to conventional international standards has made dependence on such cadres increasingly precarious (McAuliffe & MacLachlan, 2005). It is widely acknowledged that Africa's health workforce is insufficient and will be a major constraint in attaining the Millennium Development Goals (MDGs) for reducing poverty and disease (JLI, 2004). The Joint Learning Initiative (JLI) report (2004) indicated that the low health worker density in some countries has already had a major impact on maternal and child mortality. African countries, especially sub-Saharan Africa, have a very low density health workforce, compounded by poor skill mix and inadequate investment in training and development (Chen et al., 2004).

Beyond the national level shortages, imbalances in geographic distributions, especially between rural and urban areas, exacerbate the health human resources crisis (Dussault & Franceschini, 2006). In the countries that do have enough doctors, geographical mal-distribution is so severe that there may be ratios of 1 physician to500 patients in the city, while remote districts suffer from a 1:100,000 physician to patient ratio. The migration of health professionals from one geographical region to another, from the public to the private sector, from areas of generalization to areas of specialization, from medical to non-medical fields, and from one country to another affects the capacity of the health system to maintain adequate coverage, access and utilization of services (Awases, Gbary, Nyoni & Chatora, 2004; Padarath et al., 2003).

Health workers' migration is influenced by a combination of factors that either "push" professionals from the source countries or "pull" them to a recipient country. Push and pull factors refer to influences that are felt by professionals within the source country that either create an impetus to leave or an attraction to seek work in a recipient country. A WHO study (1996) suggested that regardless of the pull factors from recipient countries, migration only seems to occur if there are strong push factors from the source country. This chapter draws on research in two sub-Saharan African countries conducted over the past four years and argues that unless attention is focused on addressing the push factors, the human resources crisis will continue in a vicious cycle leading to further decline in the health systems and health service delivery in low-income countries.

IMPROVING THE WORK ENVIRONMENT

Remuneration levels have been identified as potentially the most influential factor in a healthcare worker's decision to migrate either between the public and private sector, or from low-income to higher-income countries (Dovlo, 2002). Efforts to address the workforce crisis include increased remuneration through salary top-ups, locum and rural allowances, and other forms of financial incentives. Such initiatives are based on the premise that the primary reason for migration is to obtain better remuneration. However, there is growing evidence that other factors in the work environment may also be acting as strong push factors. Workload and staff shortages are contributing to burnout, high absenteeism, stress, depression, low morale and de-motivation and are responsible for driving workers out of the public sector (Sanders & Lloyd, 2005). Poor working conditions are reported to seriously undermine health system performance by thwarting staff morale and motivation, and directly contributing to problems in recruitment and retention (Troy, Wyness & McAuliffe, 2007; WHO, 1996).

MANAGING AND MOTIVATING A DIVERSE WORKFORCE

While there is clearly a need to scale up the health workforce in sub-Saharan Africa, the macroeconomic and fiscal reality that the region is facing present a significant challenge. Real Gross Domestic Product in SSA is expected to grow at an average rate of 5.8% per year and real per capita GDP is expected to grow at 3.3% for all Africa in the short term. As a result, increases in recurrent salary expenditures, that will accompany any large scale increase in the health sector workforce, may need to be gradual in order to be sustainable. Domestic resources in many countries may not be sufficient to support scaling up the health workforce to the levels required to address population needs (JLI, 2004). It has therefore been suggested that countries need to move away from the expensive production of clinically oriented health professionals to focus instead on the more pragmatic production of health workers appropriate to their burden of disease, availability of resources, and minimum standards of care (Huddart & Picazo, 2003).

Indeed this strategy has already been adopted by several countries who are increasingly relying on mid-level cadres, such as medical assistants, clinical officers, and enrolled nurses (who have shorter lengths of training than doctors or registered nurses), to provide health care (Buchan & Dal Poz, 2003). Dovlo's study (2004) indicated that Mozambique, Kenya, Tanzania, Malawi, Uganda, and Zambia have various cadres called medical assistants, clinical officers, and nurse aides that are doing essential medical tasks, especially in rural areas. In Malawi, clinical officers are a major resource of the health sector; they give anaesthetics, provide medical care and undertake some surgical procedures. In Tanzania and Mozambique approximately 90% of caesarean sections are performed by mid-level providers. Recent studies provide strong evidence for the clinical efficacy (Chilopora et al., 2007; Pereira et al., 2007) and economic value (Kruk, Pereira, Vaz, Bergstrom, & Galea, 2007) of mid-level cadres, particularly in the provision of emergency obstetric care.

Given such positive indicators, it is important to recruit, retain and support these cadres to build the capacity of health systems in low-income countries. Educational qualifications that are less marketable internationally make it less likely that these staff will migrate, at least in the short term (as high-income countries re-evaluate their health systems' skill-mix this may change). The belief that these cadres are not internationally marketable has given rise to a certain complacency in the management and motivation of such workers. Many countries introduced them as a short-term measure with the anticipation that once the country built up its stock of health workers they would no longer be needed. Because of this there has been little investment in developing their career pathways, something which undoubtedly impacts on their motivation and relationships with other healthcare professionals.

A number of studies have drawn attention to productivity problems arising from the demotivating effects of the work environment. For example, Chaudhury and Hammer (2003) reported the results of unannounced visits to health clinics in Bangladesh that sought to ascertain the proportion of medical practitioners who were present at their assigned post. Nationwide they found a 26% absenteeism rate in rural health centres, with considerable regional variation. In the poorer areas, with single doctor clinics, this rises to 74% absenteeism. Thus, even when health facilities are staffed, the staff may not be present. In Tanzania, time and motion studies found overall productivity in public health facilities to be only 57%, with a mere 37% of staff time spent on patient care (Kurowski, Abdulla, & Mills, 2003). Further, skills among health personnel may be inadequate in terms of making an accurate diagnosis and following through with appropriate treatment; skill levels and skill mix may be inappropriate, while

application within the job can also be quite poor (McPake et al., 1999; World Bank, 2004). Ferrinho and Lerberghe (2003) have argued that poorly paid health service employees have developed a number of "coping strategies" to "compensate" for their under-remuneration, for instance, combining public sector work with "fee for service" private work. Absenteeism, under-the-counter payments for 'free' services, and misappropriating drugs or selling free drugs may be other compensatory coping behaviours. Predatory behaviour, in the form of clinicians using their authority to prescribe treatments for their patients to generate additional income, but in some cases may not be justified (for instance, in the need for a caesarean sections), is another. Public patients may be referred to private practices in return for a referrer's fee and fee splitting where the specialist shares the fee with the referrer are other examples (Ferrinho & Lerberghe, 2003). Whatever the morality of these so-called "coping strategies" they do demonstrate that when equity is thwarted, health workers will find ways to compensate, not just financially but also perhaps in terms of retaining a sense of self-worth.

This complexity of issues influencing motivation, performance, productivity and retention has been the focus of our human resources for health research over the past four years. This chapter utilises our research data from two sub-Saharan African countries to examine health workers' perceptions of their work environment, including their relationships with managers and co-workers. Data from surveys and focus groups with health workers demonstrate the impact of the work environment on burnout levels, de-motivation and retention.

THE RESEARCH CONTEXT

Two sub-Saharan African countries, Malawi and Lesotho, were selected in which to explore these issues. Malawi is one of the poorest countries in the region and has poor health indicators. Life expectancy has fallen in the last decade to 42 years and has been attributed to HIV/AIDS. The maternal mortality rate is 1,800 per 100,000 live births, while the infant mortality rate is 92.1 per 1,000 live births. The Ministry of Health is the main provider, providing 60% of all formal health services. The Christian Health Association of Malawi (CHAM), which operates on a non-profit basis, provides about 37% of all services. Other providers include both private for-profit and private not-for-profit, local government, the military and police health services, and small clinics offering care for company employees and their families (Muula & Maseko, 2006).

Two reports provide a detailed analysis of the health, nutrition and population (HNP) of Malawi. The first report *Human Resources in the Health Sector: Toward a Solution* (Government of Malawi, 2004) analyzes the country's health sector performance in terms of outcomes, household health behavior and knowledge, utilization of services, and the service delivery system. The second report, titled *Human Resources and Financing for Health in Malawi: Issues and Options* (Government of Malawi, 2006) proposes a number of policy options to address the problems in the sector. Significant factors that emerge from these reports are:

- The health status of Malawians continues to be generally poor, and the Millennium Development Goals (MDG) in health will be difficult to achieve at current rates of progress.
- Household knowledge about health and disease prevention is generally high, but utilization remains low for many key health interventions.
- Behavioural and cultural factors continue to impede good health practices and care-seeking.

- Strong performance in some health programs is clouded by faltering performance in others.
- Severe supply constraints for both clinic- and community-based health services have dampened their utilization.
- Service coverage has increased for some interventions, but quality remains variable.
- In an era of global health initiatives, some critical health problems are at risk of being neglected.
- Geographic, socioeconomic, and gender variations in health status and access to services are considerable.
- The private sector is emerging as a significant provider of services and is drawing an increasing number of Malawians, including the poor.

The human resources problem in Malawi is clearly recognised as a crisis situation. The overall vacancy rate has remained static (46%) despite a large increase in the number of filled posts in the past four years (Government of Malawi, 2007). The increase in filled posts is mirrored by an increase of 3,147 established posts in 2005; the attrition rate reached an all time high in 2005 with 491, nearly half (214) being due to death – many of these AIDS-related (Government of Malawi, 2007). There are few fully trained doctors and nurses. Ninety-five percent of medical work in Malawi is done by clinical officers. There are four districts that have no doctors. In some places nurses are doing medical assistants' work and the majority of nursing work is done by enrolled rather than registered nurses (Muula & Maseko, 2006).

The second country selected was Lesotho. Lesotho is a small country covering an area of 30,355 km^2 with a population of 1.8 million, landlocked, and enclosed within South Africa and consisting of three distinct geographical regions. The country is mountainous and more than 80% of the country is 1,800 km above sea level. This presents difficult topography and seasonal severe winters that are a challenge to health service delivery.

Lesotho is a resource poor country with a large percentage of the population (76.2%) residing in the rural areas where poverty is most prevalent. The country depends economically mainly on subsistence farming, manufacturing, and remittances from migrant labour based in South African mines. The level of poverty is high and 50.2% of the population is living on less than $1 a day. HIV/AIDS and tuberculosis (TB) remain the foremost challenges in human and economic development in the country. Lesotho has the third highest HIV prevalence in the world, the fourth highest TB incidence, and a growing problem of multi-drug resistant tuberculosis (MDR-TB) (WHO, 2007).

Public health and social welfare services are administered by the Ministry of Health and Social Welfare (MOHSW). In addition to its own publicly owned health service infrastructure, the Government of Lesotho (GOL) also subsidizes the provision of health services supplied by the Christian Health Association of Lesotho (CHAL) and a limited number of non governmental organizations (NGOs). CHAL provides approximately one third of the health care of the country through a network of eight Health Service Areas (HSA) hospitals and 73 health centres.

A Demographic and Health Survey conducted in 2004 (Government of Lesotho, 2004a) gives health statistics for the country and highlights the continuing problems with improving childhood and maternal health. Childhood mortality is high in Lesotho (double the rates for neighbouring South Africa). One in nine Basotho (the term for a person with Lesotho nationality) children dies before reaching their fifth birthday. Childhood survival has not improved in recent years. For the 10-year period before the 2004 DHS, for every 100,000 live births, 762 women died due to maternal-related causes. HIV prevalence is 23.2% for the country as a whole, with 26% for females and 19% for males. Tuberculosis is also a major public health

problem in the country with an estimated 696 TB patients per 100,000 population (WHO, 2007).

There are approximately 8,600 personnel working in the health sector in Lesotho, excluding traditional healers and traditional birth attendants. Of these personnel, only 44%, or approximately 3,790, are employed in the formal health sector operated by GOL, CHAL, other NGOs, and the private for-profit sector. The remainder, and majority, work in the informal health sector and include an estimated 4,800 community health workers (Government of Lesotho, 2004b).

The personnel census conducted for the Human Resources Needs Assessment reveals that 75% of the enumerated formal health sector employees are employed by the MOHSW, 22% by CHAL, and the remaining 3% by other NGOs and the private for-profit sector (Government of Lesotho, 2004b).

Although over 60% of Lesotho's health care is supplied at the primary care level, less than 20% of the formal sector labour supply works at this level. The largest share of the total health sector labour supply (46%) is engaged at the secondary service level, while a further 24% is employed at the tertiary care level. The remaining 10% are employed in the other support institutions, including the ministry of Health and Social Welfare and educational institutions.

The health human resources crisis in Lesotho is significant. MOHSW health statistics indicate that in 2002 Lesotho had 123 doctors, 623 professional nurses, and 562 nursing assistants. There has been a marked decrease in doctors and professional nurses because of emigration, while there has been a marked increase in the nursing assistant cadre. In 2004 there were 89 doctors countrywide, and 80% of these were foreigners from other African countries, most of whom were awaiting certification in South Africa where they can get higher paying jobs (Schwabe, McGrath & Lerotholi, 2004). Due to the shortage of doctors, other cadres of health workers, especially nurses, are very valuable in the provision of health care in the country. But nurses are also in short supply: from 1994 to 2004 the number of employed nurses fell by 15%. Only six of 171 health centres in the country have the minimum staffing required (Government of Lesotho, 2007). As of May 2007, 54% of professional nursing posts at health centres were vacant. This left trained nursing assistants, who receive just two years of training, to carry much of the burden of clinical work. At the current burden of disease it is projected that it will be necessary to triple the current supply of medical doctors. The minimum requirement projected is 255 medical officers and 17 specialists. This will ensure that Lesotho's coverage is brought into line with comparable coverage for other sub-Saharan African countries at roughly 12 doctors per 100,000 inhabitants.

The distribution of health sector personnel is also problematic in that the Central region, with more urban areas has much higher staffing ratios than either the Northern or Southern regions. While the Central Region has 2.04 personnel per 1,000 population, the Northern Region only has 1.33 and the Southern Region only 1.13. Further, the South is served by fewer than 25% of the primary care personnel, even though 29% of the population resides there and is the most dependent on primary care services. The health sector is heavily reliant on nursing assistants, particularly so in the CHAL facilities.

Research Methodology

Study Population

Three districts were purposively sampled, one from each of the three administrative regions in Malawi, and a total of 34 health facilities were visited by the research team. In Lesotho two districts from each of the administrative regions of the country were selected giving a total of 6 districts within which 36 health facilities were visited. The sample consists of those who were willing to participate at the time the data collectors visited the facilities. Questionnaires were completed by

153 staff in Malawi and 407 staff in Lesotho. In addition, in conjunction with the hospital management team, representatives of various cadres of health workers were selected to participate in Focus Group Discussions (FGD). Ethical approval for this study was obtained from the College of Medicine Ethics Committee in Malawi and from the Ministry of Health and Social Welfare Ethics Committee in Lesotho.

Data Collection

Participants completed surveys that measured perceptions of the work environment, burnout, job satisfaction, and promotion. The questionnaire was pilot-tested in two districts with 20 health workers of different cadres in each country. Respondents were asked to complete the questionnaire with the researcher present to provide guidance and clarification where necessary.

Instruments

The Healthcare Providers Work Index (HPWI) is an adaptation of the Revised Nursing Work Index (NWI-R) developed by Aiken and her colleagues (Aiken & Patrician, 2000; Aiken, Sochalski & Lake, 1997). The initial NWI-R contained 55 of the original 65 NWI items. Further analysis led to the development of a shorter, 15-item version with items being categorized into three subscales; autonomy, control over the practice setting,and nurse-physician relationships (Kramner & Hafner,1989). These scales have been used almost exclusively to measure the work environment of nursing staff (Aiken et al., 1997). In this study we have adapted the 15-item version for use with all health care providers. Details of the analysis and adaptation of the instrument are published elsewhere (McAuliffe et al., 2009).

The Maslach Burnout Inventory (MBI), comprised of three subscales measuring personal accomplishment, emotional exhaustion, and depersonalisation (an unfeeling and impersonal response towards the recipients of ones' care) was used to measure burnout. Responses are given on a 6-point scale with higher scores on the emotional exhaustion and depersonalisation and lower scores on the personal accomplishment representing greater burnout. The MBI is the gold-standard questionnaire in this area, has been cited in over 1,000 studies, and has previously been used with doctors and nurses in Africa, and in particular in Malawi. Strong reliability coefficients have been reported for each of the sub-scales in Africa (Maslach & Jackson, 1993).

Job satisfaction was explored through several items with scaled responses. None of the job satisfaction scales in the extant literature was entirely relevant and appropriate to the context of this research, as in addition to job satisfaction we also wished to explore intentions to leave and perceived likelihood of obtaining another position. The items were identified from (1) existing questionnaires, (2) a review of the relevant literature, and (3) suggestions from a panel of researchers and policy-makers with expertise in the area. The questions were intended to be descriptive of the particular context of the research, not to be additive.

SCALING UP: NOT JUST NUMBERS

A critical issue for many low-income country health systems is that high-income countries are attracting their most experienced health workers. Yet the focus of research and reporting on the human resources crisis has been largely on the numbers of health workers needed (Hagopian et al., 2004; Padarath et al. 2003; Wyss, Moto, Yemadji & Kurowski, 2002). Equally the country-level response has been focused purely on increasing numbers of doctors and nurses with little regard to where the gaps are occurring in their health systems and what specific types of expertise might be needed to meet demand. Most countries have addressed the shortfall by increasing output from

their training colleges. The impact of this strategy is only now being felt in their health systems as they become overpopulated with new, young graduates with little experience. Figure 1, which gives the age profiles of the 560 respondents to our surveys, bears this out with highest numbers of staff in the 26-30 year age bracket and a gradual decrease in staff numbers in the older age categories,. There is a slight increase in the 51-55 age category that may be accounted for by initiatives in both countries aimed at bringing nurses who have retired or resigned back into the workforce. The dearth of experienced health professionals raises concerns about clinical supervision and, ultimately, the quality of care. The response of one young Malawian medical graduate (on seeing this graph) was: "this frightens me as a newly qualified doctor – who will I turn to for advice when I have complicated cases."

Many of the health workers who took part in our research both in Malawi and Lesotho also raised their concerns about the lack of appropriate supervision and feedback on their performance. One health professional in Lesotho expressed frustration about other duties being prioritised over supervision and the implications of this:

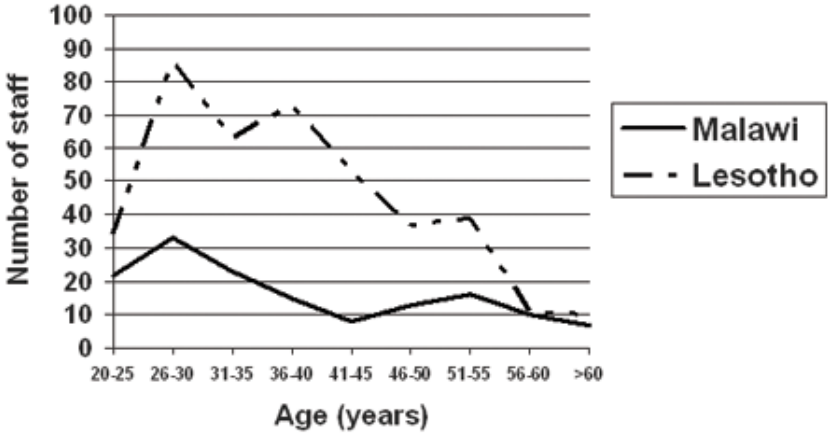
one ends up not doing justice to the people that they are supposed to supervise; they end up doing things because they have to do them and they have to address issues without honestly being guided and supervised. Regarding leadership, you forget as a leader that you play many roles to the people that you are leading; you don't just command them to do 1, 2, 3, but you are supposed to guide and monitor them as well as take care of their personnel issues. When you forget them; that means you are going to lose them because you don't handle them in such a way that they feel that you are part of them; they feel you actually don't appreciate them, and that too de-motivates them.

Another person felt that supervision is something that only happens when you make a mistake.

I think people who are supposed to supervise us do not really have interest in that; you will only see a manager when there is a problem in your department. Under normal circumstances they don't come but once there is a problem they will come and oppress you on why you haven't done this and that.

That supervision was inadequate and in some cases non-existent was a widely held view. This

Figure 1. Age profile of staff surveyed in health facilities



not only results in risk taking and possible reduced quality of care, but also has the effect of de-motivating staff. Staff working in isolation in resource-poor settings who receive no feedback on their performance and have no opportunity for clinical discussion about their cases are particularly vulnerable to becoming de-motivated. One cadre that seems to epitomise this problem are the clinical officers who provide the bulk of medical care in Malawi's health system. They are described as crucial to the running of the health system, yet there is a widespread perception that they have been trained up to a level where they are useful, and then abandoned. They work in a stressful environment, frequently unsupervised and beyond their scope of practice, with no hope of changing either their personal or professional standing (Bradley & McAuliffe, 2009). The current system forces them to either stagnate or leave clinical practice. Clinical officers themselves reported their lack of motivation, and staff who are trapped are unlikely to provide the best service (Martineau, Lehmann, Matwa, Kathyola & Storey, 2006).

Plans to increase outputs from the health professional training colleges in Malawi and Lesotho will surely exacerbate the problem of inadequate capacity and expertise for supervision. Unless this problem is addressed the increased production of health workers is likely to result in these graduates providing poor care and either becoming demotivated and unproductive and/or leaving their posts within a short period of time.

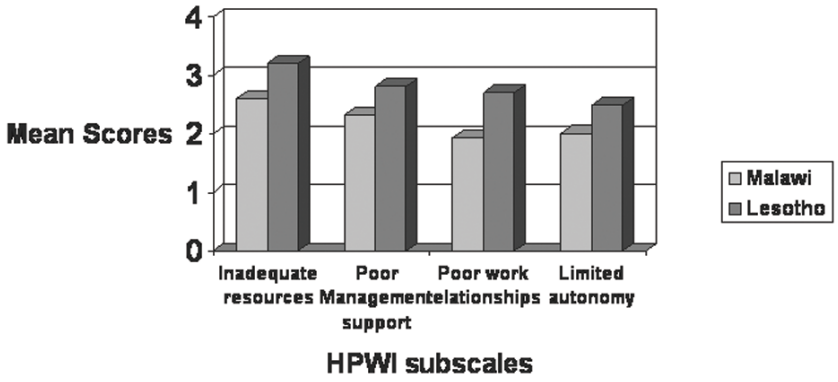
THE WORK ENVIRONMENT

The role of organisational attributes (such as autonomy of practice, workplace relationships, availability of resources) of the work environment is becoming increasingly important in ensuring that adequate staffing levels can be maintained in high income countries, particularly in times of shortage (Slater & McCormack, 2007). Several studies have shown the link between these organisational attributes and job satisfaction, (Aiken & Fagin, 1997; Gleason-Scott, Sochalski, & Aiken, 1999; Upenieks, 2002) burnout (Aiken & Sloane, 1997), retention and recruitment (Kramner & Hafner, 1989; Slater & McCormack, 2007), decreased mortality and healthier staff (Aiken et al., 1997). Little is known about the predictive value of these same organisational traits in low-income or resource-poor settings. Improving our understanding of the role such attributes play in the satisfaction, motivation and performance of health workers in low-income countries is critical to improving retention strategies in these resource-poor settings.

In order to measure the work environment we used the Healthcare Providers Work Index (HPWI) (McAuliffe et al., 2009), an adaptation of the Revised Nursing Work Index (NWI-R) developed by Aiken and her colleagues (Aiken & Patrician, 2000; Aiken, et al., 1997) from the Nursing Work Index (NWI) (Aiken & Sloane, 1997). McAuliffe et al. (2009) adapted the 15 item NWI-R) scale (previously used only with nurses) for use with a broader range of health professionals and identified four distinct subscales; adequate resources, management support, work relationships, and autonomy/control over practice. This four-point Likert scale ranges from strongly agree (1) to strongly disagree (4); hence higher values indicate more negative perceptions on each of the subscales.

Figure 2 shows the mean scores on each of the four subscales for health workers in Lesotho and Malawi. Inadequate resources and management support were most problematic in the work environments. The means also suggest less than full agreement on the presence of good working relationships and control over practice, but more staff are in agreement that these factors are present than the first two factors. Perceptions of the work environment are significantly more negative in Lesotho. One explanation for this is that the staff who took part in our research in Lesotho included

*Figure 2. Health professionals' mean scores on the work index (HPWI) *Note: Higher scores indicate more negative perceptions*



more staff with higher levels of qualification and therefore they may have had greater expectations of their work environments.

Exploring the perceptions about resourcing in more depth (see Figure 3) show that Basotho (the term used for people with Lesotho nationality) staff are far more likely to disagree that they have adequate staff to (a) get the work done and (b) do a quality job, with more than 80% indicating that these resources are not present in their work environments.

The other aspect of the work environment that differs greatly in the two countries is workplace relationships. Figure 4 shows that between 50 to 60% of Basotho health workers disagree that there are good working relationships between the different cadres and do not believe that teamwork or collaboration between cadres is a feature of their workplaces. By contrast a much smaller proportion (approximately 20%) of Malawians disagree with these statements. This would suggest that perceptions of work environment on the whole are much more negative in Lesotho. Interestingly, in our earlier studies in Malawi (McAuliffe et al., 2009) we found that the medical cadres had more negative perceptions about their workplace relationships than the nursing cadres. Such negative perceptions about one's work environment are likely to impact on the ability to work to one's best ability.

Figure 3. Health professionals' work index: Availability of resources subscale

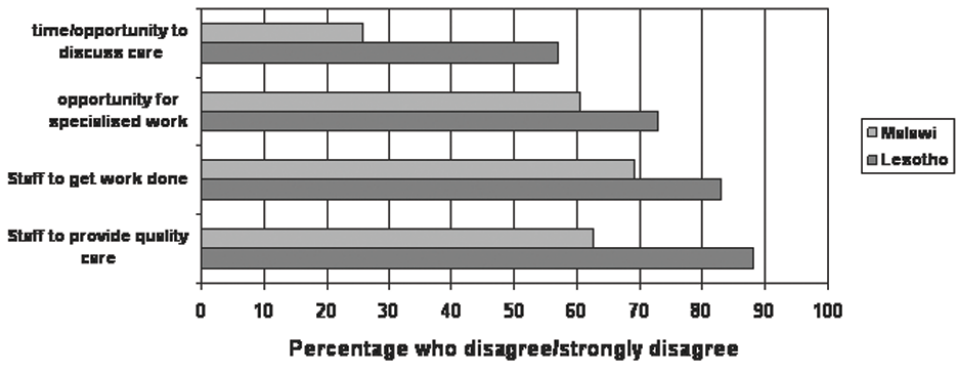
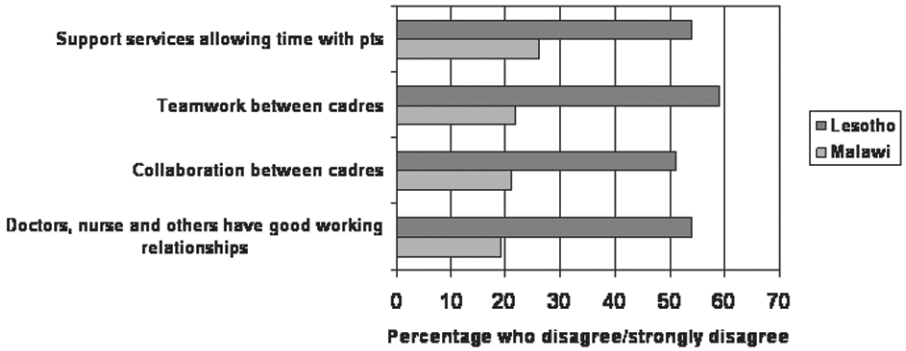


Figure 4. Health professionals' work index: workplace relationships subscale



BURNOUT AND DE-MOTIVATION

Inadequately resourced work environments over time can lead to feelings of burnout and de-motivation amongst staff. An important component of our research was assessing the degree to which burnout was a problem for staff in the two countries. Table 1 shows the percentage of staff in each country scoring high, medium, and low on the Maslach Burnout Inventory scale. Both countries have a large portion of the sample scoring high on emotional exhaustion and low on personal accomplishment. Reflective of perceptions about their work environments, Lesotho's health workforce has a significantly greater number of staff scoring high on emotional exhaustion. The unexpectedly low scores on depersonalisation in both countries are difficult to explain, although they may be indicative of a unique coping strategy amongst health workers in these resource-poor settings.

Table 1. Degree of Burnout experienced by Health Workers (expressed as % of staff for each score)

		High	Medium	Low
Emotional Exhaustion	**Lesotho**	42.1%	29.3%	28.6%
	Malawi	31%	35	34%
Depersonalisation	**Lesotho**	14.2%	13.7%	72.1%
	Malawi	5%	18%	77%
Personal Accomplishment	**Lesotho**	28.7%	26.4%	44.9%
	Malawi	27%	28%	45%

Pearson correlations (r values) showed that the four subscales in the HPWI are significantly related to feelings of depersonalisation and emotional exhaustion. Those who believe that their work environments are inadequately resourced ($r = 0.414$) with poor management ($r = 0.390$), lack of good working relationships ($r=0.370$) and control over practice ($r=0.334$) are also more likely to be emotionally exhausted ($p<0.01$). Similarly scores on the depersonalisation scale showed significant positive correlations ($p<0.01$) with perceptions of inadequately resourced environments ($r= 0.235$), poor management ($r=0.207$), lack of good working relationships ($r=0.255$), and control over practice ($r=0.264$).

Managers whom we interviewed acknowledged that the workload within their facilities is quite high for most cadres of health workers and that staffing numbers are not adequate for the workloads (Manafa et al., 2009). The majority of the health workers, especially nurses, are over-worked. They recognize that this affects their attitudes and retention as illustrated in the following quote from our focus group data:

...but the workload is too much because now most of them are gone. For instance in Ward 6, you have about 60 patients and only 2 nurses – it is not supposed to be like that; it should not be expected

that 2 nurses to provide care for 60 patients – that is why I am saying they are overloaded; and end up with negative attitudes probably from burnout; it is not surprising that they leave.

JOB DISSATISFACTION AND ATTRITION

The close relationship between emotional exhaustion and thoughts about leaving the job (evident in the above quote) was borne out by health workers' responses to our questions about job satisfaction and employment intentions. First to get a sense of how health workers perceive their jobs, we asked if they would recommend their job to a friend or family member. In Malawi 30% said they would not recommend their jobs, 48% said yes, but with some reservations, and only 20% said yes without reservation. In Lesotho 44% said they would not recommend their jobs to family or friends, 36% said yes, but with some reservations, and only 20% said yes without reservation.

Job satisfaction was explored through several items with scaled responses. Approximately one third of the Basotho health workers and one quarter of Malawians indicated that they are dissatisfied with their jobs. The higher proportion of staff in Lesotho being dissatisfied is consistent with our other findings and suggests that there is a link between work environment and job dissatisfaction. Indeed, a significant negative correlation arose between poor working relationships ($r= -0.261$), poor management ($r= -0.195$), inadequate resources ($r= -0.177$), control over practice ($r= -0.209$) and satisfaction with the job ($p<0.05$). This provides evidence that poor work environments are associated with job dissatisfaction. Whether health professionals recommend their careers to others also seems to be influenced by their perception of their work environment. Not surprisingly, the more dissatisfied they are with their working environment, the less likely they are to recommend their jobs to others.

In order to establish whether such high levels of dissatisfaction were likely to impact on retention we also asked staff whether they had (a) thought about leaving their current employment, and (b) had made any plans to leave. In Lesotho, 44% of respondents said they have seriously thought about leaving the hospital or clinic where they are currently working and more than half of the respondents said they are actively seeking other employment. In Malawi almost a quarter of the sample said they are very likely to leave their job within the next year and 11% said they plan to leave within the next six months. The following quote from a Malawian medical assistant is indicative of the extremes these health professionals are prepared to tolerate, giving up his profession to set up a market stall:

I consider leaving this job on a daily basis especially since after our former DHO (District Health Officer) left. I have even thought of going to sell in the market.

An enrolled nurse and a clinical officer are illustrating their attempts to secure a position in the private sector and articulating the benefits of the private over the public sector, respectively.

Staying here is not by choice but because of circumstances. I have been applying to NGOs (non-governmental organizations) but have not been offered a position by any

Once I finish my internship I will leave the public service to the NGO. My colleagues in the NGO earn 80,000Mk a month while I earn 21,000Mk a month. Though I have better chances to further my education in the public sector, I can still do the same working with the NGO by saving more than half of my salary for 2 years. My colleague did the same and is back in the university while his mates in the public sector are still waiting for their turn to be trained from the MOH.

Health workers who reported poor management, inadequate working relationships, and lack of control over practice are more likely to report job dissatisfaction with current job assignments, have thought about leaving their jobs or are actively seeking other employment.

Implications for the "Brain Drain"

We stated earlier in this chapter that the role of organisational attributes or the work environment is becoming increasingly important in ensuring that adequate staffing levels can be maintained in high income countries, particularly in times of shortage (Slater & McCormick, 2007). Our studies over the past four years in Malawi and Lesotho have shown that these attributes are equally important in low-income countries and could be a key component in stemming the brain drain. Yet they are receiving little attention. Our interviews with health officials and managers in both countries provide evidence that almost all of the initiatives aimed at retaining health workers in those countries involve monetary incentives. These range from salary increases, to allowances for locums, rural postings, housing, transport, or electricity. While we acknowledge that salaries are low and need to be increased, our argument is that better pay *alone* will not stem the brain drain. Indeed, anecdotal evidence from Malawi, where health worker salaries were increased by 50% in early 2005, indicates that this measure has had little effect on the overall vacancy rates there.

Our research has shown that human resources management is insufficiently developed and resourced in many sub-Saharan African countries. It is hardly surprising then that continuing professional development and career planning are at best *ad hoc* and at worst completely absent from the workplace. This is especially true in the case of mid-level cadres, as evidenced by the frustrations voiced in some of the quotes included in this chapter. Poor manpower planning, increasingly complex health needs and an ageing population in several high-income countries have created the need for additional health workers. Active recruitment of the most experienced workers from low-income countries is creating a critical expertise gap for the health systems of these countries. This critical gap is resulting not only in greater workloads for those who remain in their home country, but also in inadequate supervision and on-the job training for these workers. Understandably, health workers in low-income countries feel vulnerable, overworked and undervalued by their managers. Tensions develop between the more-experienced, but less qualified and the less experienced, but more qualified health workers in the system resulting in poor working relationships. All of this leads to poor working environments that in turn lead to burnout and job dissatisfaction and eventually pushes health workers to seek other employment options. Our research has shown that even those cadres that do not have internationally recognised qualifications are leaving to take up employment in the private sector and some are leaving the health sector to work in other sectors. This vicious cycle cannot be broken by simply increasing the numbers of health professionals being trained in sub-Saharan Africa. Interventions at several levels are necessary. Most urgent is the need to improve the existing work environment in order to retain those workers who are currently providing health services (albeit an inadequate provision to meet the health needs of these populations).

Implications for Policy and Management

Malawi and Lesotho, recognising the crisis in their health systems, have both developed comprehensive human resources strategies in the past few years (Government of Lesotho, 2005; Government of Malawi, 2004; 2006). The emphasis in these strategies is on training and providing incentives to health professionals. Our research gives a clear indication of the inadequacy of adopting a strategy of training and employing health work-

ers in the absence of strategies to strengthen and improve other aspects of the health environment in resource-poor settings.

Strategies and policies are necessary but without the manpower to implement them they will have little impact on the health human resources crisis. If rich countries are allowed to continue poaching the more experienced professionals from these countries, who will do the training? Populating inadequately resourced health facilities with junior staff with no provision for supervision and continuous professional development is an investment that has considerable risks associated with it. It is highly unlikely that these staff will remain in this type of environment, where the push factors are equally as strong as the pull factors from high-income countries.

Implications for Research

Our research over the past four years has uncovered a complex set of interacting variables that serve to continue the brain drain. It provides useful evidence to guide investment in human resources in Malawi and Lesotho. However, many governments and donors are currently investing vast financial resources in initiatives that are based on little or no evidence. The insistence that better remuneration is the solution to the brain-drain is a foolhardy strategy. It is critical that we try to understand the impact of these investments and share the learning across those countries most affected by the brain drain.

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Chapter 55
Creating the Environment for High Performing Distributed Teams:
Human Resource Strategies and Practices

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ABSTRACT

The organizational workforce has always been a complex landscape. The varying personalities, demographics, and needs have challenged organizations to be legal, fair, and just, while simultaneously competing for market share and profit margins. Although these conditions are not mutually exclusive, due to the global reach for market share and use of supporting technologies, workforces have grown increasingly diverse over the past three decades. Organizations have looked to their Human Resource (HR) division to support business strategy, growth, and development. While a few have stepped up to accommodate, many HR divisions have struggled to support business needs in perhaps the greatest time of flux in modern day business. This is creating a serious issue for most organizations who recognize the competitive way forward is through effective Human Resource Development (HRD). Business success has always been about the people and it will continue to be so. Therefore, organizations struggling to develop their workforce to perform in complex, highly distributed situations will continue to lag (often far behind) the effective workforces of their competitors. This chapter offers best and next practices from HRD leaders accommodating the needs of their businesses.

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"We are at the earliest stages of a significant workplace transformation that will profoundly affect how businesses approach people management and how individuals approach the workplace."

–Towers Watson

INTRODUCTION

Indeed HR is evolving in its attempt to address the needs of businesses and employees. Most HR initiatives, however, have become stymied in more administration and less strategic development. This phenomenon was observed critically by Keith Hammonds (2005) who articulated the reasons 'why we hate HR'. The work of HR practitioners has not gotten easier since then and there is still a faction that hates HR. However, there is also a contingent that (dare we say) loves HR – or at least that does not propose the elimination of that division from their organization due to strategic incompetence. The HR practitioners and others throughout these companies recognize that HR, and more specifically HRD, is the "lever for strategic success" (Marquardt & Engel, 1993, p. xi) especially when engaged in highly distributed work across a global marketplace.

Globalization does make a difference when managing and developing resources. According to Marquardt and Engel (1993), a number of factors differentiate global HRD from domestic HRD. Some of these factors include personnel, culture, administration, learning styles, and language. Each of these differentiating factors is important. Understanding the variances of global HRD as compared to domestic HRD should help ensure appropriate responses to training and development, career development, organizational development, and performance management needs of both the organization and the individual.

While the purpose of this chapter is not to engage in determining the efficiencies of HR administration, the exploration of HR strategies and practices must, of necessity, extend beyond functions that have traditionally been considered the purview of HRD. The related disciplines of HR Management (HRM), HR Development (HRD) and Organizational Development (OD) may have distinct origins and academic identities, however their functions in organizations are deeply interrelated and interdependent (Mankin, 2001). In practice, all of these functions commonly report to a single executive (Ruona & Gibson, 2004; Singh, 2003) within an organization. These and other studies argue that while HRD and HRM may be functionally distinct, it is pragmatically impossible for them to function independently of one another.

The focus of this chapter is HRD. However, the research cases also consider the contributions of related HR functions including recruitment, organizational reputation management (i.e. employer branding) and elements of employee retention that typically fall within the responsibilities of HRM or OD functions (Farndale, Scullion & Sparrow, 2010; Brewster, Sparrow & Harris, 2005; Ruona & Gibson, 2004). Consideration of HRD in the context of these structural interdependencies reflects the type of whole systems approach that must be incorporated into a strategic view of the HR function in an increasingly global and complex environment (Ruona & Gibson, 2004).

The discipline and function of HRD emphasizes major areas of organizational work including training and development and career development (deSimone, Werner, & Harris, 2002). Gilley, Eggland, and Gilley (2002) also noted the HRD concern for performance management. To operationalize the notion of HRD, we rely on Swanson and Holton's (2009) perspective in that HRD is "a process of developing and unleashing expertise for the purpose of improving individual, team, work processes, and other organizational performance" (p. 4). To shorten this to near mantra level, Holton and Yamkovenko (2008) suggested "HRD is to develop and unleash human expertise" (p. 276). This is a distinct and strategic task of optimizing

individual human capital and organizational intellectual capital relative to market needs and other situational conditions.

It is suggested here that effective organizations have clarity in both purpose and execution of their capital and that both purpose and exaction are aligned with organizational strategy. Moreover, there is a marked difference, and an increasing one at that, regarding organizational effectiveness stemming from HRD practices and capital management as compared to those that are ineffective as measured by organizational performance. Those effective at HRD – in which the HR leaders of the firm stepped up and are addressing the strategic needs of human and organizational capital – are proving to be more effective at addressing the challenges of a globally distributed and diverse workforce. This is the focus of the chapter – investigating the value of HRD relative to organizational effectiveness from data yielded from in-depth interviews conducted among some of the most globally savvy, experienced, and effective practitioners in the field.

BACKGROUND

Organizational effectiveness is predicated on the knowledge, skills, and abilities of people. Working effectively in distributed teams across differing timezones and cultures is "challenged by the demand for new knowledge, skills, and abilities among individuals in the workforce" (Milhauser & Rahschulte, 2010, p. 79). Tarique and Schuler (2009) also noted the challenge that organizations face relative to global talent and the general shortage of needed competencies. These challenges have pressured organizations to better manage and develop their workforces and it was Javidan, Dorfman, Sully de Luque and House (2006) who voiced concern that companies, especially multinational companies, have a shortage of managers qualified to assume globally distributed team-based assignments. A summarizing perspective from a recent Deloitte Research Study regarding this demand-supply gap noted, "Despite millions of unemployed workers, there is an acute shortage of talent" (Athey, 2004, p. 1).

It would stand to reason that these pressures would also fall squarely, or at least to a degree, on the shoulders of academe. However, Milhauser and Rahschulte (2010) concluded that the ability of universities to meet the expectations of hiring managers for the knowledge, skills, and abilities of their graduates was woefully lacking. As organizations attempt to triage the issue and offer their own training and development, they too are falling short. According to IBM (2009), companies are struggling with the accelerated pace of business because "Everything around them seems to be changing faster than they can" (p. 15). This puts even more pressure on HR to not only help attract competent and experienced talent, but importantly recognize high potential and further develop that talent.

Developing talent in an attempt to address global issues is not easy. This effort is difficult as managers on the ground face a host of communication, motivational, and decision-making challenges operating in the cross-cultural context of the global environment (Thomas, 2008). To address the challenges of talent development, leading organizations have implemented HRD programs. Trompenaars (1993) noted that an effective deployment of a global HRD type program helps to establish a competitive advantage, thus creating high performance and increasing organizational effectiveness. To reach this effectiveness, leading companies have recognized the need to be culturally competent (Kersiene & Savaneviciene, 2009) with HRD programs respectful of each local context. To be sure, this simply means that any best practice in one culture may not extend to another culture (Friedman, 2007). Thus, HRD programs need to be organizationally centric yet locally mindful.

Many researchers have studied the skills and competencies needed to effectively lead teams

in the global environment (Malone, 2004; Mohammed & Angell, 2004; Thomas & Bostrom, 2007). While the knowledge, skills, and abilities are good to know, many firms are still struggling to understand strategic modeling for this critical organizational resource. To be sure, there are some models aimed at developing competencies (Stahl, et al., 2007; Caligiuri & Di Santo, 2001). However, as noted by Tarique and Schuler (2009) most of this literature "has a number of theoretical deficiencies" (p. 22). There is little concluding evidence regarding how best to design and deploy a strategic human resource development program.

Due to the existing limitations and the specific call for "more qualitative methodologies" (Tarique & Schuler, 2009, p. 23), theory is still in need of development. Tarique and Schuler further emphasized the need for investigation into the challenges of talent management. Based on these findings, the primary question we aimed to address is, *How does an organization, competing in a dynamic and distributed market, best attract, develop, and retain talent in a way that leads to organizational effectiveness?*

RESEARCH METHOD AND DESIGN

As can perhaps be imagined from the questions, the strategy of inquiry followed a qualitative research method. Addressing this research question and its overall approach took a constructivist knowledge claim position (Creswell, 2003) in that theoretical propositions were the goal and were derived via meta-analysis of existing case studies and new, exploratory, research leveraging case method (Yin, 1994).

Exploratory case study research can lead to hypotheses, or theoretical propositions, for further investigation. This is important especially since the findings from case study research are generalizable only to theory and not population (Yin, 1994). To help mitigate the risk of even theoretical generalizabilty, a multiple case approach was employed rather than a single case study. The reason for this is that multiple cases strengthen the confidence of critical findings due to replication of data findings and pattern-matching among the research data. It is through this work of replication and pattern-matching that facts are validated (Glaser & Strauss, 1967). Although each individual case is a whole study and they were treated as such throughout the research, multiple cases coupled with a meta-analysis of existing case research further grounds the findings for future work, which is critical due to the aforementioned note of HR's continuing evolution.

To adequately address the research question via case study design, a semi-structured outline was constructed to engage the sample participant(s) of each case. The outline leveraged Tarique and Schuler's (2009) six activities in talent management systems as the basis for probing questions during interviews. The six activities include: developing an HR reputation, attracting individuals with interest in international work, recruiting based on positions, developing global leaders, reducing repatriate turnover, and increasing employee engagement. As mentioned previously, these six functions include elements that traditionally fall within the HR division's responsibility but are not necessarily all associated with the work of HRD. We coupled these probing questions with the aforementioned dimensions of HRD (deSimone, Werner, & Harris, 2002; Gilley, Eggland, & Gilley, 2002). Doing so generated this list of final case study questions:

1. How does an organization, competing in a dynamic and distributed market, *attract* talent in a way that leads to organizational effectiveness?
    a. What are your organization's current challenges to attracting this talent?
    b. How does your organization attract individuals with an interest in international and/or cross-cultural work?

   c. Can you provide examples of your recruiting process for positions with international responsibility?
   d. What does your organization do to build reputation?
2. How does an organization, competing in a dynamic and distributed market, *develop* talent in a way that leads to organizational effectiveness?
   a. What are your organization's current challenges to developing this talent?
   b. How does your organization develop individuals into globally competent individual contributors and leaders?
   c. Can you provide examples of how your organization has developed individuals for global competitiveness?
3. How does an organization, competing in a dynamic and distributed market, *retain* talent in a way that leads to organizational effectiveness?
   a. What are your organization's current challenges in retaining globally competent talent?
   b. Please describe your organization's approach to employee engagement.
   c. Can you provide examples of how your organization increases retention of globally competent individual contributors and leaders? Please include practices for returning expatriates if your organization utilizes international assignments.

RESEARCH SAMPLING

The effectiveness of case study is found in the richness of the case data, which leads to case findings. Therefore, the sampling was purposeful (Patton, 2002) so as to "select information-rich cases strategically" (p. 243). From its strategic basis, this approach was criteria driven to ensure expert informants provided meaningful and information-rich data that was both practical and relevant. The criteria included (a) experience in the field of HR, (b) at a level of manager or higher, (c) with the role of recruitment and development, and (d) in an organization with internationally distributed operations. The selection of cases is aimed to maximize findings with the understanding limitation of time constraints (Stake, 1995).

A total of six (6) cases were investigated from the same number of companies, all of whom were engaged in complex organizations with significant use of internationally distributed teams. The practitioners engaged in the research of each case are commonly known as expert informants and participants-in-action. Flick (2002) noted that good informants have knowledge and practical experience of the phenomenon in question, are articulate, and have time to participate and contribute to the study. Hassard (1991) noted, "The social world is best understood from the view point of the participant-in-action" (p. 277). As such, these practitioners are experts in their organizations relative to human resource management and development, and sufficient to serve as the research sample.

While the sample case size of six companies is small, it is important to remember that each cases is a whole study and, as important to this research, this sampling did allow for a broad range of perspectives on HRD yielding some pattern-matching for critical findings. The pattern-matching is especially relevant when evaluated against the meta-analysis of existing case study literature. Further, according to Josselson and Lieblich (as cited in Josselson et al., 2003), the sufficiency of any sample "is inversely proportional to the intensiveness of the study" (p. 268). This means that if the inquiry is deep in context and multi-layered, relatively few interviews are needed. Additionally, Patton (2002) noted, "there are no rules for sample size in qualitative inquiry" (p. 244), but rather there must be enough data to represent the richness and diversity of the phenomenon without being overwhelmed (Kvale,

1996). Generally, Josselson and Lieblich advise at least five and no more than thirty interviews are required in qualitative studies. Therefore, again, the sample is recognized as small, but sufficient regarding the phenomenon of study.

DATA ANALYSIS AND RESEARCH FINDINGS

Data were gathered through online survey instruments and semi-structure telephone interviews. Data were then codified electronically and analyzed iteratively based on the three major threads of this research: attracting talent, developing talent, and retaining talent.

Due to the complexity of organizational HRD not all data captured or inductively determined categories need elaboration. With the range of data stemming from case sample observations and commentary and, after significant analysis of the data, categories, and relationships, some findings were simply deemed not applicable to this study and if incorporated here would serve to only congest the findings relative to the aim of deriving theoretical propositions for further study. This approach is supported by Parry (1999), as he noted it is not necessary to detail all the categories that emerged from the study, but rather just those that are pertinent to the subject of the research project. As such, only pertinent findings to this study are detailed hereto.

Attracting Talent

The challenge of attracting quality talent was a consistent theme from the cases. One case spent considerable time noting "We source candidates internationally" and experience great "difficulty in finding [qualified] candidates." Another simply opined, "Talent is rare." Perhaps this challenge is due to the changing landscape of work and the fact that the skills needed for organizational effectiveness ten years ago are no longer the only skills needed for success today. The changing landscape is the distributed nature of work. According to Frauenheim (2006), "Over the next decade, most organizations will face the need to look for people beyond their local environments" (p. S7).

Relative to the need for new skills, the difficulty with attracting qualified talent is, in part, due to the demands organizations are placing on job candidates. One case sample noted that when it comes to attracting managers and executive leaders for their global firm, "It's not enough to be a great strategist or tactician. You need to be able to inspire, guide, engage, and empathize... this is where we find it difficult." Another case noted the need for "industry experience" and "real success track record." That sample went on to explain that once we find talent, "Often they are happy where they are" and it is "difficult to convince them why they should leave."

With this amount of difficulty realized, the question was raised: *So, how does an organization competing in a dynamic and distributed market attract talent in a way that leads to organizational effectiveness?* Three common themes were uncovered immediately including "brand," "reputation," and "referrals."

As one case noted, "There is a balance of including benefits, employee engagement, and a sound business model" to attract talent, but over time "A company gets a good or bad reputation based on the behaviors of managers and leaders. So, we aim to develop managers who are good managers and leaders who are good leaders in an effort to attract top talent." Another case noted, "We brand ourselves as a young, entrepreneurial company with great technology and lots of opportunity." Many comments from most of the cases touted the importance of "employee referrals." Weaker pattern-matching occurred with topics on "professional networking," "working with universities," and promoting "opportunities to work in an international and cross-cultural environment" and "providing ample opportunities to work globally."

HR involvement in organizational reputation management, also known as employer branding, has been noted as an emerging element of global talent management (Farndale, Scullion, & Sparrow, 2010; Martin, Beaumon, Doig & Pate, 2005). Farndale et al. (2010) note that corporate HR divisions are increasingly engaged in reputation management activities including "market-mapping and employer-branding to assist in the attraction and retention of high-performing employees" (p. 163). Employer branding extends the role of HR far beyond the traditional arena of employment advertising, applying the principles of external brand management to attract high caliber employees that can provide a key to competitive advantage (Berthon, Ewing & Hah, 2005). Professional HR associations including the Society for Human Resource Management (SHRM) and the UK-based Chartered Institute of Personnel Development (CIPD) have recognized that "aligning the external, corporate image of organizations with internal employee identity or engagement provides a key opportunity for HR to earn greater voice in business" (Martin, et al., p. 77).

These patterns are interesting especially when compared with cultural and generational specificity. Hansen (2006) addressed the idea of "One World, One Workforce" (p. S2). However, although the world at large may be open for talent sourcing, nations and generations are comprised of individuals seeking not one singular value, but many diverse values from an employer. Take for instance the emerging economies of China, India, and Brazil relative to the mature economies of the U.S., U.K., and Germany. In their 2010 Global Workforce Study, Towers Watson (2010) concluded that "career advancement" was the number one attractor of people to a job. As for the mature economies, "career advancement" was not even in the top three. The number one attractor in the U.S. and U.K. was "competitive salary" and those in Germany noted the need for "challenging work" to be attracted to a job. Brazil followed the maturing economies with the second most rated attractor for that group being "competitive salary." The number two attractor in China and India is "learning and development opportunities." Relative to the mature economies, "learning and development opportunities" is not in the top three. Number two for the U.K. and Germany is "convenient work location," a category not in the top three for the emerging economies. As for the U.S., the number two attractor of people to jobs is "sufficient vacation," which was noted as number three for those in the U.K. The third for Germany was "flexible work schedule" and for the U.S. it was "competitive health care," neither of which are in the top three for those in emerging markets. Number three for India and Brazil was "challenging work" and as for China, "competitive benefits." If there is a consistency among these six nations, which happen to be similar to the coverage from the six cases of this chapter's study, it is "career advancement" as noted by all three emerging economies, "competitive salary" as noted by the U.S., U.K., and Brazil, and challenging work, as noted by Germany, India, and Brazil. There are, however, far more differences than similarities regarding the attractors of people to work. This is no doubt the reason for an organizational strategy with local culturally competent considerations (Kersiene & Savaneviciene, 2009). Table 1 summarizes these findings.

In addition to geographically and nationally diverse attractors of people to jobs, attracting talent is also moderated by generational identifiers. There are commonly six noted generational identifiers including Veterans (also known as traditionalists), baby boomers, Gen X, Gen Y (also known as Millennials and Net Generation), and Gen Z (also known as Digital Natives). Jackson (2010) has provided a useful synthesis for comparing these generational tendencies. The following is even a shorter synopsis.

- Veterans, those born prior to 1946, were affected by two world wars, are disciplined, respectful of order and consistency, with

Table 1. Top attraction drivers

China	India	Brazil	U.S.	U.K.	Germany
Career advancement	Career advancement	Career advancement	Competitive salary	Competitive salary	Challenging work
Learning & development opportunities	Learning & development opportunities	Competitive Salary	Sufficient vacation	Convenient work location	Convenient work location
Competitive benefits	Challenging work	Challenging work	Competitive health care	Sufficient vacation	Flexible schedule

Adapted from Towers Watson, 2010, p. 6.

fixed views on gender roles, and roles within a hierarchy and therefore comfortable with direct, command and control management styles.

- Baby Boomers, those born between 1946 and 1964, were once open-minded, rebellious youth but are now a bit more conservative, value job and social status, tend to be optimistic, ambitious, and loyal, and believe that employment is for life.
- Gen X, those born between 1965 and 1979, are known as "latchkey kids," well-educated, resourceful, individualistic, self-reliant, skeptical of authority, and not interested in long-term careers, corporate loyalty or status symbols.
- Gen Y, those born between 1980 and 1995, are technological savvy, comfortable with ethnically diverse groups, optimistic, confident, sociable, and have strong morals and a sense of civic duty.
- Gen Z, those born after 1995, have never known a life without the internet, computers and mobile phones and are used to instant action and satisfaction. The workplace impact of this group is yet unknown, as they have yet to enter the workforce.

Apparent from this synopsis is that what serves to attract one generation may serve to repel another generation. Career advancement opportunities, for example, were identified by Towers Perrin (2008) as the top attraction driver for workers under age 24, but the importance of this factor declined with increasing age, disappearing from the top 5 for workers age 45 and older. Challenging work was ranked #4 by the youngest age group, but its position increased as an attraction driver with age, ranking #2 for all groups age 35 and above (p. 16). Sourcing and recruitment of the right people for the organization is vitally important and is the first critical contribution of the strategic HR function. The importance of attracting the right person has proven vital during the "talent wars" (Hansen, 2006) of a booming global economy, as well as during economic downturns that produce a surplus of labor in the general market.

Regardless of economic conditions, similar to the case findings, Tarique and Schuler (2009) identified organizational brand and reputation as keys to attracting talent. Employee referrals were the third pattern-matching category from the multi-case study. The similarities to existing literature, however, are not the only points of interest from these findings. Specifically, future research should investigate theoretical propositions pertaining to the means best suited to attract talent by geographic or national location and at a generational level of specificity.

- **Theoretical Proposition #1:** Although talent sourcing is a global endeavor for most organizations there is a need to further understand the delineation of people and job attraction. Specifically, there is a need to understand how best to attract skilled individuals by geographic, national, and cultural domains.

- **Theoretical Proposition #2:** Although job searching is a global endeavor for some individuals, it is likely to increase with each passing year. Thus, there is a need to further understand the delineation of generational attitudes relative to job and organizational attraction. Specifically, there is a need to understand how skilled individuals of varying generations are attracted by organizational brand, reputation, and job attributes.

Developing Talent

Milhauser and Rahschulte (2010) noted the need for specific knowledge, skills, and abilities on the part of workers and, importantly, that there is a growing gap between industry demand for skills and the supply of skills being provided by higher education systems. This is consistent with the case sample comments above regarding the difficulty in attracting talent. Finding talent is difficult when it is not readily available. And when it is not readily available, as noted by one case sample, "you source people for fit" and then "develop the talent."

Although there was one case sample noting, "We tend to look more for experience than fit" the common theme was "We source people for fit." This is not mentioned to discount "experience" because as noted in attracting talent, experience is important. Rather, this distinction is made due to the singularity of the former comment and the pattern of "fit."

Some case samples offered depth to discerning "fit." One particular case noted the use of "a personality profile" pertinent for assessing international experience, skills, and aptitude. "This is much more than an experience profile." Another case sample noted the need to "Benchmark jobs and conduct good pre-assessments to help assure good job fits instead of just good skills."

Another common theme was how to initiate a good talent development program within an organization. The first step is, "Identify the talent to retain." Once "high potential" employees are identified, then "individualized plans for each person" can be designed for retention. "We have a Top Talent Program where individualized development plans will incorporate current work, a clear path for advanced opportunities, pay, scope of responsibilities, communication, and inclusiveness." An important component to plans such as these is the need to have each individualized plan "Linked with overall corporate strategy." Employees are responsible for their plan development, but not in isolation because they must "actively take part in the development of [team and organizational] goals and metrics" which in many cases require them to "Seek out, study, customize, and apply best practices." Engaging in this process, which is part of regular reviews (which is a subcomponent to the "communication" note from one case sample), helps to keep employee activity aligned with teamwork and organizational goals. As summarized by one case sample, "We partner [inside and outside the organization] to develop solid plans that are in alignment with [corporate] strategy... linked with the design and delivery of individualized programs... linked to the individual." The use of such plans is supported by Gubbins and Garavan (2005) who noted that in order for HRD to add value to the organization there must be alignment between HRD interventions and the organization's strategic goals and objectives.

With knowledge of the process, the next logical question for the case sample was, *So, how does an organization competing in a dynamic and distributed market develop talent in a way that leads to organizational effectiveness?* In short, noted one case sample, "By creating a visible link between the work they do and the greater good/whole." This seems reasonable since the last paragraph outlined the need for individuals to understand their role relative to the team and the organization at large. This system-view could break down, or at least be challenged, in a highly distributed organization in which 'seeing' the system whole is difficult. To

understand the whole requires participation and engagement, and in a highly distributed team this could be quite expensive due to the need for collaborative technologies and travel. Interestingly, a common theme was the need for "travel" budget. One case sample noted, "Must invest in travel." This is a consistent finding among global leaders as well. Martinelli, Rahschulte, and Waddell (2010) found that "The benefit versus cost of bringing a globally-distributed team together is often debated within businesses. However, *leading* [emphasis added] global companies no longer debate this issue. For them, the act of bringing their globally-distributed teams together on a periodic basis is embedded in their project or program planning and execution practices" (p. 135).

There is evidence that travel is necessary, especially for distributed teams, to develop cohesiveness and help facilitate collaboration. One case sample noted the leveraging activity of "Tying teaching to business travel." This sample further noted, "Within our company there is recognition for those who teach" and "There is an expectation for all senior managers to teach 'x' times throughout the year. We use senior leaders and global partners to develop our learning programs." So, as employees travel, especially executives and program and product leaders, it is part of their role to participate in training, education, and human resource development in the locations they visit.

Moving beyond budgets yet remaining focused on the need for talent development, two additional cases noted in detail the use of "tribes" and "cohorts" to boost learning and development. The challenge is to leverage a cohort model without isolating them from others. "Our strategy is to deliver development programs that are formal trainings yet incorporate experiential learning and coaching." The cohort model is an interesting one that is used in some of the top universities around the world. These are interesting components to corporate HRD. Certainly many organizations use cohort models for new employee orientation and some on-boarding activities, but this is an emerging theme for HRD among high potential employees and thus leads to the third theoretical proposition of this study.

- **Theoretical Proposition #3:** Is there a measurable value of using cohort models for high potential talent? If so, what is the measure? Additionally, how are cohort risks of alienation and group think mitigated?

Retaining Talent

"One of the most critical issues facing organizations today," according to the Society for Human Resource Management, "is how to retain the employees they want to keep" (Allen, 2008, p. 1). This challenge is made even more daunting by the emergence of a global market for knowledge workers. As the number of opportunities to source talent globally has grown to include information technology, healthcare, accounting and other professional labor pools, the demand for skilled professionals and managers who can effectively cross boundaries has grown significantly (Farndale, et al., 2010), leading to a highly competitive global marketplace for talent. As with attraction, retention factors vary widely by geography, culture and generation – one size does not fit all. The case sample surveyed for this chapter's study, however, yield a single commonality: retention improves in the presence of effective managers and organizational leaders. The findings of Towers Perrin's 2007-2008 workplace study support this sentiment.

Globally, the top 3 drivers for retention were "the organization's reputation as a great place to work," "satisfaction with the organization's people decisions," and "good relationship with supervisor" (Towers Perrin, 2008, p. 17). All of these are consistent with a workplace where effective leadership and management is practiced. The question to be addressed by HRD, therefore, is, what are we doing to ensure a continuous

supply of competent managers and leaders for our organizations? While all employees of an organization have developmental needs, there is a particular strategic need to identify those "high-potential, exceptional performing individuals who will in time move into key strategic roles that will determine the success, or failure, of the firm. (McDonnell, Lamare, Gunnigle & Lavelle, 2010, p. 151).

One case sample noted the importance of effective management, stating, "The most effective retention strategies are those where managers and leaders have, over time, established a reputation for competence and integrity." Another case sample noted, "We retain talent through having strong managers." Similarly, another case sample noted they have found "People join a company and they leave (or stay with) a manager." Another case sample found, "We retain our talent with clear career paths, strong managers, decent compensation, and a good business direction." This commonality was not surprising to one case sample who noted, "We expect high performance and therefore we need strong management." A member of this case also noted a challenge of "building good managers" and that this challenge has impaired their ability to attract and retain top talent.

There were other strategies uncovered to retain talent that are consistent with prior findings for attracting and developing talent. One case sample noted that their organizational approach is "employee engagement through values – the intrinsic side of motivation" and reminded us to "Note that none of this has to do with pay and benefits. The pay/benefits may help to retain people, but not engage them." This approach is confirmed by Towers Watson (2009) who noted, "Top performers are most engaged when they can embrace and be guided by an organization's vision, values, and strategy" (p. 1). Further, Hansen (2006) found that some organizations use intangibles to create differentiation and retain talent" (p. S3). The balance of extrinsic and intrinsic motivators is important for talent retention and leads to the next theoretical propositions.

- **Theoretical Proposition #4:** Talent retention is a serious endeavor for all organizations. There is a need to further understand the delineation of people and job retention. Specifically, there is a need to understand the organizational attributes, systems and processes that lead to retention of skilled individuals by geographic, national, and cultural domains.
- **Theoretical Proposition #5:** Talent retention is a serious endeavor for all organizations. There is a need to further understand the delineation of people and job retention. Specifically, there is a need to understand how skilled individuals of varying generations are retained and engaged by organizations, and how these may change as generational cohorts progress through the life course.

Summary of Findings

Like never before, organizations face a growing need for continuous improvement and adaptation to organizational and market pressures. Effective management that can engage a diverse workforce of employees and in so doing build a reputation and brand is required for talent acquisition, development, and retention. Managers and their organizations that acquire, develop, and retain employees in an integrated way – aligned with corporate strategy and goals for teams and individuals – can build a distinct market advantage over competitors that employ a reactive HRM/HRD strategy.

One case sample noted the most important aspect of HRM and HRD strategies is "To be clear what HR functions own, so there is no overlap and loss of credibility, authority, or responsibility." The case data also noted that HRM and HRD strategies should entail the full complement of

"workforce planning, recruitment, and selection structures, retention, and succession planning." Those that can maintain alignment of strategy and execution (including the development of talent) have the greatest probability of organizational effectiveness.

FUTURE RESEARCH DIRECTIONS

Consistent with case study design, the findings have yielded areas of future research. Although case study research is generalizable only to theory and not population (Yin, 1994), some of the findings are additionally confirmed from prior case studies and literature. Comparing the findings and existing literature mitigates some internal reliability risk exposure. To summarize the recommended direction of future research, the following five propositions are suggested.

- **Theoretical Proposition #1:** Although talent sourcing is a global endeavor for most organizations there is a need to further understand the delineation of people and job attraction. Specifically, there is a need to understand how best to attract skilled individuals by geographic, national, and cultural domains.
- **Theoretical Proposition #2:** Although job searching is a global endeavor for some individuals, it is likely to increase with each passing year. Thus, there is a need to further understand the delineation of generational attitudes relative to job and organizational attraction. Specifically, there is a need to understand how skilled individuals of varying generations are attracted by organizational brand, reputation, and job attributes.
- **Theoretical Proposition #3:** Is there a measurable value in using cohort models for high potential talent? If so, what is the measure? Additionally, how are cohort risks of alienation and group think mitigated?
- **Theoretical Proposition #4:** Talent retention is a serious endeavor for all organizations. There is a need to further understand the delineation of people and job retention. Specifically, there is a need to understand the organizational attributes, systems and processes that lead to retention of skilled individuals by geographic, national, and cultural domains.
- **Theoretical Proposition #5:** Talent retention is a serious endeavor for all organizations. There is a need to further understand the delineation of people and job retention. Specifically, there is a need to understand how skilled individuals of varying generations are retained and engaged by organizations, and how these may change as generational cohorts progress through the life course.

CONCLUSION

Global talent management is a major business concern that has emerged at the end of the twentieth and beginning of the twenty-first centuries (McDonnell, et al., 2010; Scullion & Collings, 2006). The process of attraction, development, and retention can serve as a major advantage for organizations that are effective with this challenge. To be sure, strategic HRD is a challenge. There are a number of trends highlighting this challenge. First, organizations are challenged by their engagement in a highly distributed, global market. Second, within this global market, there is increased diversity as measured by time, geography, age, and importantly knowledge, skills, and abilities. Due to these first two trends, the third can be summarized simply as the constancy of change. Although change is not new, the complexity of the change is and therefore increases the likelihood of failure.

Jackson and Schuler (1995) noted the pressure of globalization alone is a catalyst for interest, concern and research into HRM. Moreover, the three trends pressure the importance of strategic HRD effectiveness. Many HR practitioners aim to be strategic and some, in fact, are. Those that remain mired in tactical issues, barriers, and challenges of administration, will find themselves unprepared to focus on strategies that optimize human capital and development necessary to complete in today's dynamic markets. The HR professionals that transcend traditional organizational and disciplinary boundaries to develop integrated, holistic solutions that advance the greater organization will lead the way.

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KEY TERMS AND DEFINITIONS

HRD: The discipline and function of Human Resource Development (HRD) emphasizes major areas of organizational work including training and development and career development (deSimone, Werner, & Harris, 2002). Gilley, Eggland, and Gilley (2002) also noted the HRD concern for performance management. To operationalize the notion of HRD, we rely on Swanson and Holton's (2009) perspective in that HRD is "a process of developing and unleashing expertise for the purpose of improving individual, team, work processes, and other organizational performance" (p. 4). To shorten this to near mantra level, Holton and Yamkovenko (2008) suggested "HRD is to develop and unleash human expertise" (p. 276). This is a distinct and strategic task of optimizing individual human capital and organizational intellectual capital relative to market needs and other situational conditions.

HRM: Used largely as a replacement of personnel management, the focus of Human Resource Management (HRM) is an overarching approach to the managing people within an organizational context.

Theoretical Proposition: A theoretical proposition is a proposed theory. Often identified as part of a qualitative study, propositions theorize collective, patterned, or saturated findings from data. Glaser and Strauss (1967) noted, "Grounded theory can be presented either as a well-codified set of propositions or in a running theoretical discussion, using conceptual categories and their properties" (p. 31). This study used the former as means for reporting findings.

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Chapter 56
Effective Virtual Project Management Using Multiple E-Leadership Styles

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INTRODUCTION

The field of organizational behavior defines leadership as "the ability to influence a group toward the achievement of goals" (Capella, 2005, p. 294). Leadership styles have been well studied and researched. Early leadership studies were developed using traditional, co-located work arrangements in mind. Later studies expanded to include traditional project team environments. In the current business environment, however, nontraditional virtual work arrangements are becoming more popular. Virtual project teams are increasing in business today and will continue to become more common in the future (Martins, Gilson, & Maynard, 2004).

Managing nontraditional work involving virtual teams is becoming a necessity in the current business environment. The type of leadership e-managers must demonstrate for successful virtual team management is different from traditional project team management (Konradt & Hoch, 2007). Understanding appropriate leadership styles for virtual project teams and the transition toward new leadership styles is an important part of managing human resources in organizations and successful virtual project management. Emerging e-leadership roles and management concepts for virtual teams include multiple leadership models, and their application is an important part of our evolving virtual organizational behavior.

This paper reviews management concepts for virtual teams that include leadership styles such as control-related models, transformational and transactional leadership styles, leadership that empowers team members to self-manage, and situational and contingency leadership styles. In the virtual project environment, the effective manager

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needs to use as many different styles as needed to bring the project to a successful completion.

BACKGROUND

Introductory Definitions

Virtual teams reflect the ever-increasing non-traditional work environments of the 21st century, with members collaborating from geographically distant locations (Lee, 2009). Ariss, Nykodym and Cole-Laramore (2002) define virtual teams as a group of skilled individuals who "communicate via computer, phone, fax and video-conference" (p. 22). Virtual teams involve individuals who are geographically distributed and use technology to communicate and produce results (Duarte & Snyder, 1999).

The term e-leadership describes leadership in today's nontraditional virtual business environment. The need for e-leadership in virtual project teams has become increasingly relevant as businesses move toward more non-traditional work. Virtual project teams are increasing in business today, and understanding e-leadership styles of virtual teams is an important part of e-business. E-leadership styles for virtual project team managers may be different from traditional project team managers, and how they might be different is still an emerging study. E-leadership styles is an expanding topic for developing the knowledge and practices necessary to determine the most effective leadership styles for virtual project managers.

Leadership Styles

Control-Related Leadership

Control-related leadership is defined as leading by tasks and includes motivating, providing role clarity, setting clear goals and priorities, and by giving good directions. Control-related leadership has been linked to effective virtual team management. Konradt and Hoch (2007) examined leadership roles and showed that the task leadership function was "rated as significantly more important to virtual team effectiveness than people leadership function" (p. 25) and "that managers in virtual teams viewed control-related roles as more appropriate for virtual team success and performance than non-control-related roles" (p. 26).. Similar goal-related concepts can be found in management by objectives (MBO) studies. Previous studies found that control-related leadership strategies were positively related to virtual team success (Hertel, Konradt, & Orlikowski, 2004). Control often has a negative connotation when linked to management behaviors, but leadership involves some degree of responsibility for influencing the behavior of workers (Hersey, Blanchard, & Johnson, 2001, p. 17).

Transformational and Transactional Leadership Styles

Transformational and transactional leadership characteristics are common management styles for virtual teams. Transformational leaders are defined as leaders who inspire followers to work (Capella, 2005). Transactional leaders are defined as leaders who motivate followers to complete goals by clearly identifying roles and setting vision (Capella, 2005). In a study by Hambley, O'Neill and Kline (2007) to determine virtual team leadership behaviors, the results were divided into five major behaviors closely related to transactional leadership characteristics: (1) ability to provide role and expectation clarity and good communications, (2) working along with the team; (3) relationship building skills; (4) effective team meetings; and (5) strong project management. Many of the e-leadership behaviors identified in the Hambley, O'Neill and Kline study (2007) can be linked to the transformational and transactional leadership styles. They found that leaders setting goals for virtual teams reflected the transformational style

motivational skills. Providing role and expectation clarity for virtual teams reflected the contingent reward factor of transactional style leadership.

Leadership Through Empowerment

Effective leadership through empowerment involves self-management within virtual teams. Bell and Kozlowski (2002) report that virtual leaders need to implement a system that will allow virtual project team members to self-manage. Self-managed work teams are defined as teams that "take on many of the responsibilities of their former supervisors" (Capella, 2005, p.234). It is important for virtual team leaders to distribute leadership functions to the team itself, making it self-managing (Bell & Kozlowski, 2002). Bell and Kozlowski suggest that many virtual teams are composed of individuals who already have virtual team experience and expertise in their area of work. Leadership roles can be shared by team members who are not co-located (Pearce & Conger, 2002). Similar to empowerment, the leader-participation theory "provides a set of rules to determine the form and amount of participative decision making in different situations" (Capella, 2005, p. 309) and could be applied to e-leadership. However, a truly empowered leadership style will free the virtual team from organizational constraints and encourage proactive action and accountability (Hersey, Blanchard, & Johnson, 2001).

Situational Leadership Styles

The situational school of leadership models assume that effective leaders can develop and adopt certain styles or behaviors. Tannebaum and Schmidt (1958) presented a framework to help explain an effective leader in their continuum of leadership behavior. Their theory analyzed the different patterns of leadership behavior and how this range of behaviors determined the type of leadership, leadership pattern, and effect on short- and long-range objectives. Blake and Mouton (1964) proposed a behavioral management theory that suggested that many behaviors and motivations affected leadership. They established five key managerial styles: do nothing, country club, task/production, mundane/middle of the road, and team. However, Blake and Mouton's main limitation was that their model assumed that there is one consistently sound style of leadership across all situations. Hersey and Blanchard (1969) contributed to the emerging situational school of leadership, proposing that effective leaders adopt certain styles or behaviors to be successful. Hersey and Blanchard proposed a life-cycle theory of leadership suggesting that leadership could be adjusted to the maturity of the subordinate. They used multiple dimensions - task/production oriented and people-oriented – and the variable "maturity" scaled from most mature to most immature. Building on existing research, they developed a situational style leadership model (telling, selling, participating, delegating) dependent upon workers' maturity.

Contingency School of Leadership

The contingency school of leadership models further developed situational leadership ideas to encourage matching the leadership style to the activity or work. In Fiedler's (1967) seminal book, he identified three major variables – leadership trust, clarity of task, and leadership power/authority – that match the style to the situation. Fiedler identifies two basic styles of leadership – task oriented and relationship-oriented (participative). He suggests that by using a least-preferred coworker scale, workers can be assigned to task oriented or participative leaders to achieve maximum effectiveness. Fiedler re-conceptualized existing leadership studies, theories and research to determine that task oriented leaders perform best in situations that are very favorable or very unfavorable to the leader and that relationship-oriented leaders perform best in situations that are intermediate in favorableness. His significant

contribution to leadership theory was his focus on situational variables as moderating influences.

House (1971) presents a path-goal theory based upon motivation theory. House's leadership effectiveness theory, part of the contingency school, suggests that the leader influences (motivates) the team to find the path to their goals by using an appropriate leadership behavior (directive, supportive, participative and achievement-oriented). The leader adapts leadership behaviors to environmental factors (such as task structure, authority system, and work team) and subordinate factors (locus of control, experience, ability) resulting in more effective and satisfying team performance. House's theory suggests that the leaders diagnose the situation before attempting a leadership intervention. During the 1970s, Hersey and Blanchard (1974) developed a contingency theory that suggested a situational leadership style where the leader is flexible in what type of leadership behavior is used dependent upon the needs of the team.

The common thread for these approaches is that the leader should be flexible and be able to adapt and apply the appropriate leadership style as necessary. Later, Vroom (2003) suggested a contingency theory model that relates leadership style to the task at hand or situation. The Vroom Decision Tree Approach (Vroom, 2000) prescribes leadership styles appropriate for the situation. It uses five leadership styles that are dependent upon the subordinate participation to determine the degrees of being autocratic, consultative, or group oriented when making leadership decisions. Situations shape how leaders behave and influence the consequences of leader behavior (Vroom & Jago, 2007).

Project Management Leadership Research

The seminal contributions of these scholars shaped subsequent research for leadership theory for work teams and project teams. In the body of knowledge for project management leadership, these theories identify leadership styles for traditional project management. Determining whether different leadership styles are appropriate at different stages of the project life cycle and with different team structures has been explored and research conducted in the project management context, with the general conclusion that leadership styles theory can be appropriately applied to project management leadership. Applying these theories and research, then, to virtual project management could be the next step in exploring how leadership styles for virtual project teams are different than traditional leadership styles and traditional project management leadership.

Traditional Project Management Research

Slevin and Pinto (1991) challenged the complexity and often-contradictory research on leadership and the perception that the process of project leadership is confusing. They attempted to describe a cognitive approach to leadership to help project managers consciously select the correct leadership style. They proposed a two-dimensional leadership model (information input and decision authority) on which leadership style can be plotted using percentile scores that it is practical, simple and recognizes three main leadership decision styles (participative, delegation, and pressured). Shenhar's (1998) research also explored a two-dimensional model for management and determined differences in management style based upon a classification system of project type. Results indicated that fit between project leadership style and type of project are important to the success of the project. Turner and Muller's (2006) study attempted to develop guidelines on selecting the appropriate project manager for projects dependent upon leadership style. They found that leadership style was positively correlated with project success and that different combinations

of leadership competencies were positively correlated with project success.

Virtual Project Management Research

Lee-Kelley (2002) suggested in her study of virtual project teams that Fielder's (1967) identification of the key situational variables influence a leader's style, and her study included Fiedler's leadership instrument and least preferred co-worker (LPC) scale. The theory that a manager's ability to control and influence the team or situation impacts his or her management style was confirmed by the study, as was Fiedler's proposal that task-motivated managers perform best when situational control is high as well as in situations where control is low. Konradt & Hoch's (2007) work is important in establishing virtual managers' perceptions of roles. They also questioned if men used more directive leadership styles (indicating a control-related leadership role) than women leaders to manage virtual teams. Hambley, O'Neill and Kline (2007) explored virtual team leadership behaviors in six different experimental conditions and connected virtual team leadership to transformational and transactional leadership styles.

APPLICATION OF THEORETICAL CONCEPTS FOR LEADERSHIP STYLES TO VIRTUAL PROJECT MANAGEMENT

Application of Control-Related Leadership

Konradt and Hoch (2007) research results showed that control-related leadership roles correlated to virtual team success and performance, A field study of two large companies in Germany by Hertel, Konradt, and Orlikowski (2004) showed that effective virtual team management practices included setting clear goals, tasks, and outcome interdependencies. They found that the higher the quality of goal setting processes and task interdependence, the more effective the virtual team. Hertel, Konradt, and Orlikowski suggest that e-leaders focus on high quality goal setting, high task interdependence and use team-based rewards to produce the best results from virtual teams. Hooijberg and Choi (2000) found that the goal achievement role, (attainment of goals, setting clear goals, and coordinating work) had a strong relationship with the perception of leadership effectiveness. Lee-Kelley's (2002) study indicates that the task-motivated leadership style for shorter projects would appear to be effective. Implications for the organization are the need to know the tenure of their projects and ensure that the project leaders' styles are appropriately matched to the term of the projects.

Application of Transformational and Transactional Leadership Styles

Motivation can be enhanced by providing challenges, recognition, and rewarding responsibility and creativity (Project Management Institute, 2001). Communicating the vision can be achieved through a well-developed project charter, developing emotional buy-in and ownership of the vision within the team, and using the vision to guide and direct the work (Kliem, 2004). Inspiring followers to work and motivating followers to complete goals by clearly identifying roles and setting vision are skills that can be learned. Training on transformational and transactional leadership skills and when each style is appropriate can provide an opportunity to apply these skills in real work situations. Hambley, O'Neill and Kline (2007) suggest developing training programs for virtual leaders and virtual project team members to increase team performance. Leaders can be taught skills (Capella, 2005) and learn the leadership techniques that can be most effective in virtual team management.

Application of Leadership Through Empowerment

Bell and Kozlowski (2002) suggest that virtual team leaders need to be proactive in providing clear direction and specific goals to encourage each team member to monitor their own performance and self-regulate their work to be successful. To do this, they suggest the leader develop rules, guidelines and habitual routines for the team. Self-managing teams, usually 10-15 people, usually report higher levels of job satisfaction (Capella, 2005), but the team norms and organizational culture can be influences on the success for teams that self-manage. It is often necessary for a virtual leader to provide motivational incentives, set objectives and mission, and develop an appropriate climate or tone for the virtual team (Bell & Kozlowski, 2002). Day (1999) suggests that empowerment is dependent upon a company cultural attitude that includes education about the organization and what is really happening in the organization, operational consistency, a proven process, loyalty, and trust. Increasing these company cultural behaviors may increase the success of leadership through empowerment. Wickham and Walther (2007) imply that the emergence of more than one leader may be the result of the situation or environment of the virtual team, and project managers must recognize this fact.

Application of Situational and Contingency Leadership Styles

The situational leadership style assumes that effective leaders can develop and adopt certain styles or behaviors dependent upon the needs of the project and team, analogous to the contingency school of leadership that emphasizes matching leadership style to the leadership situation. Tannebaum and Schmidt's (1958) situational leadership theory would provide the opportunity for the project manager to analyze the different patterns of leadership behavior, and how this range of behaviors could determine the type of leadership needed to affect short- and long-range objectives. Determining the degree of authority used by the project manager and the degree of freedom experienced by the virtual team members, the continuum could help determine the behaviors needed. Hersey and Blanchard's (1969) life-cycle theory of leadership would assist the project manager in adjusting to the maturity of the team member, and become more flexible in what type of leadership behavior is needed dependent upon the needs of the individual. Adopting this model would help control any loss of mature, experienced virtual team members from the team.

The Vroom Decision Tree Approach (Vroom, 2000) could help the project manager understand the team members' level of participation to determine the degree of autocratic, consultative, or group oriented leadership necessary. An overview of this theory would be valuable to the project manager in understanding the relationship between the need for participation and the need for leadership with both the on-site and virtual team members and assist in balancing the team relationships and work. Slevin and Pinto's (1991) model plots four extremes of leadership style with the level of participation by project team members and could be used as a day-to-day working framework for project managers. Turner and Muller (2006) conclude that the project manager's leadership style and competencies contribute to project success and make suggestions for appointment and deployment of project managers based upon their findings.

Moving toward Multiple E-Leadership Styles

Benefits of Multiple Leadership Styles in Virtual Projects

By understanding control-related leadership roles (Konradt & Hoch, 2007), using transformational and transactional leadership styles

Table 1. Effective leadership concepts for virtual teams

Leadership Concept	Description	Application
Control-related	Leads by tasks Motivates Provides role clarity Sets clear goals and priorities Gives good directions	Use a high quality goal setting processes Encourage task inter-dependence Lead by task for shorter projects
Transformational	Inspires followers to work	Clearly identify roles Set the project vision
Transactional	Motivates followers to complete goals Clearly identifies roles Reinforces the vision	Use a well-developed project charter Develop emotional buy-in and ownership of the vision Use the vision to guide and direct the work
Empowerment	Leads self-managed work teams Distributes leadership functions	Develop rules, guidelines and habitual routines Provide motivational incentives Set strong objectives and mission Develop an appropriate climate or tone
Situational	Adopts certain styles or behaviors Adjusts to the maturity of the subordinate	Be skilled in multiple leadership styles Adopt the appropriate style dependent upon the experience and needs of the team member
Contingency	Matches leadership style to the activity/work Assigns workers to task oriented or participative leaders Adapts to environmental factors Leads dependent upon the needs of the team	Be trained on multiple leadership styles Remain flexible Adapt and apply the appropriate leadership style as necessary

(Hambley, O'Neill, & Kline, 2007), empowering virtual project teams to self-manage (Bell & Kozlowski, 2002), and incorporating situational and contingency leadership styles, those managing virtual teams will be able to offer benefits to the organization by providing positive, successful leadership, resulting in better project deliverables (see Table 1).

Virtual project management has become increasingly important and a necessity as the trend in virtual work teams continues. Leadership styles for managing virtual project teams are different from leadership roles for managing traditional, co-located teams. Understanding emerging e-leadership styles for virtual project teams and their application is an important part of our evolving virtual organizational behavior.

FUTURE RESEARCH DIRECTIONS

The literature reviewed may provide scholar-practitioners research topics related to the relationship between leadership orientation and adaptability for virtual project managers. Shenhar (1998) indicates that more research is needed to explore the role of contingencies in project management. Lee-Kelley and Loong (2003) recommend that there needs to be more evidence that the project manager can change leadership styles in response to altered circumstances.

Little research has been done to determine if situational and contingency theories of leadership can be applied to e-leadership of virtual project teams. The goal of future quantitative or qualitative research could be to determine if situational and contingency leadership style theories are applicable and increase the effectiveness of virtual project manager leadership. How leadership functions in virtual project teams evolve throughout the

project and the best way(s) the project manager can adapt to these changes to lead the team to a successful deliverable - on time, in scope, with quality, and on budget – is vital to the future of e-leadership.

CONCLUSION

This paper provides a review that could be used as a starting point for defining successful management styles for virtual project team leaders. For each style, there are leadership skills that managers can use to ensure success. As we move toward virtual organizations, we need to understand more clearly leadership roles in the virtual environment.

The general conclusion, also supported by Turner & Muller (2005), is that multiple leadership styles can be appropriately applied to project management leadership. Applying these theories and research to virtual project management provides an improved approach for managing human resources. The application to human resource management is that this flexibility in leadership style can provide the key to profitable project work, satisfied team members, and continued organizational growth through successful virtual project deliverables.

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KEY TERMS AND DEFINITIONS

Contingency Style Leadership: Leading by matching the leadership style to the situation.

Control-related Leadership: Leading motivating, providing role clarity, setting clear goals and priorities, and by giving good directions to complete tasks.

E-Leadership: The term e-leadership describes leadership in today's non-traditional virtual business environment.

Empowerment Leadership: Leading by allowing self-managed work teams to take on the responsibilities of traditional management.

Situational Leadership: Leading by developing and adopting different styles or behaviors as necessary.

Transactional Leadership: Leading by motivating followers to complete goals by clearly identifying roles and setting vision.

Transformational Leadership: Leading by inspiring followers to work.

Virtual Team: Virtual teams are groups of skilled individuals collaborating from geographically distant locations and linked by technology that communicate electronically to achieve the goals of a project or work together on solving problems.

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Chapter 57
Analysis of Gender Equality in Higher Management Levels: A Study Model

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ABSTRACT

The main goal of this chapter is to undertake a critical analysis of the current situation concerning the equal treatment of female managers in Spain. In this chapter, the authors analysed the dynamics of business behaviour in order to understand why inequality of women managers for gender reasons persists in spite of the anti-discrimination measures recommended by the legislative framework in place. This analysis has allowed proposals for measures to be drawn up to be taken into account in designing human resources strategies, based on systems of management by competencies and assessment of managerial performance.

1. INTRODUCTION

The economic participation of women is essential in shaping the economy of a country, not just for reasons of equity and equality, but also as a strategic question. According to the resources and capability based view (Wernerfelt, 1984; Barney, 1985; Rumelt, 1987; Conner, 1991), the human capital of business organizations, comprised of a combination of people's skills, knowledge, and reasoning and decision-making abilities, constitutes the main competitive value of firms (Grant 1996). Societies that do not use the talent of half the population carry out an allocation of resources that is not efficient, grow less and put their competitiveness at risk.

However, the inequalities between men and women continue in the business world, related

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to their access to employment, vertical segregation ("the glass ceiling effect"), (Hymowitz & Schellhardt, 1986; Morrison & Von Glinow, 1990), differences in pay or inequality in working contidions.

In Spain, Law 3/2007 establishes a regulatory framework that obliges organisations to adopt equality of opportunity as an objective to be pursued. Nevertheless, in spite of this initiative, statistics show that the problem persists. Paradoxically, since this law came into force, there are some cases where the percentage of women has stabilised or even diminished. In addition, three new matters for concern emerge:

- According to Amuedo (2007), it is becoming extremely difficult to find women willing to belong to Boards of Directors, for fear of being regarded as "quotas"[1]. This phenomenon could spread to the rest of the organisation, self-exclusion appearing for certain promotions in level, because of identical reservations.
- The confusion between "equality" and "positive discrimination" has popularised the idea that the current context offers opportunities to women *at the cost of* men. In the words of Gómez-Mejía the "*beaten man syndrome*" (Gómez-Mejía et al., 2007). As a consequence of this situation resentment arises, anxiety increases and prejudice grows amongst those who feel threatened. A greater proportion of men perceive these measures in terms of a threat than do women. They believe that currently they are discriminated against by measures favouring women, that they have fewer employment opportunities and that they are paying for the consequences of a situation in which women suffered from discrimination in the past.

In these conditions it seems clear that the Law, even though it may help to correct certain deficiencies, is not as effective as it aims to be. It is necessary, therefore, to understand what the dynamics of business behaviour are that can cause the phenomenon of the "glass ceiling" to appear in promotion to management and, on the basis of this understanding, propose policies for action that allow organisations to exploit all their managerial talent, independently of whether this talent is possessed by men or women.

2. DIAGNOSIS OF THE SITUATION

The inclusion of women in paid employment is one of the great achievements of the 20th century. Nevertheless, the situation in which women have been included on equal conditions is yet to be reached.

A longitudinal analysis shows the progressive inclusion of women into the labour market. In Table 1 it can be seen that the female employment rate has increased by more than 20 percentage points in recent years, in a clear trend towards convergence with the male rate.

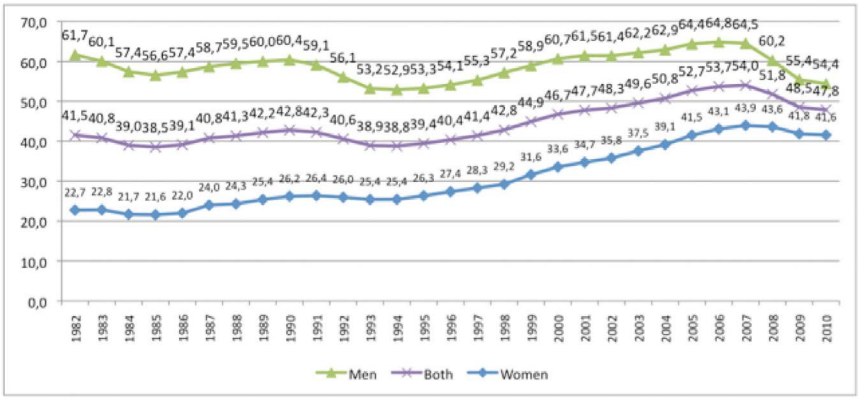
Nevertheless, trends and scrutinising data are different things. It is true that, in percentage terms, women have been entering the labour market in an increasing proportion, but it is no less true that their numbers continue to be below those of men (Table 2).

It can be seen from the data in Table 2 that the activity rate as well as the occupation rate is lower in the case of women, while the only figure that is higher is the unemployment rate.

This difference between trend and reality is a common denominator in the analysis of the labour market at the moment. Generally, it can be said that different inequalities persist: (1) at entry level (2) in promotion and (3) in salaries.

1. Inequalities at entry level, or horizontal segregation. Data gathered by the latest survey of the active population warn us of the persistence of this inequality at the

Table 1. Employment rate development (Source: Institute for Women, 2010)



level of access to employment (Table 3). As already remarked upon, in spite of the fact that women constitute approximately half of the labour force in the country, the number who are actually working is noticeably below that of men.

In addition, when analysing this apparent "barrier" to access to employment for women, another piece of data should be taken into account: the *quality* of the employment of those who do have work. As can be seen from the figures in Table 4, the level of "precarity" or "temporariness" of women is significant.

From among this data, the proportion of women employed on a fixed-term contract basis or, above all, those of a temporary nature in order to substitute a worker, should be noted. In these conditions, and taking the current economic situation into account, it would not be a great risk to suggest that the number of women swelling the

Table 2. Active population development (Source: EPA 2010)

		2,001	2,002	2,003	2,004	2005	2006	2,007	2,008	2,009	I Q 2010
Both sexes	ACTIVITY RATE	53,41	54,63	55,91	56,74	57,72	58,58	59,12	60,13	59,76	59,83
	EMPLOYMENT RATE	47,74	48,29	49,56	50,75	52,70	53,72	54,03	51,77	48,50	47,84
	UNEMPLOYMENT RATE	10,63	11,62	11,37	10,56	8,70	8,30	8,60	13,91	18,83	20,05
Women	ACTIVITY RATE	40,96	42,72	44,47	45,79	46,95	48,56	49,37	51,38	51,70	52,05
	EMPLOYMENT RATE	34,71	35,79	37,54	39,13	41,50	43,05	43,94	43,6	41,84	41,55
	UNEMPLOYMENT RATE	15,25	16,22	15,60	14,55	11,61	11,36	11,00	15,14	19,07	20,16
Men	ACTIVITY RATE	66,55	67,16	67,92	68,19	68,95	69,00	69,23	69,21	68,14	67,95
	EMPLOYMENT RATE	61,47	61,42	62,17	62,90	64,37	64,81	64,51	60,24	55,44	54,39
	UNEMPLOYMENT RATE	7,62	8,54	8,46	7,76	6,64	6,06	6,83	12,96	18,64	19,96

Table 3. Active population 2008 (Source: EPA Q4 2008)

MEN	
Population from 16 to 64 years	15636.2
Activity rate (16-64)	82.72
Unemployment rate (16-64)	13.04
Employment rate (16-64)	71.93
WOMEN	
Population from 16 to 64 years	15265.2
Activity rate (16-64)	65.29
Unemployment rate (16-64)	15.21
Employment rate (16-64)	55.36

unemployment figures in coming months will be significantly higher than that of men.

2. Vertical inequality. In exactly the same way, we can see that women have more difficulty in being promoted to positions of responsibility in organisations. This is a common feature of any statistics we analyse, whatever their sectorial, community, national or international origin.

It seems evident that it is difficult for women to be promoted in enterprises, public as well as private. The following table (Table 5), which is related to the presence of women in managerial positions in public and private enterprises, clearly shows that the proportion of women in these positions is notably below that of men:

The only level on which the numbers seem to be balanced is "management of firms without paid employees", that is to say where women manage because it is their own firm (as in the case of self-employed women, for example) or they are its only employee. This trend is independent of the type of firm, public or private, that is being analysed. In the case of public companies, they do not reach 20% in the best of cases (Table 6).

The situation is not much better in private enterprise. If we look at the situation of firms listed in the IBEX 35, the percentage of of women managers is, on average, lower. (Table 7)

In addition, in this final table, it can be seen that change is slow. It is true that, on average, the percentage of women on boards of directors has practically doubled, but due to the amount of inclu-

Table 4. Types of contract (Source: Institute for Women 2008)

	1987		1,997		2,007	
	BOTH SEXES	% WOMEN	BOTH SEXES	% WOMEN	BOTH SEXES	% WOMEN
Contract of indefinite duration	6,841.60	28.21	6,950.70	35.68	11,658.20	42.50
Permanent over time	6,696.60	28.08	6,806.90	35.14	11,423.70	42.03
Discontinuous	145.10	34.25	143.70	61.52	234.50	65.37
Temporary	1,656.50	35.03	3,436.60	38.43	5,218.40	46.06
Short-term for reasons of production	65.40	35.32	-	-	923.30	51.44
Learning, training or work placement	65.40	35.32	127.30	40.61	177.10	42.41
Seasonal or fixed period	557.50	33.42	267.80	41.37	276.10	52.01
In probationary period	-	-	31.50	42.54	68.50	45.99
Substituting another worker in their absence	-	-	151.20	72.95	431.30	72.50
For a fixed task or service	-	-	796.70	19.52	2,017.20	31.86
Verbal not included in previous options	-	-	-	-	465.40	67.10
Other type	1,033.70	35.87	2,062.10	42.63	178.20	59.48
Do not know	-	-	14.80	35.14	661.30	44.81
	TOTAL	**TOTAL**	**TOTAL**	**TOTAL**	**TOTAL**	**TOTAL**
	8,511.00	**29.51**	**10,404.10**	**36.59**	**16,876.50**	**43.61**

Table 5. Women and management (Source: Institute for Women 2009)

	2007 % Women	2008 % Women
Management of Public Sector and companies	**32.9**	**32.7**
Management of Public Sector and companies with 10 or more employees	**23.4**	**23.4**
Executive and legislative power in public sector, management of organisations	47.8	36.6
Company management	21.9	22.6
Management of companies with less than 10 paid employees	**28.7**	**28.9**
Commerce	35.3	36.3
Hotel and catering	44.6	50.1
Other companies	24.6	20.8
Management of companies without employees	**47.3**	**48.5**
Commerce	55.2	54.0
Hotel and catering	44.6	50.1
Other companies	30.5	33.7

Note: the figures refer to the third quarter in both years

Table 6. Women managers 2008 (Source: Institute for Women 2009)

	Public organisations		State owned firms	
	Both sexes	% Women	Both sexes	% Women
Total	**195**	**18.5**	**1.126**	**13.7**
Presidents	14	14.3	49	6.1
Vice-presidents	6	16.7	33	6.1
Board members	162	18.5	955	13.9
Secretaries	13	23.1	45	28.9
Other members	-	-	44	6.8

Sources: Compiled by the Institute for Women from data provided by the various organisations and firms

Table 7. Women managers in IBEX firms (Source: Institute for Women 2009)

	Public organisations		State owned firms	
	Both sexes	% Women	Both sexes	% Women
Total Board	**463**	**3,5**	**497**	**6,4**
Presidents	35	2,9	35	2,9
Vice-presidents	41	2,4	53	3,8
Board members	379	3,7	413	7,5
Secretaries	8	0,0	5	0,0

Table 8. Middle management: Women in managerial tasks.(Source: Institute for Women 2009)

		2004	2005	2006	2007
Both sexes	**Total Board**	**503**	**478**	**463**	**497**
	Presidents	37	37	35	35
	Vice-presidents	39	40	41	53
	Board members	417	388	379	413
	Members/Secretaries	10	13	8	5
% Women	**Total Board**	**2.58**	**2.09**	**3.46**	**6.43**
	Presidents	5.41	0	2.86	2.86
	Vice-presidents	2.56	2.50	2.44	3.77
	Board members	2.88	2.32	3.69	7.51
	Members/Secretaries	0	0	0	0

sion of women in junior management or middle management positions (board members or below), not in the managerial front line (Table 8)

3. Inequality in salaries. The analysis of salaries received by men and women also throws up great inequalities (Table 9). It must be pointed out that we are talking about inequalities, not discrimination. There is a considerable debate about what the correct terminology is. While some authors (Flabbi, 2005; Hernández and Méndez, 2005; Aláez and Uribarri, 1999) maintain that the majority of salary differences between men and women are explained by discrimination, others maintain there is no such discrimination, but inequality (Oliver, 2005). According to these authors, salary differences can be completely explained by a set of objective factors such as women workers having less experience or seniority; less occupation of positions of responsibility; greater presence in the service sector, holding less skilled positions that are more temporary. Others still (Camarero and Vega, 2000; Moreno et al., 1996) believe that both factors combine.

It can be seen from the Table 9 how the distribution of salaries, on average, is always higher in the case of men. It is true that various reasons can be given, *a prior* objective, for these inequalities: the influence of seniority increments (seniority increments constitute a significant percentage of the salary of workers. Women have recently entered the labour maket, for which reason they probably have less seniority), differing working hours, varying quantities of overtime or productivity bonuses, for example. In fact, researchers disagree when determining what the variables are that have the greatest weight in determining salaries. Aláez and Uribarri (1999) place experience, seniority and level of education first but also concede importance to the type of contract and the sector of activity. For Camarero and Vega (2000) the variables with the greatest influence are seniority (22%), level of education (15%), size of the firm (14%), sex (12%), type of contract (12%), occupation (7%), collective agreement applied (6%), final consumer market (6%) and sector of activity (2%).

From what has been said above it can be deduced that significant inequalities between men and women persist in the labour market. Even considering social pressure in this regard, as well as various political and legal initiatives, these inequalities are maintained through time.

Table 9. Average annual salary (INE, 2009)

	1995	2002	2006	2008
MALES	18.223,29€	22.169,16€	22.051,08€	24.203,33€
FEMALES	12.237,21€	15.767,56€	16.245,17€	18.910,62€
% DIF	32,85%	28,88%	26,33%	21,87%

3. THE PROPOSED OBJECTIVE: A CAUSAL ANALYSIS

In spite of the existence of legislation specifically directed towards achieving equality in the workplace with regard to gender, the statistics show a reality that does not correspond to the objectives set out. Inequality between men and women on a professional level has not been reduced at the speed expected. The interaction of factors of a social, cultural or psychological nature, not considered in the legislative framework, continue to make real equality difficult in business organisations.

Therefore organisational designs and action policies are maintained that, far from favouring access to work and promotion for women, create intangible barriers that are difficult to overcome through legislative rules. Currently, the smaller percentage of women that have entered the executive level in firms and institutions permits the existence of organisational behaviour that is not being taken into account to be detected. In recent years neither governments, nor large corporations, banks, academic or scientific institutions, not even international organisations such as the United Nations, have considered assessing the opportunity cost that not using the managerial talents of many women represents. A more balanced distribution of decision-making power in the levels of the hierarchy could not only allow the value of this talent to be exploited, but also favour equality at work at lower levels of the hierarchy.

Gender discrimination in the workplace is such a broad and complex problem that it is impossible to analyse it from a single perspective. For this reason we have limited our study to the phenomenon known as "Discriminated Elites", as we consider that the formation of the organisational conditions that can favour or impede the promotion of women at work to executive positions could affect their future participation in the managerial processes of business organisations.

The starting point for our analysis is based on an initial set of premises that will determine the development of the approach proposed.

- There are no significant differences in managerial competencies in organisations for reasons of gender. On the contrary, levels of competence will depend on the following factors:
  - Specific knowledge: business management, organisational behaviour and psychology and technical knowledge of the area.
  - Management skills: capacity for social relations, negotiating and communication skills, initiative and leadership.
  - Previous executive experience in management or junior management positions.
  - The existence of a broad social network of contacts key for achieving the strategy of the organisation.
- The existence of a smaller number of promotions of female managers compared to male managers, considering the existence of an equal number of candidates of both sexes, could be related to the following:

  - The existence of organisational policies that discourage the promotion of women managers
  - Social, cultural and educational factors that influence the assessors when taking decisions about work promotion in their organisations.
  - Resistance to change or the "status quo" of the current management bodies of the organisation, which are mostly made up of male managers.
- The percentage of women managers who leave is greater than that of men due to life, emotional, and differential behaviour factors. The difficulties female managers have in maintaining themselves as a minority group in top management bodies are related to the increase in the rate they leave.

The traditional view defines women as a problematic aspect of the labour force. Thanks to political concern to encourage measures that reduce inequalities in the workplace between men and women, superficial remedies in practice have multiplied in recent years that neither deal with the strategic causes of inequality nor integrate women at all levels of the labour force. Policies that facilitate leave of absence to take care of children, encourage part-time work, give preferential access to training courses or fiscal benefits for employing women, even if they are very rewarding acts aimed at improving the image of a government or socially responsible firm, are not clearly of any help in really solving the problem of inequality in the workplace, and less so at the level of management.

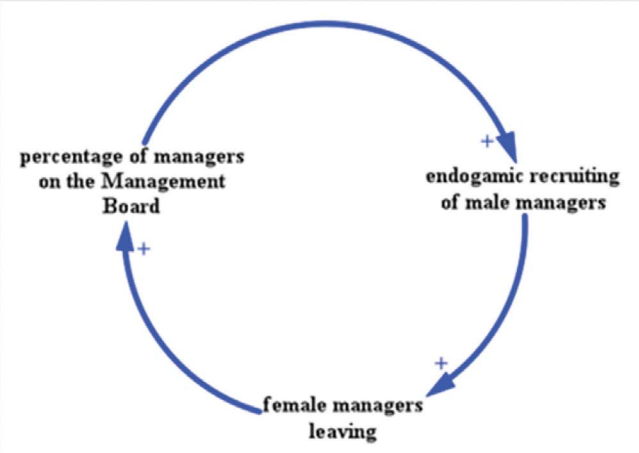
Research on the advancement (or, more correctly, the "non"-advancement) of women in professional careers (Perry et al., 1994; Tharenou et al., 1994), the reconciliation of personal and professional life (Stroh et al., 1996), female managers (Lyness and Thompson, 1997; Bass and Avolio, 1994), leadership (van Knippenberg, 2004; Hunt, Boal and Dodge, 1999) or gender and organisation (Agars, 2004) indicate that the majority of the "technical" or traditional barriers (access to higher levels of education, a non-discriminatory legal and institutional framework) have been gradually overcome in recent years.

Taking the dynamic role that groups play in determining the form and context of an organisation into account (Ryan and Haslam, 2007; Haslam et al., 2003), we can infer that these barriers are the result of intra-group pressure in the decision-making process, when basically these decisions are taken by men. That is to say that given that the majority of managers in organisations are men, it will be them who have to choose a woman for a management post. Breaking with tradition, prejudices and sexual stereotypes and possible difficulties in ways of dealing with matters because they are different sexes may be some of the reasons that curb male managers from taking this decision. This discrimination could also be interpreted as a way to reduce the status quo and acquired privileges (Schmitt, Ellemers & Branscome, 2003).

From this point of view, because of the internal dynamics of power endogamy (Figure 1), the individuals belonging to a closed group such as a managerial body tend to choose their new members from among those people who are similar to the majority, avoiding the introduction of elements that distort the existing equilibrium and increase the possibility of future conflicts at the heart of the group.

The maintenance of this dynamic through time causes some women members of a management team to leave, because of the isolation created by their minority situation and differences in characteristics from the rest of the group members. The following diagram explains the higher leaving rate that appears amongst women managers compared to their male counterparts. The higher the percentage of men who are at management level, the higher will be the percentage of new male managers recruited. This situation will make the isolated position of the women managers

Figure 1. Endogamous loop (source: made on the premises)



belonging to the same level more acute, which will cause more of them to leave for this reason, which in turn will increase the percentage of male managers with decision-making status.

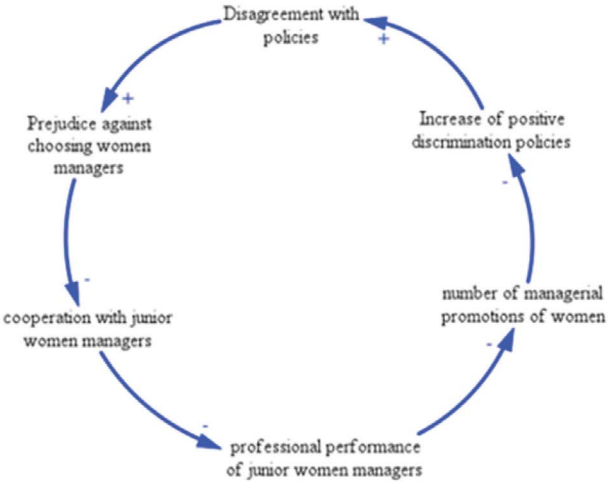
These dynamics allow the fact that low female representation is maintained at a managerial level in various organisations to be explained. To ameliorate this low representation, a set of policies has been put in place in recent years under the heading "positive discrimination". These are intended to assure a minimum participation of the female minority in managerial bodies. The method advanced by these policies means that if in the selection process there are several equally eligible candidates the selectors will discriminate in favour of the woman. With this method it is intended, in the mid-term, to achieve quantitative equality of both sexes in decision-making bodies. This is a measure that, even though it is obligatory in the Public Sector, is only a recommendation for good governance in the case of private organisations.

From the proposed approach it is not obvious that this type of policy, recently introduced, can achieve the intended objectives. The complexity of the internal reactions of the organisation itself as a group of individuals, not taken into consideration in the practical application of the proposed action, could mean failure in the real objective of this policy.

The following causal diagram (Figure 2) shows the interrelation between various variables that may influence the situation. The increase in policies promoting equality through positive discrimination creates an attitude of disagreement among the men who occupy the majority of managerial positions. This disagreement increases prejudices towards those new female managers favoured in the selection. This attitude is transmitted to the junior managers, making cooperation difficult between male managers and women junior managers. As a result of this situation the productivity of the female junior managers may decrease in comparison to that of their male colleagues. Afterwards, the assessment of the performance of the female junior managers who are candidates will be inferior to that of their male counterparts. As a consequence the previous condition of equal eligibility will not be met during the promotion process, which will make the promotion of new women managers difficult.

Nevertheless, if this diagram allows the maintenance of female managers in a minority in organisations to be explained theoretically, it does not clarify the situation of inequality between sexes that appears at management level in strategic areas in organisations.

Figure 2. Loop of resistance to change and cession in the power structure (source: made on the premises)

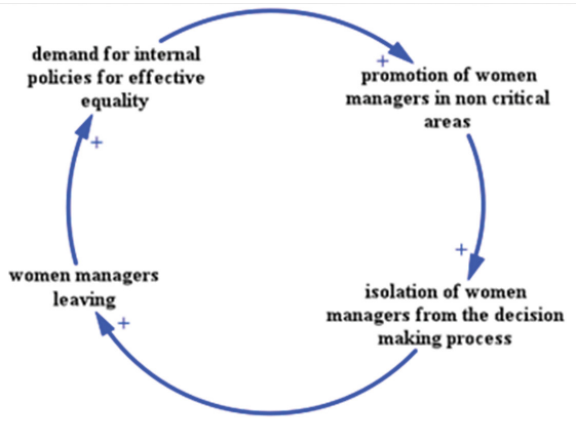


The explanation of this phenomenon can be due, from a comprehensive point of view, to the contradiction that appears between the final objective of the policies put in place (that is to achieve global parity between sexes at a managerial level) and the traditional cultural values that exist in the perception of the majority of the male managers whose job it is to implement these policies. In this way the subjective perception of the lack of managerial competence of female junior managers favours the promotion of women into managerial jobs that are not critical for the organisation to function well, placing them in areas of activity with lower budgets or considered "feminine" according to gender stereotypes.

This situation, seen from a dynamic point of view (Figure 3), perpetuates a loop able to keep women managers in a minority despite promotion policies put in place to avoid this.

As a result the promotion of the majority of women managers to areas that are not critical for the global functioning of the organisation, which means occupying posts with less responsibility, budget and margin for manoeuvre, causes their isolation in the important decision-making bodies. This situation reduces the support of their male

Figure 3. Organisational culture loop (source: made on the premises)



colleagues at the same time as it again stirs up prejudices and gender stereotypes, in time provoking a greater leaving rate among women managers in relation to men.

4. PROPOSED MEASURES

Organisations today are aware of change in the competitive environment. Intangible assets, when they are scarce, valuable and lasting, constitute the basis of sustainable competitive advantage (Barney, 1991; Grant, 1996; Drucker, 2005).

Knowing how to manage and develop the managerial competencies of their employees becomes, therefore, a strategic objective for organisations, key to their differentiation. Renouncing this competence because of a gender question can be manifestly unprofitable. Nevertheless, putting women into managerial positions just because they are women, without them having suitable competencies compared to other candidates, may result in the same situation.

It seems necessary, therefore, to identify a strategy that should guide the behaviour of an organisation that intends to select and maintain the managerial talent of its employees as a strategic resource without gender criteria being able to bias decision-making one way or another.

The measures proposed below require close collaboration between the functions of strategic planning, human resources and organisation. Without this coordination, as well as the commitment of management to the objective of equality of opportunity, it will not be possible to change the conduct identified in the above analysis as causing the glass ceiling effect.

4.1. Strategic Planning

A firm's business plan is firmly in the sights of partners, investors, creditors and public organisations involved in its going into operation. The fulfilment of each and every one of the declared objectives adequately and in time allows a firm to gain the necessary credibility to stimulate its growth.

For this reason, the management of a company should embody the distribution of tasks to be carried out in the organisational structure. To do so the following is necessary:

A. *A clear definition of the functional and professional job profile of the management positions.* In order to do so the system of assessment of factors and competencies (Orue-Echevarría, J., 2004; Fernández-Ríos, M., 1995) allows the most relevant functions of each position to be identified, as well as the professional qualities required to carry them out successfully. Only when gender is a relevant aspect to be considered in each of these profiles would it be licit to include it as a criterion in the selection of management.

B. *A distribution of objectives through the organisational structure,* which implies a hierarchical distribution related to the level of responsibility (objectives of the company, the area, individuals), as well as a distribution of functions that is coherent with the basis of groupings in the organisational structure (intra-functional objectives, inter-functional objectives). The weighting of objectives within the process of managing performance allows the degree of commitment of every professional to be assessed at the various levels of objectives. Nevertheless, it is the responsibility of management to define the *goals grid* to be accomplished, that will allow the work of the organisation to be aligned with the fulfillment of the objectives in its Business Plan. Ambiguity in responsibilities combined with a changing situation and an organisational structure that is not well-defined are often features that favour biased and opportunistic behaviour, more concerned with individual interests than the accomplishment of business objectives. It

is in this context that bias can appear in the selection of management for gender reasons, and endogenous behaviour that tends to eject women from the management team just because they are women.

When defining a strategic process of introducing human resources practices, we have considered the starting point to be the classification hierarchy of Wright and Gardner (2003), that differentiates four levels: (1) guiding principles (2) alternative policies (different practices), (3) products (competencies or behaviour that stimulates practice, and (4) processes of putting into practice (effectiveness in the execution of the practices). It is considered that while some practices such as payment for performance, or selection by competence, could be universally effective, this effectiveness does not really come from the practice itself, but from the *fit* between practice and the result obtained (for example, a salary increase for a good performance level or the selection of suitable professionals in relation to a specific strategy).

The description of management profiles and strategic objectives allows a system of management by competencies to be put in action that will serve as a connecting theme for the measures tending to identify and maintain management talent in the organisation.

4.2. Recruitment and Selection Measures

Considering the non-existence of significant differences in management competencies in organisations because of gender, and taking into account that competence in management is related to matters such as knowledge of administration, communication and negotiation abilities, leadership, previous executive experience and a network of contacts, the following are put forward as *selection criteria* for candidates for management posts.

- *A blind review of merits.* This means the consideration of the curriculum value of the candidates without having any information about their gender.
- *The above assessment of competence connected with systems for managing performance*. In order to do this it will be necessary to design tests specifically directed towards assessing, on a predefined scale, the performance of candidates in solving management problems. Strategic problem simulators allow a complete set of parameters of reasoning to be assessed, at the same time avoiding the assessor's bias. This will make it possible to avoid decisions influenced by personal or cultural factors connected with perception of the gender of the candidate.

4.3. Management Coaching System

One of the reasons identified in the above diagnosis as causing the greater leaving rate of female managers was lack of support from the previous management group. To avoid this situation resulting in organisational behaviour in which the group expels the marginal member, or that this member gives up because of lack of support from equals, *a coaching or tutorial system is proposed that encourages managers to stay*, regardless of their gender, as long as the objective assessment of professional performance advises that they remain.

To do this, managers should have a high level of dynamic vision of the organisational scene in which they carry out their work (Table 10).

The perception of self-efficacy is conditioned by expectancy of control over reinforcements (Rotter, 1966). These expectancies reflect belief in one's own responsibility for the consequences of behaviour, and are influenced, one the one hand, by intellectual and social capabilities and resources, under internal control, and on the other by external reinforcement coming from the

Table 10. Adapted from Lewin's Force Field Analysis

Driving forces		Resisting forces
People	→	People
Economic benefits	←	Traditions / previous culture
Situation in the environment	→	Organisational policies
Wants and needs of the management	←	Attitudes of the management team
Availability of technology and tools	?	Costs

perceptions of managerial efficacy that third parties transmit.

The perception of self-efficacy similarly conditions expectancies of results (Bandura, 1986). These refer to the beliefs that, in this case, women managers and junior managers may have about the probability that specific results will be the consequence of controllable behaviour.

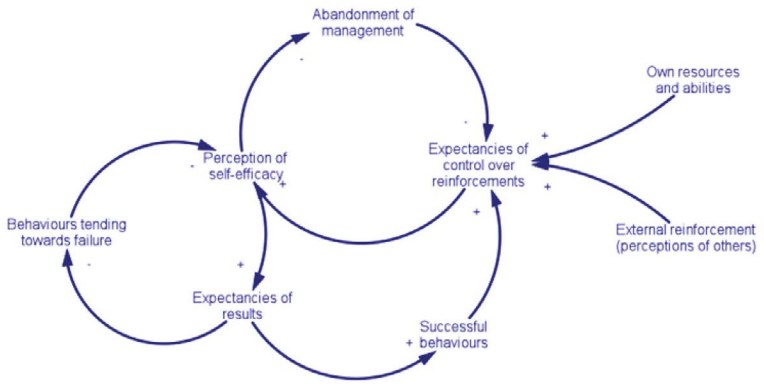
Taking these relationships into account, we have identified three behavioural loops which allow in depth analysis of how self-exclusion works as a barrier to the promotion of women managers.

A. *Prior deterrent loop:* The perception of others, biased by gender stereotypes, lessens the effect of the value of the resources and abilities of women hoping to access managerial positions, lowering their expectancies of control over reinforcements. This reduces their perception of self-efficacy, resulting in abandonment of their promotion to manager, even before this happens.

B. *Positive behavioural loop:* The reduction of the belief in their responsibility for the consequences of their behaviour (expectancies of control over reinforcements) reduces female managers' perception of self-efficacy. This causes a lowering of expectancies of results and reduces those behaviours tending towards achieving managerial success. This situation reinforces the lowering of expectancies of control over reinforcements, creating a dynamic of managerial paralysis (lack of proactive behaviour in the absence of perception of the behaviour-results connection).

C. *Negative behavioural loop:* Reduction of female managers' perception of self-efficacy causes a lowering of expectancies of results which, by contrast, may set in motion be-

Figure 4.Causal diagram of managerial self-exclusion (source: made on the premises)



haviours tending towards failure, motivated by stress, poor assessment of alternatives or those motivated by personal interests. All of this creates a negative dynamic which reinforces the reduction of female managers' perception of self-efficacy and may cause abandonment of the position of responsibility.

The proposed analysis suggests a dynamic which is difficult to change. The majority of measures proposed by the Government focus on providing management training for women and establishing quota systems for female representation in positions of responsibility within organisations. Measures which, whilst they contribute in part to altering the current situation, do not contribute to changing the underlying causes for the psychological and social barriers which prevent the smooth promotion of female talent in organisations.

The coaching measure proposed is directed towards encouraging greater external reinforcement of the work of pre-selected female managers. This support, aligned with their own managerial competencies, may influence expectancies of control over reinforcements, activating successful behaviour and avoiding leaving motivated by a perception of low self-efficacy.

5. CONCLUSION

In recent years we have seen the proliferation of legal regulations -national and international- directed towards introducing equality of opportunity between men and women. Simultaneously, awareness and social pressure have been increasing in this regard. Nevertheless, the situation of women in the labour market continues to be of concern: less activity, higher unemployment rate, imbalances in levels of entry, salary and managers.

In Spain, Organic Law 3/2007, on the effective equality of men and women, attempts to ameliorate this situation, completely or in part. This law represents a challenge for many organisations. Among the several obligations that the introduction of this law brings with it figures the requirement to draw up an equality plan in firms of more than 250 workers, which will probably before long be extended to the rest of firms.

All together, the greatest challenge that the law creates is the negative collateral effects in the workforce, above all in groups not benefitted by the measures. We have seen that there is a low level of acceptance of positive discrimination measures, above all among men. We also detect that the perception arises among men that their situation is being impinged on to the benefit of women. Conflicts will appear in justice, legitimacy and authority. Women, for their part, may find themselves with problems of self-perception of their capability, getting to the point of excluding themselves from the possibility of benefitting from these measures.

This situation means bad use of managerial talent in the heart of organisations. If in principle business efficiency requires the best use possible to be made of resources, that is to say to always use the "most suitable" resource, applying this to the specific case of human resources implies allocating *the most suitable person* to a post with regard to different attributes (training, work record, productivity, specific knowledge, contribution to results, etc.) that make a person most suitable, independently of their gender.

In this chapter we have analysed the dynamics of business behaviour that allows it to be understood why the situation of inequality of women managers for gender reasons persists in spite of the positive discrimination measures recommended by the legislative framework in force. This analysis has allowed proposals for measures to be drawn up to be taken into account in designing human resources strategies, based on systems of management by competencies and assessment of managerial performance.

From the proposed approach, these measures, adapted to the needs and conditions of each organisation, will allow the orientation of decision-making towards the criterion of efficiency based on exploiting the managerial talent of professionals who work in an organisation, independently of whether this talent is masculine or feminine.

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ENDNOTES

[1] Law 3/2007 does not directly mention quotas, but the principle of "balanced presence" (First Additional Provision), according to which a 60-40 (maximum) percent distribution between the sexes should be respected at each organisational level.

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Chapter 58
Listening and Leadership

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ABSTRACT

This era is both characterized by continually evolving and changing market conditions and the relevance of knowledge to adapt to the new environment.

In this chapter, the authors will focus on three ideas: the connection between the company results and the leader's listening skills; people as the firm's most valuable resource; and therefore, internal communication as the key for success and full potential of the company. However, the survey concludes that internal communication is scarce and not always effective since one way communication seems to be the most common form of interaction, even though leaders know the importance and value of their human resources.

INTRODUCTION

In the era that we live in, where the market conditions are continually evolving and changing, and organizations are struggling to adapt to the new conditions, leaders must understand that what they really manage in an organization is people. House (2004) defines leadership as "the ability of an individual to influence, motivate and enable others to contribute toward the effectiveness and success of the organizations of which they are members", The DePree´s (1992) idea of leadership, a position of servant hood, compliments with Drunker (1992) observation that the Japanese leader recognizes that rank does not confer privileges but rank entails responsibility. For Nelda Spinks and Barron Wells (1995) to make people feel as though they are accomplishing something and not just "putting time", a leader must work with people and not against them. Leaders must understand that people are the most important components in an organization and that having

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an effective communication with them is key to enhance performance. But reality seems to be different since leaders do not put in practice, during their daily interactions, the elements that make good communication possible. Trusting and open environments are the exception in an overall organization's atmosphere characterized by judgment, interruptions, and misunderstanding of people's needs.

LITERATURE REVIEW

The Key Leadership Skill

Communication is the most important skill a leader must possess; since it occupies 70 to 90 per cent of his/her time (Mintzberg 1973, Ecles & Nohria, 1991). If that same study were done today including e-mail, cell phones, and text messaging, the percentages yielded would be even higher. The total amount of time managers dedicate to communicate emphasizes the importance of having strong communication skills to advance to leadership positions. Mastering leadership communication should be a priority for managers wanting their organizations to consider them as leaders (Deborah J. Barrett, 2006). Without effective communication, a manager accomplishes little. Without effective communication a manager is not an effective leader, and through effective communication, a leader leads.

Communication is the transmission of meaning from one person to another or to a group of people, whether verbally or non verbally. Leaders must pay attention to four elements to become effective communicators: the sender, the medium or channel, the receiver and the context (Figure 1).

This triangle shows what would be an ideal and simple communication process without miscommunications or misunderstandings. The person, who sends the message, understands the audience (receiver) and the context, selects the most appropriate medium and sends a clear message. On the other hand, the person who receives it understands the message as the sender intended. But in reality, communication resembles some variations, as in Figure 2 (Barret, 2006).

The complication in communication comes from the interruptions or interferences in that transmission, whether the sender causes them or the receiver. Leadership communication necessitates anticipating all interruptions and interferences through audience analysis and then developing a communication strategy that controls the

Figure 1. Ideal and simple communication process (Source: Own elaboration)

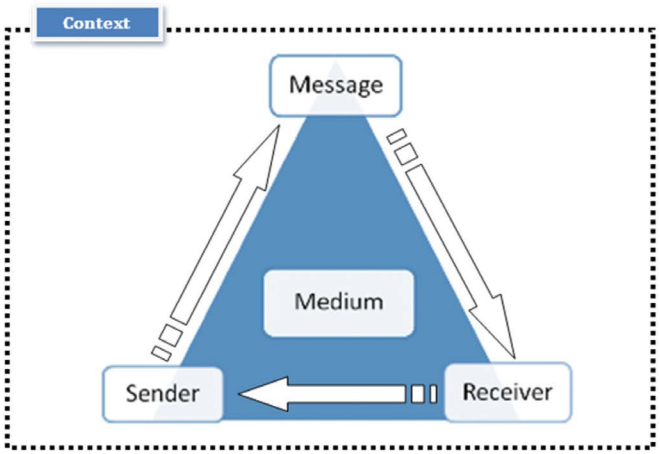
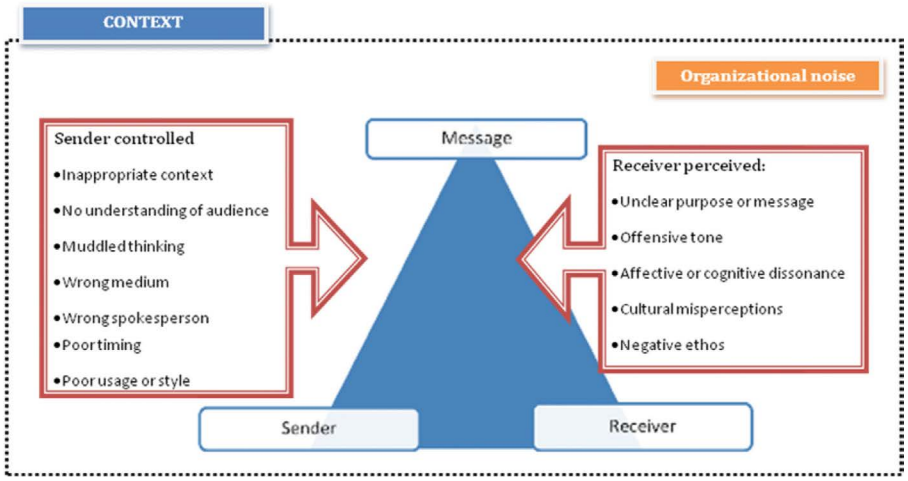


Figure 2. Real and complex communication process (Source: Barret, 2006)



rhetorical situation and facilitates the effective transmission of the message.

The purpose of the sender is to communicate a thought or idea formulated within their mind. Even though he or she clearly sees the idea, factors like the sender's current frame of mind, level of communication skills or familiarity with the receiver influence the communication outcome.

A channel of communication is selected, whichever written or oral. Written communication is exposed to different interpretations of symbols and words, and to poor production. Even though the clarity of the written message, it can be neglected or ignored because of improper spelling/grammar skills, the incorrect format or inappropriate length. In the same way, oral communication is vulnerable to poor listening or distracting voice. To gain effectiveness, the sender must consider the velocity, the tone and the body language used during the communication process. It is mandatory for the messenger to read the receiver's body language to evaluate the degree of understanding. Once the message arrives to the receiver, it is submitted to physical and emotional conditions, predetermined notions and different levels of receptivity.

New Communication Environment

In the past, interactions between individuals used to be face-to-face. Today, an ever-increasing number of encounters are mediated by technology. This new way of interacting involves different types and levels of risk, and they are only possible if users trust each other and the systems they use to communicate. As Checkland (1999) pointed out, any technical system that is brought to an organization can only work efficiently as part of a larger socio-technical system, i.e., the organization and its human actors. Some authors claim that the benefits associated with the implementation of new technology in organizations fail to yield the expected increases in productivity because of its inability to build social capital (Launder, 1996; Resnick 2002). Trust can be formed by informal exchanges, but if new technology contributes to make these exchanges archaic though mechanization, trust could be unavailable when it is required. Interactions that used to be face-to-face and based on long-established personal relationships are now carried out over distance by automated systems, a process called dis-embedding (Giddens, 1990). From this point of view, conducting more interactions using new technology rather than face-to-face

can deprive leaders of opportunities to build trust. To evaluate the potential of new technologies for enabling new forms of interaction without considering these undesirable consequences, trust and the conditions that influence it, can undermine the opportunities for development.

A clear and extreme example of a new form of professional interaction is working at home. The benefits from teleworking programs, understood as any work agreement in which employees can work at any time or place, and can perform their tasks in an effective and efficient way, are not as easy as they might seem. Successful teleworking programs require, according to Chaudron (1995), the "right employee", "the right job" and "the right reasons":

- Employees whose personal traits will be suitable for teleworking.
- Jobs involving individual versus team contributions
- Management teams who do not just view teleworking as a benefit for their employees but also as an opportunity to enhance productivity.

Baruch and Nicholson (1997) research study reveals that ninety four percent of sampled teleworkers declared they wish to continue working at home, but less than ten per cent affirmed a desire to continue on that situation for the rest of their working lives. These results show the inner conflict experienced by the at-home worker. Anxiety, communication gaps, isolation, guilt, negative spillover between family life and work and reduced productivity are some of the feelings they can experience.

Participants at an ACM forum (1995) declared that teleworking does not facilitate the social and professional interaction of the employee, killing his/her most human quality. At-home workers, can feel left out of interactions from office rumors to changes in company procedures, activities or policies. On the other hand, managers and at-home workers who are part of a program to interact informally, develop interpersonal organizational networks and create synergistic relationships have shown reduced feelings of isolation (Kurland and Cooper, 2002).

Huws (1984) identified in his survey that 60 per cent of respondents felt isolation as the major disadvantage of working at home. This physical separation reduces not only the amount of feedback that teleworkers receive from clients, supervisors or coworkers, but also reduces its quality because the non-visual communication reduces the nonverbal cues (Norman et al., 1995). Hamilton (1987) stated that at-home workers miss the motivation of exchanging experiences and ideas with colleges

As it happens in the in office environment, the out-of-office one also needs good communication between managers and workers to maintain business and personal relationships and to accomplish tasks. But in the out-of-office environment communication channels are mostly electronic, document handling and e-mail being the most commonly used communication methods.

In Weiner and Hill (1995) qualitative study findings, the negative influence that at-home workers had on peer interaction and communication with managers and coworkers contrasts with the view of organizations as social systems whose basic structure is made of relationships among individuals (Fritz, Narasimhan and Rhee, 1998). Employees sharing the same physical location develop alliances, learn through communication and foster creativity through communication with coworkers through casual encounters around the coffee machine and elsewhere (Allen, 1977) Kraut et. Al. (1998) study showed that using e-mail to socialize was positively related to social isolation, depression and loneliness, indicating that e-mail is not as good communication channel as it is face-to-face. Weick (1987) suggests in his research that face-to-face or organic systems involve more managerial information, two way communication and advice rather than instructions, decisions and orders than electronic or mechanical systems. A

leadership style closer to consultation than command (Courtright, Fairhurst and Rogers, 1989).

Communication and Leadership

Geneen (1984) identified in his study that good leadership, which inspires people to excel, contributes as much as 80 – 90 per cent of organization's success. In the opinion of Wells B. (1992) this leadership can only be exercised through quality communication. As DePress (1992) explained, quality communication is the avenue by which leaders clarify their visions and foster participative management within the organization. In this context, Bennis (1989) determined that leaders are people who are able to express themselves fully. They know what they want, why they want it and more important, how to communicate what they want to others to gain co-operation and support. In the words of Tracy Goss (1996) "language is the only leverage for changing the context of the world around you. This is because people apprehend and construct reality through the way they speak and listen". Robert Bolton (1998) expressed, it is how we manage our conversations and have a discipline about conversations that we can achieve change and transformation in organizations and consequently the achievement of breakthrough results.

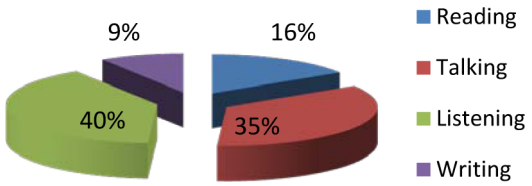
The fast and efficient exchange of information is undeniably a competitive advantage in business. And for communication to be effective, everyone must be up to date. A balance flow of information reduces the frequency of misunderstandings and limits expensive mistakes. Employees feel a greater sense of connection with their supervisor and co-workers. They are able to adapt to changes more rapidly and they can offer targeted insights, ideas and perspectives. As a result, supervisors and staff work smarter, not just harder. The effect of quality information flows on quality performance (Forza 1995). Management practices are information and people dependent despite all the technological advances of our time. Organizations are still managed and operated by people and it is their knowledge and skills what determines success (Teresa Brannick et al., 2002). But unfortunately, in the rush to adapt to market needs, many organizations sacrifice effective communication. As priorities shift, executives may impart only the immediate goals and fail to share the rational and strategies behind them (Max Messmer, 2004). Managers must be so focused on results that they neglect to praise and reward their staff. And most of all, they may forget that communication is a two way exchange, one part dialogue, one part listening.

Poor communication is today's number one problem at work, at home and in the work place. People communicate through a set of filters shaped by history, sense of identity, beliefs about what is true, and values about what is right, as well as perceptions and interpretations of what is going on. When someone else communicates with us, we squeeze the message through our own personal filtering system to understand (Shelle, R. Ch., 1995). Every person has a certain number of filters by which they let in certain parts of the real world.

The Role of Listening

Leadership communication uses a full range of communication skills and resources to overcome interferences and to create and deliver messages that guide, direct, motivate or inspire others to action. It is estimated that leaders dedicate as much as 45 per cent of his/her communication time in the form of listening. For Burley Allen (1995) communication breaks down as in Figure 3.

Figure 3. Communication skills and resources (Source: Burley Allen, 1995)



Even though the importance of listening, few individuals are trained in the development of listening skills. Leadership and decision making are as much the art of listening as they are the art of doing (James T. Scarnati (1998). We tend to assume that listening is basically the same as hearing, leading us to believe that effective listening is instinctive. People must seek first to understand, and then to be understood (Covey, 1989).

The word listening comes from the Middle English word *listnen*, which derives from Old English *hlysnan* (Hlud means loud), which simply refers to paying attention to sound. In present literature, listening entails a more refined definition: listening is an in-depth process beyond hearing (Shoho, Woods and Smith, 2006). Webster's dictionary (Agnes 2003) defined listening as to make a conscious decision to hear. For the International Listening Association (ILA) listening is "the process of receiving, constructing meaning from, and responding to spoken and/or nonverbal massages" (Emmert, 1996,p.2) Burley – Allen (1995) and Bakhtin (1993) consider listening as a process that entails a sophisticated mental model that requires discipline and energy. Bakhtin (1993) considered that every word in a conversation replies to another word. Spears (1995) described listening as the active recognition and acceptance of employees´ ideas, opinions and suggestions. Bass and Avolio (1994) described it as the leader's motivation to entertain even the most eccentric ideas from followers, noting that this behaviour enhances follower's commitment. Bechler and Johnson (1995) came across with the relationship between leadership effectiveness and listening skills and with the strong positive connection between leadership emergency and listening skills (Johnson and Bechler, 1998). Kramer (1997) tested interpersonal skills and discovered a link between transformational leadership effectiveness and listening.

But it was not until the work of Ralph Nichols that listening was considered a study focus as an element of verbal communication. Lewis and Nichols published in 1954 a guide to effective verbal communication emphasizing the relevance of listening in becoming an effective speaker. In 1957, Nichols co-authored the book *Are You Listening?* The first book dedicated to listening. Shortly, business people and scholars became interested in Nichols´ work as the significance of communication between subordinates and supervisors became more apparent (Orick, 2002).

After Nichols´ work various factors have been linked to the concept of listening. Brandt, Emmert and Emmert (1992) discussed in their work six specific elements of listening, as shown in Figure 4.

And adopted these variables to develop the Listening Practices Feedback Report (LPFR). In their work, 860 people representing 22 firms in a variety of industries and business participated in the study. The survey asked them to make a list with the names of three colleges they considered to be good listeners and another list with the names of three people they considered to be poor listeners. The participants were also asked to write five habits or qualities they will use to identify an effective listener and five more to describe a poor one. Even though there was not a major difference between the group of good listeners and the group

Figure 4. Six specific elements of listening (Emmert and Emmert, 1992)



of poor ones, the attained results were used to group specific characteristics into general concepts (open mind, empathy, memory, attention, respect, and response) to develop the LPFR.

Open mind refers, according to Brandt Management Group (1999), to be free from personal biases. It is considering logic and content and it is not being critical of appearance, vocabulary, delivery, etc.; it is about not becoming defensive or emotional when confronting a difficult situation, keeping an proper balance between listening and talking; and staying away from emotion-packed clichés, phrases or words (Brandt Management Group, 1999).

Attention describes the use of the listener's body, eyes and face to show the speaker that he or she is the most important thing occurring at that specific moment (McEwan, 2003). It entails the listener's non verbal communication as well as the degree the listener creates a private listening environment (McKewan, 2003).

Empathy refers, according to Covey (1989), to a person desiring to understand what the other person feels and thinks. It is the person's willingness to understand the paradigms of the other person although it is different from his or hers. It involves seeing the word from the other person's ayes and willingly being in the other person's shoes. Covey (1989) believed that empathy was key to find a common ground and to create a productive relationship. For the Brandt Management Group (1999) a person demonstrates empathy by summarizing, paraphrasing, or repeating the comments of the other person in order to ensure understanding by the listener, by giving confidence to others to give their views on subjects under discussion as well as reflecting on the subject under discussion before responding, and by putting oneself in the speaker's situation and understanding their feelings and concerns.

Memory is related to the result of listening. Good listening produces an outcome aligned and consistent with the guidelines or instructions agreed ahead, the precisely remembered comments and the notes taken when appropriate (Brandt Management Group, 1999).

Respect can be measured in numerous ways. It can be seen as the ability to be confident and listen honestly without just going through the actions. Respect can be articulated by having patience during a conversation and recognizing others´ ideas and words in spite of economic, business or social status (Brandt Management Group, 1999)

Response is related to the listener's reaction. A good response happens when the listeners ask relevant questions for clarification of points that are misunderstood or technical. Response also refers to the appropriateness of verbal and non verbal replies, such as facial expressions or nodding (Brandt Management Group, 1999).

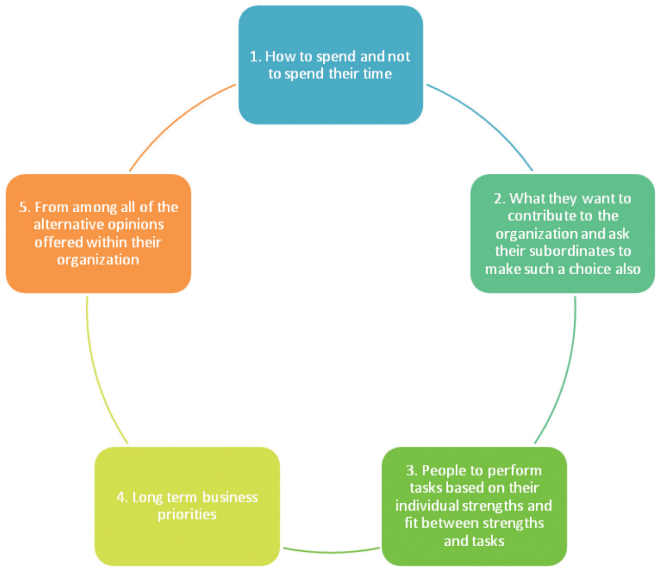
The question that can arise at this moment is "Why should leaders listen to their people?" Osterman (1993) indicated that Covey (1989) could have answered this question when he settled that "the greatest need of a human being is psychological survival-to be understood, to be affirmed, to be validated and to be appreciated" (p.241) Listening carefully to another person gives "psychological air" to him/her. And it is only when this need is satisfied when the leader can focus his/her attention on problem solving or influencing.

Bennis (1997) talked about the four characteristics that people look for in their leaders:

- Sense of trust,
- Sense of purpose,
- Optimism and
- The capacity to achieve results

"One of the best ways to build trust is by listening. It is the most powerful dynamic of human interaction when people feel that they are being heard. Listening does not mean agreeing, but it does mean having the empathetic reach to understand one another" (p. 75).

Figure 5. Listening effectiveness model (Source: Peter Druker 2002)



In Peter Druker's effectiveness model (2002) executives must carefully choose (as illustrated in Figure 5).

The model relies on the listening abilities of the leaders, especially steps one, two and five. Listening is required during step one to understand the employees´ plans and improvements to avoid control of everything, therefore annulling step one. Druker's conviction that organization effectiveness depends on subordinate's contribution is emphasized in step two. It is only when subordinates and managers express their contributions that everyone feels ownership and a role in the organization effectiveness. The importance of searching for views and questioning about the basis for these opinions to make decisions and put plans into action is emphasized in step five as opposed to the alternative of centring the evolution on pre-arranged ideas. It requires listening with genuine curiosity to persuade others to voice and sustain their opinions, instead of just setting forth proposals hoping form a general agreement.

For Kouzes and Posner (1987) pioneer leaders feel comfortable jumping into the unknown. They identified five common practices to successful leaders, shown in Figure 6.

They emphasize, in these five leadership practices, the power of encouragement, and noted that encouragement is achieved through listening and recognition.

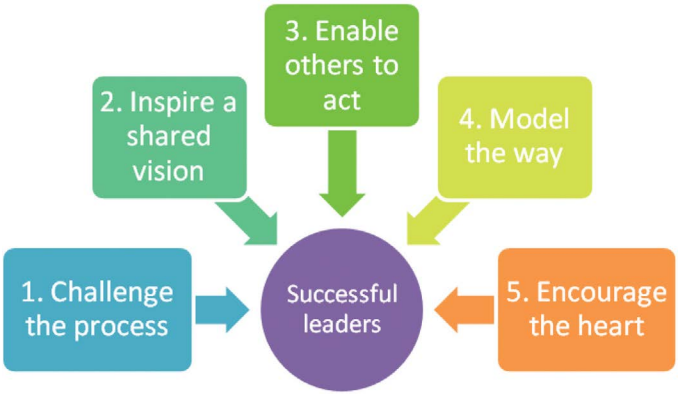
On the other hand, Burley Allen (1995) mentioned the consequences of not developing listening skills:

- Individuals create unnecessary problems for themselves.
- Misunderstandings.
- Hurt feelings.
- Confused instructions.
- Loss of important information.
- Embarrassment
- Frustration

Listening is a potent force for reducing stress and tension, since true listening builds (Burley Allen, 1995):

- Team work
- Trust
- A sense of belonging to a group

Figure 6. Five leadership practices (Kouzes and Posner, 1987)



When people know they are talking to a listener instead of someone who sits in judgement, they openly suggest ideas and share thoughts. The listener has an opportunity to respond to the person's concerns and needs that otherwise might have gone unnoticed. Factors such as the information not sounding good, not making sense or not ringing true act as filters because they are the result of values and past experiences. These filters result in a closed mind. Listeners with closed minds focus on (Burley Allen, 1995):

- Disagreeing.
- What is not right
- What is wrong

This negative process can be discouraging for the talker. A listening barrier exists when someone hears what he wants to hear, not what is really communicated. The James T. Scarnati (1998) formula: open your mind, your ears, your eyes, and your heart while closing your mouth is a winning combination for listening.

Many people are poor listeners, because listening is difficult and because it is usually more satisfying to be on the offensive. Listening in fact is often more tiring than talking. It demands intellect effort. The average person speaks at rate of 150 words per minute, whereas humans have the capacity to listen at the rate of over 1.000 words per minute (Robins 1989). This leaves a mental deficit equivalent to a "distraction zone" of about 850 words per minute. Be a productive listener takes a great deal of mental effort. Successful leader will have not the loudest voice but the reediest ear (Bennis 1993).

Active Listening

Active listening provides a climate for decision making that can best impact strategic change. Nothing will kill genuine dialogue and the motivation to pursue new initiatives faster than a senior manager who is unwilling to listen and who demonstrates little patience or respect for what people have learned and the knowledge they want to transfer. Active listening by top management is a catalyst for change because It overcomes some of the distance created by the authority they hold (Kenneth J. Hatten and Stephen R. Rosenthal 2000). Leaders who practice active listening sign a genuinely open door, and demonstrate care and respect for those doing the talking.

In mastering the role of leadership, leaders must discern between behaviour modification and attitude modification. Behaviour modification implies that people change their outward action, while their attitudes, beliefs, feelings and opinions remain the same. On the other hand, attitude modification implies that followers change their

inward thinking hence, their attitudes, feelings, and opinions are brought into line with those of the leader. In opinion of Wells B. (1992) attitude modification is more important.

Another element to take into consideration is the managers´ general assumption that all they are supposed to do is to issue directives and to make decisions. As Sayles (1979) points out, managers often do not know how to react when they encounter a situation that requires endurance, patience, spontaneous compromises continuous interactions and negotiation. Just because executives know their aspirations does not mean that they know how to attain them. Managers have, within themselves, the ideas, capacity and vision to become more effective and to accomplish their goals. However, because most directors need the support and assistance of other people to accomplish their objectives, they need to learn what to do in order to motivate others to perform relentless tasks. In this context, the charismatic and transformational approaches are ideal for innovating, initiating, or energizing others´ behaviour, but fail for directing and maintaining their behaviours.

Leaders responsible for maintaining performance on a day-to-day basis have to pay attention to how they interact with their followers. Letting people occasionally know what they liked or disliked about their jobs and frequently communicating, in a casual way, their impressions about their performance through the day make followers aware of how leaders perceive and value their performance and understand different ways to improve it. The managers´ agreements and disagreements resulting from their observation of the followers' performance can be called performance consequences. These consequences provoke a manager's response that is succeeded by a follower reaction:

- *Positive contingent consequences:* The manager compliments followers for an outstanding job.
- *Positive non-contingent consequences:* The manager praises followers when they did poorly and well.
- *Negative contingent consequences:* The manager reprimands followers when their performance was bellow the standard.
- *Negative non-contingent consequences:* The manager makes followers accountable for things over which they had no control.

Collaborators were more satisfied with their managers when they felt that contingent consequences were delivered by their supervisors. The majority of the problems are not based on peoples´ insincerity, but because they seem to be insincere. So, in some cases, it is not a question of content, but a question of style; and in others, it is about a manager who does not have or know the information on which to support a sound judgement, even a positive one.

Another important aspect is the frequency of managers' acquisition and communication of information.

To avoid non-contingent consequences, managers must pay attention to the quantity and quality of their information gathering efforts. Frequently monitoring performance provides natural opportunities to provide consequences on a daily basis. Landy, Barness and Murphy (1978) found, after surveying employees of a large manufacturing organization, three aspects connected to the employees´ attitudes about the accuracy and equity of their evaluations:

- The supervisor's frequency of appraisals
- The supervisor's communication of the goals that the employee should try to attain in order to eliminate weaknesses
- The superior's knowledge of employee's level of performance and job duties.

Monitoring and consequences are two important elements to improve and sustain performance. Effective managers collect information about how

their workers were doing and, who, based on this monitoring, present consequence that shows that bosses know what is going on. This back and forth information exchange must be an interactive process performed together by managers and workers in a sort of communication symphony. Even though their melody does not always sound pretty and peaceful, it is "in tune" in the sense that participants listen to each other.

FINDINGS

Communication is the most important skill in life since the ability to communicate well is critical for effectiveness. Having a clear vision and good communication skills are critical to becoming a successful leader since they are the only tools available to interact with the team members in order to understand their personal needs, values, objectives and intentions, to align them with the vision of the firm and to create a powerful team spirit.

Poor communication is today's number one problem. 59 per cent of the people participating in the study claim that communication in their work place is tense, disorganised, non-directional, and insufficient. When asked what they understand by communication, 42 per cent of them consider it as a one way process used to transfer information from one person to another. Since two monologues do not make a dialogue, perceiving communication as alternating monologues is a big problem. Communication suffers when the parties involved focus their attention on what to say, how to say it and how to communicate it better, because the speaker focuses his/her attention to achieve his/her conversation goals and forgets the other end of the message. For communication to exist, the receiver has to interpret and to understand the sender's message in the same way the sender intended it.

Leaders must understand that when communicating, people see things not as they are but as they perceive them to be. The communication process is complex and it is vital to have a clear understanding of it if a person wants to succeed.

For communication to be completed the receiver must understand the message and the sender must be sure that it happens. It seems it is an exception since more than 40 per cent of respondents described communication in their work place as a one way process. The Neuro-Linguistic Programming (NLP) presupposition of communication is that the meaning of communication is the response one gets. The response a person gets gives him/her valuable points about what to do next. People know if their message has been properly received by two way communication or feedback. It is surprising that more than 60 per cent of survey respondents understand feedback as something to be given not as something that is part of the communication process. The purpose of feedback is to understand the impact that the message causes on the other person in order to change or adapt it so the new message is better understood and communication can succeed. Communication is an exchange, not just an emission. All parties must participate to complete the information exchange.

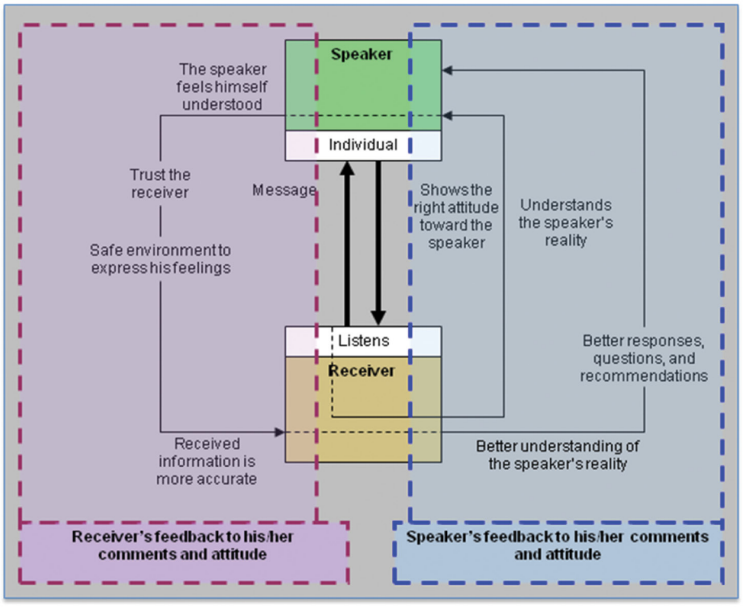
People in business organisations must communicate clearly if they want to reach their basic purpose, to make a profit. Successful communication is based on the ability of practicing the act of listening. This "simple" act of listening to each other opens the door to connection, understanding and transformation and improves the individual's conversation capabilities. When two people are truly listening to each other they are not only present but also they are present to something beyond their individual selves. It is what James E. Sullivan defines as the "*dying the self*" and describes as the giving up, at least temporarily, of the individual point of view. This exercise requires putting individual perceptions aside for a moment in order to be present in the world of the other. It is to see what the other person sees,

and to feel what the other person feels. It is this type of conversation that can transform a firm.

The reality shown in the survey indicates that people are constantly interrupting each other in order to make a point or convince someone to do something, since more than 60 percent of respondents did not feel respected or understood during the communication process. When speaking, people hear what they already know but when they listen they may learn something new. For a conversation to be effective participants can disagree among themselves but they must be able to see, respect and understand the other person's point of view. When listening to somebody it is essential to fully understand the other person's perspective. The listening process has to start with an attitude that presumes that the other part has sound reasons for why they are saying what they are saying. From the understanding of the topic it could be possible to reflect the importance of active listening in the Figure 7.

For communication to exist, someone, the speaker, must be willing to communicate something to someone, the receiver. In order for this process to be effective, the listener must be receptive to what is going to be communicated by showing some respect towards the speaker. The survey reveals that more than 80 per cent of respondents have regular bad communication experiences when communicating with their superiors, a circumstance that sure influence their approach in future conversations and that sure contribute to destroy the ground for a good communication process. On the other hand, a positive attitude, allows the listener to better understand not only the message but also the feelings involved in the message. The speaker's perception of this positive attitude of the receiver will make him/her feel comfortable and safe and will make him/her willing to go deeper into his/her thoughts and feelings. This circumstance will provide the receiver more and better information about the message formerly presented. The result of this circular process is not only a better understanding of the idea and feelings expressed by the speaker and a better recommendation given by the receiver but also the start of a long term trusting relationship. It is remarkable that 44 of the sur-

Figure 7. Importance of active listening (Source: Own elaboration)



veyed people felt interrupted, not listened, inferior and not comfortable when speaking with their superiors. The result of that is a low quality relationship and trust between them. The employees´ level of commitment and motivation decreases, dissatisfaction appears and staff turnover rises. The end result will be a company with a personnel working as individuals not as a team.

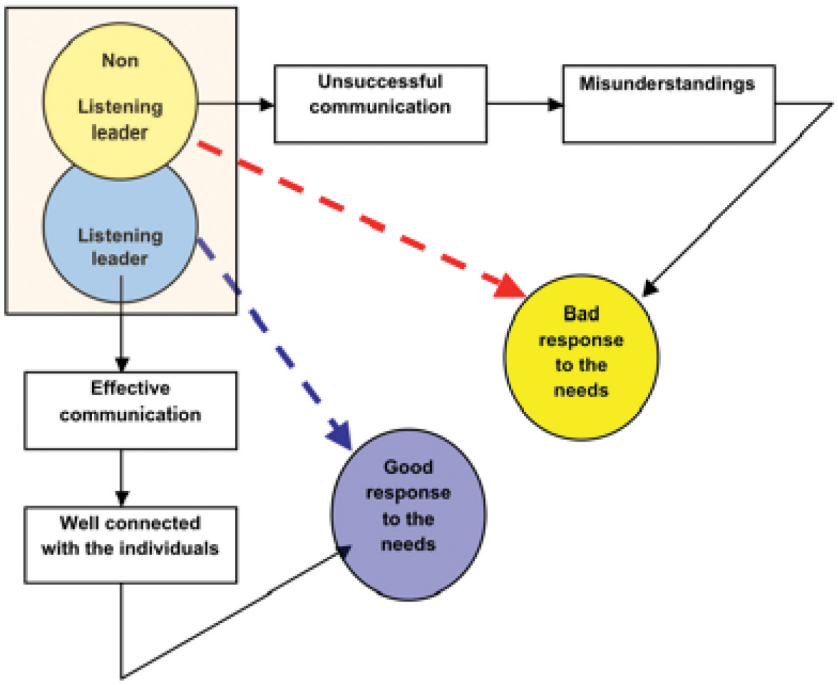
From the findings it is possible to graphically describe the result of a leader interaction depending on his/her listening skills as in Figure 8.

Having good listening skills is connected with having good interpersonal communication which facilitates professional growth. The better understanding derived from good listening skills avoids misunderstandings, hurt feelings, confused instructions, loss of important information, embarrassment and frustration, and facilitates career satisfaction. When people realise that they are in front of someone who listens instead of someone who judges, they openly share thoughts and suggest ideas. Listening leaders have the opportunity to respond to the follower's needs and concerns that otherwise might have gone unnoticed. The principle behind this is "the better the understanding, the better the response". But this principle is far from being present in the surveyed firms since more than 40 per cent of respondents claim that the communication with their superiors is a one way process.

The survey gives the idea that managers are inclined to show power by demonstrating that they know everything. They believe listening is not needed and they share the thought that if they are not talking they are not leading. The consequence of this behaviour is managers blocking openness to new ideas and concepts. Since new perspectives and ideas are not needed, why listening? Richard de Vos, chairman of the Orlando Magic NBA franchise, gives a good answer to this question:

"Listening provides the foundation of productive human reaction without which society cannot function. If we do not listen to each other, we cannot

Figure 8. Leader interaction depending on listening skills (Source: Own elaboration)



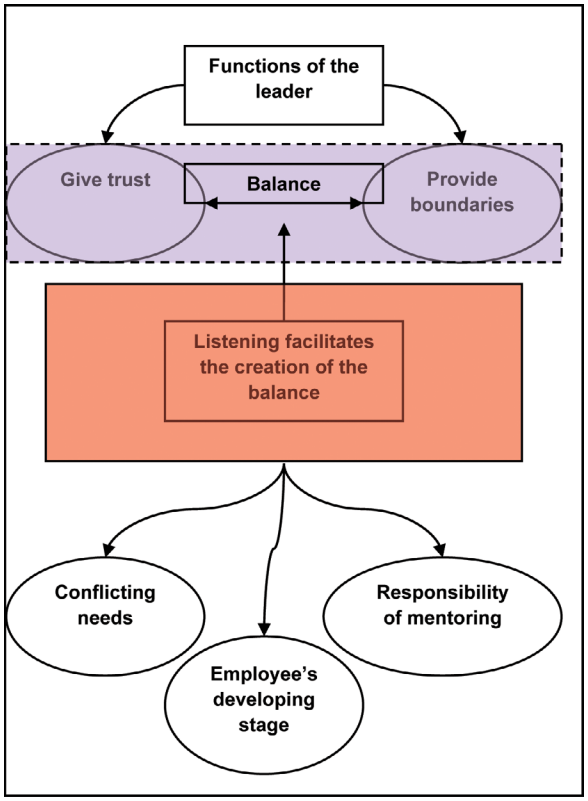
learn from each other. Listening is a vital skill. It is specially important in view of the enormous amount of information and misinformation that is exchanged in today's world"

Information is power. Effective listeners are able to concentrate and find the most valid information in whatever they hear. Effective listeners are powerful people.

A listening barrier exists when someone hears what he wants to hear not what is really communicated. From the survey results it can be possible to draw the map to represent the listening barriers shown in Figure 9.

The purpose of listening, building a relationship, is specially challenging in the case of managers because they have a dual function. On one hand, they must show trust in their people allowing them to explore, make decisions and become increasingly independent, but on the other hand, they must also provide the boundaries, the safety lessons, the directions, the values and the beliefs that the employee needs to become self sufficient.

Figure 9. Listening barriers (Source: Own elaboration)



The required balance between these two responsibilities can be achieved creating an excellent communication environment, which will be possible thanks to the adoption of an active listening attitude.

The process of creating this ideal communication environment is not easy since there are inherent blocks to making real emphatic listening connections work. The human relations involved in the process are challenging because of the different goals of the people involved. Bosses and employees often have difficulties hearing each other when their interests are in apparent conflict.

During the employees´ development stage managers can judge rather than listen. The employee's inexperience at this stage will keep the manager/leader from listening because of his/her perception of the situation as a period of threat and will react projecting his/her experience onto the employee to guarantee success.

An analogy can be drawn between employees and children, the former learn from their leaders as children learn from their parents. They all absorb the values their mentors represent and there are no shortcuts in values education. "*Do what I say not what I do"* is a doomed message. Despite signs to the contrary, employees are always watching their leaders.

CONCLUSION

There is a connection between the company results and the leader's listening skills. Even though leaders understand the inefficiency of directive models to manage people they keep using a variant of it since listening seems not to be a priority on their day to day activities. Internal communication is

scarce and not always effective since the one way communication seems to be the most common way of interaction among the interviewed people.

Internal communication is the key for success. Without it the survival of the firm is at risk or its developmental capabilities are not being used at its full potential. It could be reflected the importance of a leader's listening skills in relationship to achieving organizational performance as shown in Figure 10.

The objective of most firms is to make a profit in order to survive and the objective of the leader is to manage the company's resources in order to make the firm's objective possible.

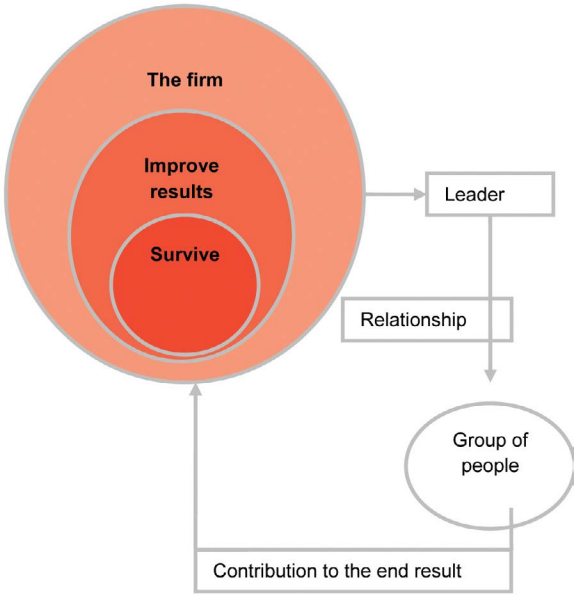
In the knowledge era in which we live, 'people' is the firm's most valuable resource. So how the leader manages it makes the difference between success and failure.

To succeed, the leader's main responsibility is to create an open and trusting environment where everyone feels safe to express feelings without the threat or fear of being judged and to use this information to build a team whose members are included and involved. It becomes clear the role of communication in the leaders understanding of people's needs.

If the group of people decides to work a team, individuals working for the team instead of for themselves, the possibilities for the firm and the leader to succeed increase exponentially.

From the information collected in the survey it is possible to end up with the impression that leaders know the importance and value of their human resources but apparently they do not act accordingly. They continually blame failure on their employees' behaviour and seem not to know what to do differently to overcome the situation. But paradoxically when employees are asked about how to improve their present situation at work they demand more time and empathy from their managers. If they listen they understand the situation and the alternatives.

Figure 10. Importance of leader's listening skills in relationship to achieving organizational performance (Source: Own elaboration)



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KEY TERMS AND DEFINITIONS

Active Listening: Provides a climate for decision making, genuine dialogue and motivation to pursue new initiatives.

Communication: The transmission of meaning from one person to another or to a group of people, whether verbally or non verbally. It's a crucial skill since the ability to communicate well is critical for effectiveness.

Leader: Person who make people feel as though they are accomplishing something and not just "putting time"; a leader must work with people and not against them. Leaders are able to express themselves fully.

Leadership: The ability of an individual to influence, motivate and enable others to contribute toward the effectiveness and success of the organizations of which they are members.

Listening Barriers: Exist when someone hears what he wants to hear not what is really communicated.

Quality Communication: The avenue by which leaders clarify their visions and foster participative management within the organization.

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Chapter 59
Strategic and Organizational Considerations Related to an E-Learning Model: A Case of Study

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ABSTRACT

The aim of this chapter is to assess the impact of different organizational factors on the success of e-learning programs, in terms of both self-reported satisfaction and the level of learning. Hence, this study adds to the analysis of the efficacy of e-learning models from an organizational perspective by providing some useful insights, which may help to improve decision-making related to employee's continuing education and satisfaction. This simulation, using a bivariate ordered probit model, shows that economic and indirect economic incentives play a key role in augmenting the level of both satisfaction and learning. This analysis also considers how efficacy of learning programs may thus improve by linking the human resources development policy with results obtained in e-learning courses.

1. INTRODUCTION

The application of latest advancements in Information Technology to business education has contributed to fulfill most wishes of education managers. The demand for continuing education programs with top specialists, the costs of mobility, the fragmentation of learning time due to inopportune meetings, among other difficulties, seem to have come upon a solution with the

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so called e-learning model (Box, 1999; Kirby, 1999;Bose, 2003).

Technological improvement and the design of high-capacity networks for sharing data have allowed for solving most of the limitations of the traditional learning methodology, by facilitating both access to information and the adaptation of programs to individual needs. However, earlier applications of e-learning have shown that those technological tools do not automatically guarantee high levels of learning (Snyder et al., 2000; Ettinger et al., 2006, Fernández Díez de Lastra, R., 2001). Moreover, Ettinger et al. (2006) demonstrate that the mere act of uploading materials of traditional courses to a software platform may reduce motivation and, thus, learning outcomes. Discussion about these problems has generated a second wave of development of e-learning models (Servage, 2005). Due to the different approach to learning under the new model, it has been argued that e-learning needs a different pedagogical system (Roy, 2006). As a consequence, a number of firms, focused on the management of educational contents for e-learning, have born during the last decade. Those firms offer teams of experts in pedagogy, scriptwriters and technicians, who work for creating personalized educational paths and taking advantage of all possibilities of software platforms for enhancing learning. In addition, the development of e-learning educational materials has actually generated an increasing demand for standard rules to facilitate the compatibility of contents and software platforms (Singh and reed, 2002; Orbea, 2008).

Previous research about factors influencing learner satisfaction reveal that learner computer anxiety, instructor attitude toward e-learning, e-learning course flexibility or quality, perceived usefulness, and diversity in assessments are critical factors affecting learners´ perceived satisfaction (Sun, P.; Tsai, R.J.; Chen, Y. & Yeh, D., 2008). Perceived self-efficacy has been also considered as key factor that influences e-learning satisfaction (Liaw, S., 2008). According to existing literature, disposing of both advanced technological instruments and adapted learning programs does not guarantee the optimal management of e-learning within firms (Ettinger et al., 2006; Galagan, 2002; Netteland et al., 2007). In fact, it is necessary to consider where, when and how learning programs take place, to identify the possible difficulties and how the firm should manage learning through a software platform (Zhand and Jasimuddin, 2008; Rahmandad et al., 2009). Learning by using the new training model requires self-motivation and self-management, and it demands both cultural and organizational changes (Redmon and Salopek, 2000; Tynjäla and Häkkinen, 2005; McPherson et al., 2005; Ettinger et al., 2005; Davis and Wong, 2007). Hence, organizations must strategically define what the main objective of e-learning is, and what they should do in order to achieve their goals.

The rest of the paper is organized as follows. Section 2 describes the main objective and the methodology used in the analysis. Section 3 presents data, descriptive statistics, and the model that will be estimated. Section 4 discussed main results, and the last section summarizes conclusions.

2. MAIN GOAL AND METHODOLOGY

The aim of this paper is to assess the impact of different organizational factors on the success of e-learning programs, in terms of both self-reported satisfaction and the level of learning. Hence, this study adds to the analysis of the efficacy of e-learning models from an organizational perspective by providing some useful insights, which may help to improve decision-making related to employee's continuing education and satisfaction. To this end, the case of EVERIS, one of the first firms that introduced e-learning as the standard methodology for its employees, has been studied. From a methodological point of view, the analysis can be divided into two parts. Firstly, both directors and users of e-learning programs at

EVERIS have been surveyed. The survey included questions about personal satisfaction, level of learning, and relevant organizational factors such as the existence of incentives, the preference for e-learning compared to the traditional system, and users' capacity to use the technological platform (variables are fully described in the next section).

In order to assess the impact of the explicative variables on satisfaction and learning, we estimated a bivariate ordered probit model, which is specified by seemingly unrelated equations. The main reason for using this methodology is the potential existence of an indirect relationship between satisfaction and learning, which might cause biased results when two different ordered probit models are considered, one for satisfaction and the other for the level of learning. There is a growing empirical literature which makes use of bivariate probit models. Greene and Hanser (2009) cite more than 20 different papers applying this methodology from 1997 to 2007, though first applications are due to Calhoun (1989, 1991, 1994), and more recently, Dawson and Dobson (2010). The methodology used here is the same used in these papers and, explicitly, we have followed Sajaia (2008) for its implementation in Stata©.

3. DEVELOPMENT OF THE ANALYSIS

As starting point of the framework, we analyzed both strategic and organizational factors that have driven a firm such as EVERIS to choose an e-learning model. To this end, we discussed the reasons for the implementation of e-learning with directors of EVERIS, who helped them to better understand relevant variables. As a multinational consulting firm, EVERIS offers solutions for business strategy, development and maintenance of technological appliances. The growth of the number of employees (from 3300 persons in 2004 to 7400 in 2009), as well as the increased volume of projects and its differentiation, justified in 2006 the strategic decision of adopting e-learning for continuing education at EVERIS. On evaluating this choice, the board of directors analyzed the need for aligning with new tendencies of professional education, and they also underlined both the possibility of offering a larger number of courses, and the opportunity for cost-reduction.

In particular, two main goals emerged as reasons for change toward an e-learning model: enlarging the offer of educational programs, and innovating through alternative models of learning. Provided that one value of EVERIS is the building of a learning software platform for continuing education for its employees, these goals were perfectly aligned with their business strategy. In order to carry out the implementation, departments of Marketing, People and Human Resources worked together and, under the direction of their Corporate University, they evaluated open-source applications for collaborative learning. The adoption of e-learning was thus an internal process of the organization, and it took about six months.

Employees at EVERIS are characterized by a higher qualified and technical skills than other professionals, which allowed the firm for not investing in their capacity to use the learning platform. It should be noted, in fact, that this is one of the main investment limitations in other organizations. The management of the e-learning model in this firm involves the development of a supply of courses, which reflects the professional needs of employees and makes use, to this end, of specific personal mapping for professional development. Each personal map consists of mandatory courses, recommended programs, and other optional courses depending on both personal preferences and job skills. This educational system aims to achieve the goal of 40 hours of education per employee and year, by investing about 10 millions of euros yearly.

At present, the learning model of this company takes the form of "blended-learning", combining lectures and online courses available at EVERCAMPUS. Though the firm did not design an

explicit incentive scheme, the monetary value of grades achieved by EVERCAMPUS is published and communicated to employees, thus underlining their direct value in terms of employability or market value of professionals.

3.1 Data and Descriptive Statistics

Data have been collected by a survey to 84 employees of EVERIS Madrid, who were attending e-learning courses between march and may 2010, and voluntarily answered our online questionnaire. It should be noted that the questionnaire is independent from both the attendance of any particular course and results obtained (though data about dropout rates for each course is not available, the average at EVERCAMPUS is about 28% of all participants). In addition, given our objective, we have decided to survey employees independently from the specific course they attended, and we focused on specific organizational measures such as incentives, time and space availability for learning, and the skills that permitted to use the learning platform in a profitable way.

Figure 1 presents the functional distribution of the sample of employees surveyed. Although this analysis did not focused on studying satisfaction with a specific e-learning course, most of the contents assessed were related with technical knowledge (programming languages, technical certifications) and management skills.

As it can be observed, about 50% of respondent work in the department of Technology Systems, a characteristic that is likely to affect results. In fact, we expect those employees to be able to handle the learning platform with ease.

Table 1 presents the definitions of variables being analyzed, along with descriptive statistics. Dependent variables, self-assessed satisfaction and self-assessed learning, are categorical variables, which take value from 1 to five.

On considering the impact of organizational factors on Self-Assessed Satisfaction (SAS, hereafter) and Self-Assessed Learning (SAL, herafter), it is important to control for both basic characteristics of the course, such as quality of contents, for example, and the ability of attendants to use the e-learning platform. This is in fact the standard object of study in existing literature, and taking into account these variables allows for a comparison of main results. Figure 2 represents the distribution of SAS when subgroups of respondents that value positively specific aspects of the e-learning course attended are considered. As it can be observed, and as expected, the distribution of SAS suffer a significant change when people have a positive perception of both course material and contents. In other words, satisfaction and the quality of contents are highly correlated, and we will thus take into account this factor in the rest of the analysis. In addition, the quality of contents positively affects learning, as Figure 3 points out.

Figure 1. Functional distribution of the sample

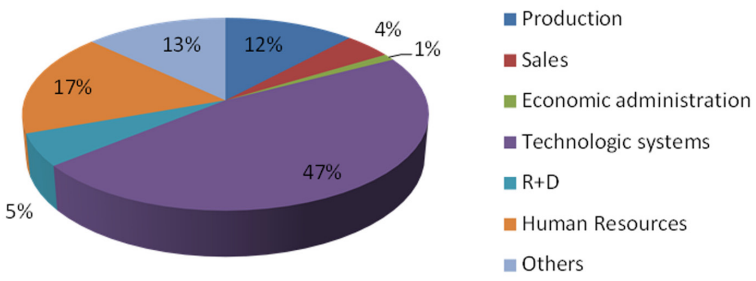


Table 1. Variables and descriptive statistics

Variable	Description	Mean (sd)
SAS	Self-assessed satisfaction, it takes discrete values from 1 (not at all satisfied) to 5 (very satisfied)	4.06 (0.848)
SAL	Self-assessed learning, it takes discrete values from 1 (very low) to 5 (very high)	3.454 (0.851)
TECNO	1: Learning technology is perceived as excellent 0: Otherwise	0.523 (0.502)
INC	1: If there is incentive related to learning (both real and perceived) 0: Otherwise	0.333 (0.474)
TIME	1: Specific time for learning available 0: Otherwise	0.13 (0.339)
EASY	1: If the use of the learning platform is perceived as very easy 0: Otherwise	0.19 (0.395)
MODEL	1: If respondent prefers traditional learning methodology 0: Otherwise	0.623 (0.487)
TECHSUP	1: If respondent works in technical support department 0: Otherwise	0.511 (0.502)
CONTENTS	1: If course contents were perceived as very good 0: Otherwise	0.357 (0.482)
PLACE	1: E-learning course attended out of the workplace 0: Otherwise	0.619 (0.488)

Figure 2. Distribution of SAS when all respondents are considered (top left), for the subgroup of people who value postively the contents of the course (top right), for the subgroups that value positively the e-learning platform (bottom right), and for the subgroup of people who value positively the tutoring system (bottom left)

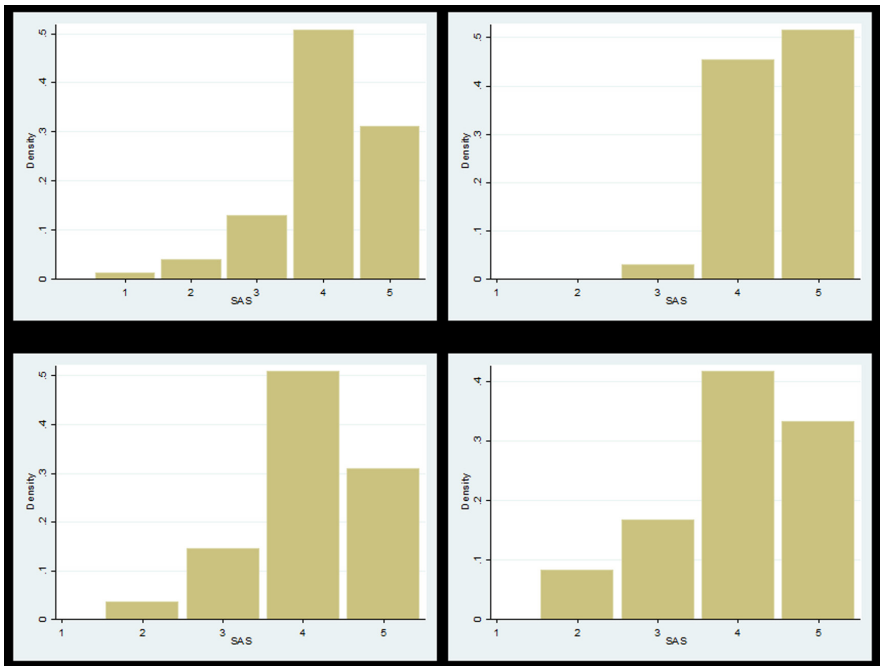
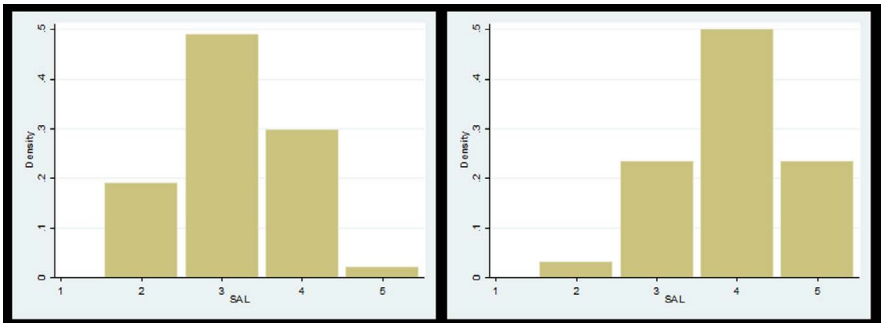


Figure 3. Distribution of SAL when CONTENTS: 0 (left), and when CONTENTS: 1 (right)

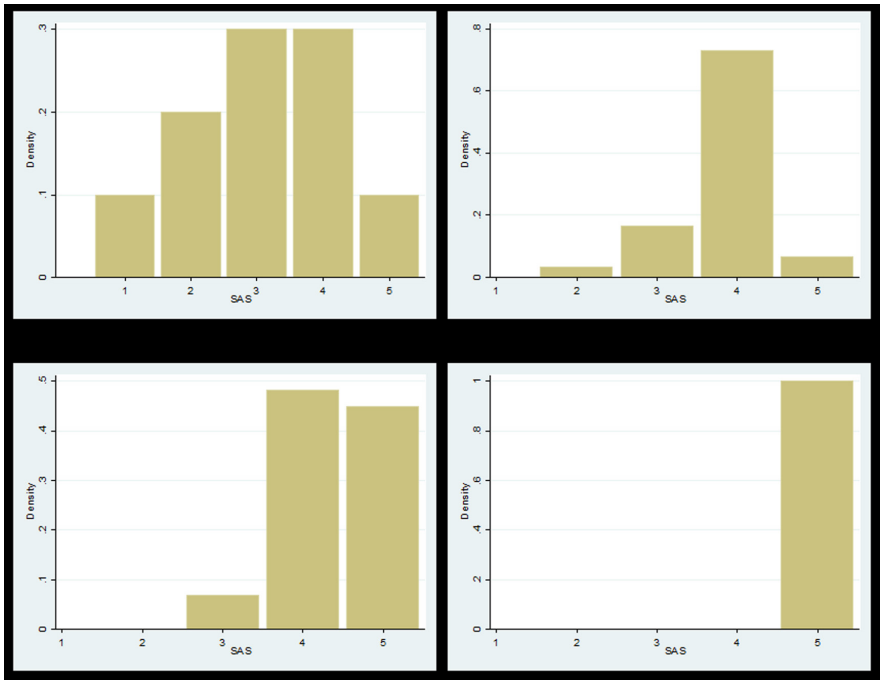


This last point underlines an important feature, which affects our analysis and the specification of the model being proposed: the same set of variables may have an impact on both satisfaction and learning. Figure 4, in fact, demonstrates that SAL and SAS are highly correlated. The rest of this section develops the model being estimated, in which the correlation between SAL and SAS is considered.

3.2 Model Description

The objective of this paper is to assess the impact of different key organizational factors on the levels of both satisfaction and learning related to the e-learning model. This study makes use of categorical dependent variables, which constraint the possibility of specification of the model (see Table 1). It is assumed here that the same set of variables might have an effect on both satisfaction and learning, as in

Figure 4. Distribution of SAS when SAL: 2 (top left), SAL: 3 (top right), SAL: 4 (bottom left), SAL: 5 (bottom right)



$$SAL_i = f(x_i) \quad (1)$$

$$SAS_i = g(x_i) \quad (2)$$

Neither the level of learning nor the level of satisfaction are directly observable from answers to survey questions; hence, following Greene and Hensher (2008), we assume that latent variables SAL_i* and SAS_i* depend on:

$$SAL_i^* = x_1'^{2}{}_1 + \mu_{Ai} \quad (3)$$

$$SAS_i^* = x_1'^{2}{}_2 + \mu_{Si} \quad (4)$$

where β_1 and β_2 are vectors of unknown parameters, ε_A and ε_S are error terms, and x_1 is the vector of explicative variables. Explicative variables are, by assumption, exogenous; that is, $E[x_1' \varepsilon_{Ai}]=0$, $E[x_1' \varepsilon_{Si}]=0$.

Provided that the specification proposed in (3) and (4), which represent seemingly unrelated equations, does not imply any identification problem, we can use the same set of explicative variables. In fact, there are not any theoretical reasons to exclude some variable from one particular equation. We can observe in our database the values of the categorical variables SAL_i and SAS_i such that:

$$SAL_1 = \begin{cases} 1 & siSAL_1^* \le c_{A1} \\ 2 & sic_{A1} < SAL_1^* \le c_{A2} \\ 3 & sic_{A2} < SAL_1^* \le c_{A3} \\ 4 & sic_{A3} < SAL_1^* \le c_{A4} \\ 5 & sic_{A4} < SAL_1^* \end{cases}; \quad SAS_1 = \begin{cases} 1 & siSAS_1 \le c_{S1} \\ 2 & sic_{S1} < SAS_1^* \le c_{S2} \\ 3 & sic_{S2} < SAS_1^* \le c_{S3} \\ 4 & sic_{S3} < SAS_1^* \le c_{S4} \\ 5 & sic_{S4} < SAS_1^* \end{cases} \quad (5)$$

where $c_{j1} < c_{j1} < c_{j1} < c_{j1} < c_{j1} < c_{j1}$, j = SAL, SAS. The probability of being $SAL_i = k$ and $SAS_i = 1$ is:

$$\begin{aligned} &\Pr\left(SAL_i = k,\ SAS_i = l\right) \\ &= \Pr\left(c_{Ak-1} < SAL_i^* \le c_{Ak},\ c_{Sl-1} < SAS_i^* \le c_{Sl}\right) \\ &= \Pr\left(SAL_i^* \le c_{Ak}, SAS_i^* \le c_{Sl}\right) \\ &- \Pr\left(SAL_i^* \le c_{Ak-1}, SAS_i^* \le c_{Sl}\right) \\ &- \Pr\left(SAL_i^* \le c_{Ak}, SAS_i^* \le c_{Sl-1}\right) \\ &+ \Pr\left(SAL_i^* \le c_{Ak-1}, SAS_i^* \le c_{Sl-1}\right) \end{aligned} \quad (6)$$

When error terms are distributed as normal bivariant with correlation ρ, their contribution to the likelihood function can be expressed as:

$$\begin{aligned} &\Pr\left(SAL_i = k,\ SAS_i = l\right) \\ &= \int \left(c_{Ak} - x_{1i}'^{2}{}_1,\ c_{Sl} - x_{1i}'^{2}{}_2, Á\right) \\ &- \int \left(c_{Ak-1} - x_{1i}'^{2}{}_1,\ c_{Sl} - x_{1i}'^{2}{}_2, Á\right) \\ &- \int \left(c_{Ak} - x_{1i}'^{2}{}_1,\ c_{Sl-1} - x_{1i}'^{2}{}_2, Á\right) \\ &+ \int \left(c_{Ak-1} - x_{1i}'^{2}{}_1,\ c_{Sl-1} - x_{1i}'^{2}{}_2, Á\right) \end{aligned} \quad (7)$$

The logarithmic likelihood function for observation I is, thus:

$$\begin{aligned} &\ln L_i = \sum_{k=1}^{5}\sum_{l=1}^{5} I\left(SAL_i = k,\ SAS_i = l\right) \\ &\ln \Pr(SAL_i = k,\ SAS_i = l) \end{aligned} \quad (8)$$

By adding (8) for each of the N observation we obtain:

$$\begin{aligned} &\ln \mathcal{L} = \sum_{i=1}^{N}\sum_{k=1}^{5}\sum_{l=1}^{5} I\left(SAL_i = k,\ SAS_i = l\right) \\ &\ln \Pr(SAL_i = k,\ SES_i = l) \end{aligned} \quad (9)$$

Using (9), we can estimate model (3)-(4) by the procedure described in Sajaia (2008). It could

be argued that model (3)-(4) takes the form of a seemingly unrelated specification, though both dependent variables might have a direct impact on each other. Hence, either Equation (3) or (4), or both of them, should include as explicative variable the dependent variable used in the other equation. Though this might be true in principle, we have estimated the model with a simultaneous bivariate ordered probit specification, and tests carried out permit to exclude a direct effect of either satisfaction or learning on the other variable. Accordingly, the seemingly unrelated specification has been adopted here.

4. RESULTS

We have estimated model (3)-(4) by both a bivariate ordered probit model and two separated ordered probit models for each dependent variable. Table 2 shows results of the bivariate model (column 1) and the two ordered probit models (columns 2 and 3). Firstly, regarding the interdependency between Equations (3) and (4), it can be observed that the correlation between error terms is positive and significantly different from zero: the null hypothesis of independency of the two equations does not hold true. In other words, the two ordered probit models produce biased estimations, which may be adjusted by the bivariate model. We will thus consider results of column 1 only. The first relevant result is the positive impact of incentives on both satisfaction and self-assessed learning. INC, in fact, is the variable with the largest effect on both SAL and SAS. In addition, incentives (either monetary incentives or the possibility of advancements in the professional career) have a greater effect on satisfaction compared to learning. The ability to handle the technological platform (variable EASY), in contrast, has not a significant effect on both learning and personal satisfaction. However, a good assessment of the technological aspect of the platform (TECNO) generates an increase in the probability of both being satisfied and awarding a positive evaluation to the level of learning. In other words, results underline that the quality of the learning platform has a significant impact on both learning and satisfaction, independently from the basic ability to handle it.

Table 2. Results of estimations

	(1)		(2)	(3)
	SAL	**SAS**	**SAL**	**SAS**
INC	1.050** (0.288)	1.295** (0.380)	1.044** (0.286)	1.321** (0.387)
EASY	0.514 (0.290)	0.446 (0.340)	0.501 (0.294)	0.461 (0.348)
TIME	0.843** (0.342)	0.141 (0.457)	0.840** (0.346)	0.162 (0.455)
MODEL	0.541** (0.286)	0.718** (0.258)	0.543** (0.285)	0.786** (0.268)
TECNO	0.796** (0.307)	0.759** (0.349)	0.808** (0.316)	0.766** (0.358)
TECHSUPP	0.598* (0.306)	0.976 (0.336)	0.593* (0.306)	1.003 (0.333)
PLACE	0.602** (0.267)	0.598** (0.275)	0.600** (0.267)	0.617** (0.267)
CONTENTS	0.963** (0.302)			
N		77	77	77
ρ	0.377** (0.160)			
Model stat		68.01**	49.22**	49.04**
LR test		5.56		

Note. ** = confidence level 95%; * = confidence level 90%. Robust standard errors in parenthesis.

Assigning a specific amount of time to learning during the working day has interesting consequences. In fact, having time for education boosts the level of learning, whereas its impact on satisfaction is not significant. This variable thus appears to be especially relevant to the goal of optimizing investments in education. On considering the professional group, being a computer technician has a significant impact on both SAS and SAL. Possibly, due to their higher "sensibility" to technological aspects of the e-learning platform, computer technicians report a significantly lower level of satisfaction; in should be observed, in addition, that the impact is much larger for SAS then for SAL.

Preference for an e-learning model compared to classic methodology, based on the meeting of trainer and trainee in a common space and time, is another interesting variable being analyzed. Estimations suggest that people preferring the classic methodology are both less satisfied with e-learning and report to have achieved a lower level of learning. As for TECNO, however, the effect on SAS is larger: people who do not prefer e-learning declare to be unsatisfied, where their level of learning is affected to a considerable lower extent. This might be due to the functional distribution of respondents, as pointed out in section 3 (Figure 1).

Finally, it can be observed in Table 2 that flexibility (in terms of the possibility of attending the e-learning program out of the workplace), improves both satisfaction and learning.

Estimations carried out allows for predicting the effect of explicative variables on the probability of reporting at the same time both a high level of satisfaction (SAS = 5) and a high level of learning (SAL = 5), when incentive schemes are introduced. This is a relevant prediction, provided that it explains the impact of a (costly) organizational measure with potential benefits. Under this scenario, the model predicts that adopting an incentive scheme, when no incentives are initially implemented, causes an increase of about 121.5% in the probability of declaring both SAL = 5 and SAS = 5. Explicitly, the probability of reporting a high level of satisfaction would grow about 112.6%, whereas the increase in the probability of reporting a high level of learning would be equal to 79.5%. In other words, incentive schemes affect the level of satisfaction most. Another interesting result is obtained when analyzing a scenario in which people are not assigned any amount of time for studying. In fact, the model predicts that when specific time for study is assigned to people, the probability of reporting a high level of learning increases of about 80%.

5. CONCLUSION

E-learning does not automatically imply learning. In fact, it might actually reduce the level of learning, motivation and satisfaction of users, when it consists of just uploading course materials initially designed for use with classic methods. Organizational factors as e-learning course flexibility (Sun, P.; Tsai, R.J.; Chen, Y. & Yeh, D., 2008) or perceived self-efficacy (Liaw, S., 2008) were considered in previous research as key issues that influence e-learning satisfaction. As a consequence, a complete pedagogical system has been developing through recent years, which is aimed at establishing the educational process in the new technological environment. At the same time, companies are conscious that some organizational features may facilitate learning within the new model and thus, they could contribute to improve both its efficacy and efficiency.

Following this approach, this paper has considered the impact of a number of organizational features on satisfaction and learning of users. It is shown, firstly, that incentives schemes play a key role in augmenting the level of both satisfaction and learning. It should be noted, moreover, that by incentive we mean either monetary rewards, which are almost absent in our sample, or the expectation of advancements in the professional

career within the firm. This circumstance may also help to a better understanding of the greater impact of incentives on satisfaction respect to learning, which we found out in our analysis. In other words, the organizational value of learning programs for employees, independently from the level of learning, not only causes their greater acceptance, but also it may also positively affect behaviors in such a way that favor learning. Efficacy of learning programs may thus improve by linking the human resources development policy with results obtained in e-learning courses.

Another interesting conclusion we obtained in the analysis is the importance of assigning a specific amount of time for attending e-learning courses. Explicitly, it is shown here that time available for learning has a positive and significant impact on learning, whereas it does not affect satisfaction. This implies a relevant question. In fact, one of the main advantages of e-learning is its temporal flexibility, which permit to work and study during the same period of time. Model predictions about the positive effects of a fixed amount of time available for learning are thus in apparent contrast with flexibility. On the other hand, it seems logical that focusing on study during a certain amount of time, without disturbance or interruption due to working activity, facilitates concentration and therefore, learning, and results about the importance of spatial flexibility support this conclusion. One possible solution we propose is to assign an amount of time to each student, who is then responsible to use it whenever he or she wants, thus obtaining some degree of flexibility together with reducing interruptions when studying.

On considering the limitations of our analysis, it should be noted that our sample includes users of e-learning programs within a single firm. The aim of this paper is the study of a particular case, and the generalization of results is beyond our scope. Results are in line with previous research mentioned in the introduction; we have considered how organizational factors, which are normally excluded from the analysis, have affected the implementation of e-learning at EVERIS. Moreover, we considered e-learning users independently from the program attended. In other words, an implicit hypothesis of this piece of research is that courses have homogeneous and comparable characteristics regarding their internal structure and therefore, users' opinion is assumed to be referred to the e-learning model rather than one particular program. This limitation suggests one step forward in the same line of research. It would be interesting, if data were available, to divide the sample and study the impact of organizational measures depending on both the type of course and the professional category of the student. In addition, comparing results with other firms that adopted the e-learning model would permit to analyze additional policies aimed at improving efficiency.

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Chapter 60
Talent Management:
A New Perspective in Human Resource Management

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ABSTRACT

Talent management is a new concept in the scientific literature, but not in the practitioner arena. In this sense, this chapter underlines the powerful perspective of talent management integrating practices from organizations and providing a scientific approach. Some previous results from different research are expressed in relation to strategy and organizational performance. Talent Management is clearly a concept close to high performance work system, with the difference of a more strategic approach. More than practices are goals for the organization to achieve excellence at work. So Talent Management is clearly linked with a strategic approach to the organization in order to attract, develop, evaluate, and retain professionals with high capacities.

INTRODUCTION

Today's businesses have to cope with hard competition and continuous change (Hamel & Prahalad, 1994) and Human Resources Management (HRM) and Talent Management (TM) is clearly affected by this turbulent environment. As Farndale et al. (2009) confirm, competition between employers has shifted from the country level to the regional and global levels (Ashton & Morton, 2005). Indeed, as Ulrich (1997, p.304) emphasises "under environment conditions of low change, attention to HR practices had little impact on business results, but under environmental conditions of high change, executive attention to HR practices had a large impact on business results". Moreover, Lawler (2005) defend that HR "can and should add more value to corporations. The best way to do this is by being a business partner- by directly improving the performance of the business. This

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can be accomplished by effective talent management" (p. 165).

In response to this situation, it is argued that organizations are flattening, relying on self-managed teams, becoming highly matrixed, and reconfiguring the structure of work (Shippman et al., 2000). Lepak and Snell (2002) argue that given pressures for both efficiency and flexibility firms are exploring the use of differentiated employment modes to engage workers and allocate work. Indeed, HRM "is under pressure to reduce costs, to improve its services, to increase its impact, and to provide a more satisfying work experience for its own employees" (Kochanski & Ruse, 1996, p. 19). Also, Calvo and Garcia (2010) in the analysis of talent management in professional services firm observed that a lack of flexibility within the organization tended to lead to a reduction in potential intellectual capital, and increased excess workload, together with a decline in the company's competitiveness within the marketplace, as seen in a drop in its level of corporate attractiveness.

In this sense, Farndale et al. (2009) according with Bhatnagar (2007) argue that "while companies are facing significant talent management challenges in several regions of the world, such as Europe and North America, the challenges are most acute for young professionals and new managers in the emerging markets such as the BRIC economies of Brazil, Russia, India, China and the economies of Central and Eastern Europe" (p.161). Indeed, there is a shortage of leadership talent (Farndale et al., 2009) and assuming talent management as a source of competitive advantage has been key in HRM (Frank & Taylor, 2004; Lewis & Heckman, 2006).

In spite of the great deal of research on HRM in the last decades, there is still a significant gap between what happens in theory and practice (Pfeffer & Sutton, 1999). This is especially the case in the area of "talent management" (TM). There is much talk about 'talent' and 'talent management', driven largely by the belief that while traditional approaches to HRM have served MNCs well in the 20th century, the contemporary business environment requires new and innovative approaches in the development and deployment of human resources (Caligiuri, 2006; Lengnick-Hall & Andrade, 2008). However, while much is claimed for it, much confusion also surrounds it. A cursory trawl of the literature will reveal several variations on the meaning of TM: informal individually-focused talent management (Tansley, Turner & Foster, 2007); TM as a relabeling of human resource planning (Lewis & Heckman, 2006); TM as succession management (Hirsch, 2000) and strategic TM (Cappelli, 2008; Zuboff, 1998; Boudreau & Ramstad, 2005).

Talent management comes up as a new perspective from strategic human resource management (SHRM) linked more than ever with business strategy. Therefore, TM offers SHRM goals covered with different HRM practices in a configurational way. This systemic perspective have attracted practitioners more than other scientific HRM approaches.

Regardless of how it is conceived, of critical importance in this regard is the debate on TM and firm performance. If a focused talent strategy is capable of delivering a return of investment of up to twenty two points over other firms in the same sector, why it is not widespread in firms? Indeed, practices should warranty the use of talents in the organizations and this can be done not only with practices but also "cultures and systems in which these great people can actually use their talents, and even better, management practices that produce extraordinary results from almost every-body" (O´Reilly & Pfeffer, 2000, p. 63).

MAIN PURPOSE

HRM is growing as a discipline that takes information from many other fields. This multidisciplinary approach makes more complex but also richer the research in the next future. In this sense, HRM

and High Performance Work System (HPWS) literature has concentrated during the last years to analyse configurations in organizations to fit strategy and environmental factors. Our main purpose in this chapter is to analise the theoretical construction of TM in the line of HPWS perspective as a system. Also we present different results obtained and the evolution of HRM during the last few years from this perspective. Finally, we present the results in the research of TM in its relationship with organizational satisfaction and job performance.

Wright and McMahan (1992) indicated the need for the creation of a horizontal fit among HR practices, so that they complement each other rather than compete against one another. This horizontal fit has been called internal alignment (Becker & Gerhart, 1996; Huselid, 1995) and it is completely coherent with a talent management systemic perspective.

TALENT MANAGEMENT AND STRATEGIC COMPETENCIES FOR COMPETITIVENESS

HRM needs to advance scientifically and professionally in order to assume a proactive role in these new sceneries. One new perspective is assuming organizations as a bank of talents, that is, focusing on TM. A talent strategy may be conceived as the attraction, the development and retention of people with excellent competencies appropriate to the work context. Generally, TM is associated with Competency Based Management (CBM) where competencies are aligned to organizational values and goals (Hayton & McEvoy, 2006; Kochanski & Ruse, 1996; Sharma & Bhatnagar, 2009; Ulrich, 1998; Ulrich et al., 1995). Also competencies activate actual performance and employee potential. Indeed, competencies refer to "an individual´s demonstrated knowledge, skills or abilities" (Ulrich et al., 1995, p. 474). Also Ulrich (1998) defined intellectual capital as the function of competence by commitment. Therefore, firms with high competence, but low commitment, will have talented but unengaged employees. Conversely, in the context of having high commitment with low competence, the organisations talent pool is more limited, but commitment is high. Intellectual capital requires both aspects. And this equation can be analysed at different levels: firm, units or individual. Arguably there are at least two ways to increase competence in a firm: aligning competencies with business strategy and generating competences through more than one mechanism (buy, build, borrow, bounce and bind). Similarly, commitment can be generated thorough different ways: (a) reducing demands, (b) increasing resources so employee can find new resources to accomplish work and (c) turning demand into resources. But most importantly, by way of consequence, the intellectual capital index will be positively associated with productivity.

There is a clear consensus about the importance of employee behaviours more than the HRM practices in the value creation of an organization (e.g. MacDuffie, 1995; Schuler & Jackson, 1987; Wright & Snell, 1998; Colvin & Boswell, 2007). Discretionary employee behaviours that are difficult to specify in advance are particularly valuable to organizations because, unlike routine job performance, they are difficult for competitors to imitate or replicate and thus may provide a source of sustainable competitive advantage (Colvin & Boswell, 2007). TM offers a strategic perspective where behaviours are aligned with performance goals in the organization. Therefore, micro and macro perspectives are connected in a configurational model of HPWS.

This focus in HRM research has involved a shift in the outcomes of interest from individual level impacts to outcomes at the level of the organization (Becker & Gerhart, 1996; Delery & Shaw, 2001). However, the shift has not simply been towards using organizational performance measures as the dependent variables of interest, but also a growing interest in how employees relate to the organization

and how human resources contribute to the business strategy of the organization. Driving much of this interest is the underlying idea that HRM can play a more central role in organizational success by enhancing the contribution of employees to organizational value creation (Wright & McMahan, 1992) thorough TM.

Thus, competencies are dealt with as values that must be developed and are interpreted as provoking benefits both for employees and organization (Van der Heijde & Van der heijden, 2006). In this sense, CBM is the base for a more integrated model dedicated to further addressing how organisations which are suffering a shortage of talent might respond to the challenge (Chiavenato, 2002; Michaels et al., 2003; Peters, 2005; Schlemenson, 2003). Thus, all efforts are concentrated on TM (Casado, 2011; Cubeiro, 2004; Chiavenato, 2002; Gubman, 2000; Jerico, 2000; Michaels et al., 2001; Peters, 2005; Schlemenson, 2003). And TM is based on strategies of talent banks trying to focus on four main actions: (1) staffing and atraction of talents, (2) detecting and identifying talent in the organization, (3) developing talents and (4) retention and loyalty of talents. These SHRM goals guide HPWS in the organization.

TM, through HPWS literature, has been linked with positive results including higher efficiency, less turnover and higher commitment, and a growth in what Sternberg (1999) has termed organisational intelligence. Also, TM as a HPWS have been linked with improvements in the market value of organizations and a higher ROA. Indeed since the last recession, the TM proposition is more strategic now than ever.

One of the streams of research that seems to hold "the promise of creating a truly strategic approach to talent management" (Lewis & Heckman, 2006, p. 145) is the Resource-Based View (RBV) perspective. The HR arquitecture is a value-creating system that raises the question of the appropriate locus of strategic value creation (Becker & Huselid, 2006). These authors follow "going forward, however, we need more theoretical work on the "black box" between the HR architecture and firm performance, and less emphasis on the "black box" within the HR architecture (p. 900). Following Lee and Miller (1999), a dedicated and talented workforce may serve as a valuable, scarce, non-imitable resource that can help firms execute an appropriate positioning strategy. Indeed, competences are one category of possible resources that enable firms to achieve performance and (sustained) competitiveness. A prerequisite for sustained competitive advantage consists of a unique combination of acquiring and retaining competent workers, and adequate HR policies and practices which promote the importance of investing in them. In the RBV literature, terms like resources and capabilities "are used interchangeably and refer to the tangible and intangible assets firms use to develop and implement their strategies" (Ray et al., 2004, p. 24). Strategy experts argue that an organization´s internal resources-including the capabilities of its workforce- could give rise to competitive advantage (Barney, 1991; Wernerfelt, 1984). Competencies benefit firms when they provide customer value, resist imitation, and enable a firm to create new business through product and service-extensions and through innovation (Hagan et al., 2006). Therefore, RBV literature offers clearly a theoretical approach to TM and HPWS literature.

DEVELOPING A TALENT MANAGEMENT MINDSET

A growing number of organizations see competence as the key to enduring performance and to making HR most effective (Kochanski & Ruse, 1996, p.19). Prahalad and Hamel (1990) argue that key employees are the ones who have unique and very valuable competencies that developed in a right organizational context generate key organizational competencies for sustained competitive advantage. Ulrich et al. (1995), have situated the

competencies in a framework referred to as the HR Value Proposition "an integrated blueprint for the future of HR" (Ulrich & Brockbank, 2005, ix).

Against the backdrop of this value proposition, a question that arises is how can we develop TM as a talent strategy in firms? Michaels, Handfield-Jones and Axelrod (2001) argue that talent mindset is the key concept, something which they refer to as a passionate belief that to achieve excellence in business we need talents and these have to be underscored by the company values and goals. This cannot be done by the HRM Department, it cannot depend on HR processes, but rather demands a unique and different mental predisposition. Michaels et al., (2001) in their treatise on the future of HRM point to the existence of a shortage of talent which they suggested would result in a "war of talent". This war is predicated on the necessity to increase the skill level of up to 60% of the workforce in order to compete in the age of the smart economy. The firms surveyed by these authors were all considered High Performance Companies and results demonstrated that only 20% considered that they have enough leaders with talent and only one out four establish talent banks as a priority. But results also indicated that 48% of leaders were likely to leave the organization in the next two years. Therefore, "we are seeing a shortage of skilled management talents" (Gubman, 1996, p. 34).

But is there a shortage of talent? Results of several studies indicate that talent mindset is not often present in firms. Right Management Consultants (Philadelphia, a subsidiary of Manpower; Credit Union Management, 2004) found that four out of ten managers and executives are considered excellent leaders, exhibiting management talents their employers value most. Moreover, from a practitioner perspective, TM is predicted to be the highest challenge for Human Resources up to 2015. Indeed, a study with 1350 managers in 27 countries done by The Boston Consulting Group (BCG) and the European Association of Personnel Management (EAPM) identified five main challenges for the future, TM being the number one challenge. Also, HR Focus, a prestige practitioner journal found that 75% organisations they surveyed were worried about retaining and developing key employees into the future.

Gupta (2001, p. 2), noted that "If I am puzzled as you are with the crisis of TM, I encourage you to engage in some serious study of this issue. We need to learn more before it´s too late". More recently Boudreau and Ramstad (2005) in an article published in *Human Resource Management* indicate that a talent science is needed given its incremental importance to stimulate talent decisions, while Tolich (2005) in *Administrative Science Quarterly* notes the dearth of TM and the consequences of our inability to deliver on the promise and potential of the knowledge economy. In 2007 the *Harvard Business Review* gives a special emphasis on TM (HBR Spotlight, *How to manage the most talented*) with two articles: (1) "Leading clever people" (Goffee & Jones, 2007) and (2) "Crisis at the Summit" (Parsons & Pascale, 2007). And finally, The Economist published in 2006 an article entitled *The battle for brainpower* claiming that organizations are much concerned about TM.

But what composes a talent mindset? Some research in Benchmarking has been done from the *American Productivity and Quality Centre* and *the Centre for Creative Leadership* (McCauley & Wakefield, 2006) in order to analyse TM. They include eight main practices, several of them focused on organizational culture (integration, involvement, key employees), others linked with the measurement from the competency model, and others associated with the organisational context.

HPWS TO ENHANCE TALENT MANAGEMENT AND PERFORMANCE

Hiltrop (1999) also supported the importance of HPWS for strategies that strive to attract and retain

talented personnel, arguing that high performance organizations beat their competitors in a number of HR factors such as team work, healthy relationship between collaborators, training and the development of opportunities that are offered to workers.

Luna-Arocas and Camps (2008) mention that in short, scholars conceptualize HPWSs as a set of distinct but interrelated HR practices that, taken together, select, develop, retain, and motivate a workforce (Becker & Huselid, 1998; Guthrie, 2001; Huselid, 1995). However, Becker and Gerhart (1996) have suggested that among empirical studies which have examined the link between HR practices and firm performance, there is little consistency in regards to the individual HR practices that have been included within these studies. Similarly, Way (2002) analyzed six exemplary empirical studies (Arthur, 1994; Huselid, 1995; MacDuffie, 1995; Ichniowski et al., 1997; Becker & Huselid, 1998; Guthrie, 2001).

The differences in the practices used by researchers come from the variety of perspectives in HR (Becker and Gerhart, 1996). Three main traditional approaches have been distinguished (Delery and Doty, 1996): universalistic, contingency and configurational. The universalistic approach assumes a direct relationship between HPWS and organizational performance. The contingent approach contemplates the value of strategy, among other aspects of the organization, as moderating the relationship between HPWS and organizational performance. And finally, the configurational approach considers that some variables in HPWS can act jointly showing consistent patterns related to organizational performance. In general terms, as is defined by Becker and Gerhart (1996, p. 786) "there may be a best HR system architecture, but whatever the bundles or configurations of policies implemented in a particular firm, the individual practices must be aligned with one another and be consistent with the HR architecture if they are ultimately to have an effect on firm performance. In this sense, the best practice and contingency hypotheses are not necessarily in conflict-they simply operate at different levels of an HR system". Also, some authors have contemplated universalistic and configurational perspectives together to explain HPWS impact over organizational performance (e.g., Shih, Chiang and Hsu, 2006).

The main trend in research on the HRM-firm performance linkage comes from a systems view of HRM by considering the overall configuration of HR management practices (Ferris et al., 1998). Moreover, some practices are argued to support better organizational performances (Jackson and Schuler, 1995; Huselid, 1995) and these HRM practices, as a system, can contribute to firm performance helping the organization to achieve strategic goals (Bowen and Ostroff, 2004). Following these two authors, we can distinguish two features of an HRMS: content (based on the HRM practices needed to achieve organizational goals) and process (how the HRM system can be designed and administered).

In this sense, HRM research has focused on the practices, as a system, directly related with organizational performance. This is called HPWS and is concerned as a means to maximize firms´competitive advantage (e.g., Guthrie, 2001; Huselid, 1995; Sun, Aryee and Law, 2007; Takeuchi et al., 2007) and a way to improve firm performance (Arthur, 1994; Combs, Liu, Hall, and Ketchen, 2006; Datta, Guthrie, and Wright, 2005; Guthrie, 2001). Indeed, HPWS understand HR management as a system concerning the management practices that provide employees with skills, information, motivation and attitude that results in a work force that becomes a source of competitive advantage (Huselid, 1995; Collins and Smith, 2006). Thus, HPWS refer to a group of separate but interconnected HR management practices designed to enhance employee and firm performance outcomes through improving workforce competence, attitudes, and motivation (Huselid, 1995). TM goes beyond putting practices together to achieve strategic goals. Therefore, dif-

ferent organizations can use different practices to achieve the same organizational goals.

Also, a main premise of this research stream is that a system of internally coherent HR practices aligned with an organizational strategy, rather than individual HR practices used in isolation, may enhance organizational performance (Lepak, et al., 2006). Literature has much empirical evidence in support of these HPWS or systems of HR practices (Lepak, et al., 2006). It is the combination of practices in a bundle, rather than individual practices, that shapes the pattern of interactions between and among managers and employees (Cutcher-Gershenfeld 1991). Thus, research that focuses on the impact of individual HR practices on performance may produce misleading results, with a single practice capturing the effect of the entire HR system (Ichniowski, Shaw, and Prennushi 1993).

Folllowing MacDuffie (1995), implicit in the notion of a "bundle" is the idea that practices within bundles are interrelated and internally consistent, and that "more is better" with respect to the impact on performance, because of the overlapping and mutually reinforcing effect of multiple practices.

From the HRM literature, the concept of HPWS has emerged as a core construct encompassing the extent to which firms invest in the attraction, selection, management, and retention of the best possible human capital (Huselid, 1995; Lepak et al., 2006; Lepak & Snell, 2002) linking HPWS with the new TM approach. That is, HPWS are indicative of the value firms place on their human capital as a source for competitive advantage, with higher HPWS levels indicative of greater value firms place in their human capital.

Summing up, from the literature about TM, we distinguish five main components: alignment with the organization, that is, the adequacy of value that involves commitment and loyalty; managers that manage with talent, that is, a model about how employees can use and relate with others concerning talent; talent effectiveness, that is, the way people can use their talents; the freedom and autonomy to use their talents, that is, a basic characteristic of empowerment; and last, the development of talent, that is, the update of feedback about competencies and the development of potential in organizations. Therefore we propose a model of TM to analyse its relationship with other organizational variables.

EMPIRICAL EVIDENCE

In this chapter we present two main empirical results. First, the role of strategy and organizational structure with HPWS on firm performance. Second, the role of job satisfaction as a mediator variable in the impact of TM over individual performance. Results from the first study of Camps and Luna-Arocas (2009) showed that the originality of this work lies in conveying the fact that in order for these companies competing in quality to implement HR commitment practices it is important that they have a strong company culture based on shared values. Once the image one has of the company is perceived homogenously, making important investments and efforts in achieving optimized paying systems, training workers or selecting them properly becomes more coherent (See Figure 1, Figure 2).

TM is associated with a high performance system in organizations. But from a behavioural perspective, one of the main indicators of a high performer employee is their own perception of the work and effort they do (Bailey, 1993; Kuvaas, 2008; Peccei & Rosenthal, 2001; Tam et al., 2002). In this sense, the main model proposed postulates that the application of a TM strategy will have a direct effect on individual performance. Although this is quite useful for building a model of TM as was expressed by Lewis & Heckman (2006), as earlier literature has indicated, other variables related with involvement/commitment and satisfaction are also important in explaining the effectiveness and impact of a TM strategy. In this sense the literature review supports the idea of a

Figure 1. Structural model results. Standard regression weights

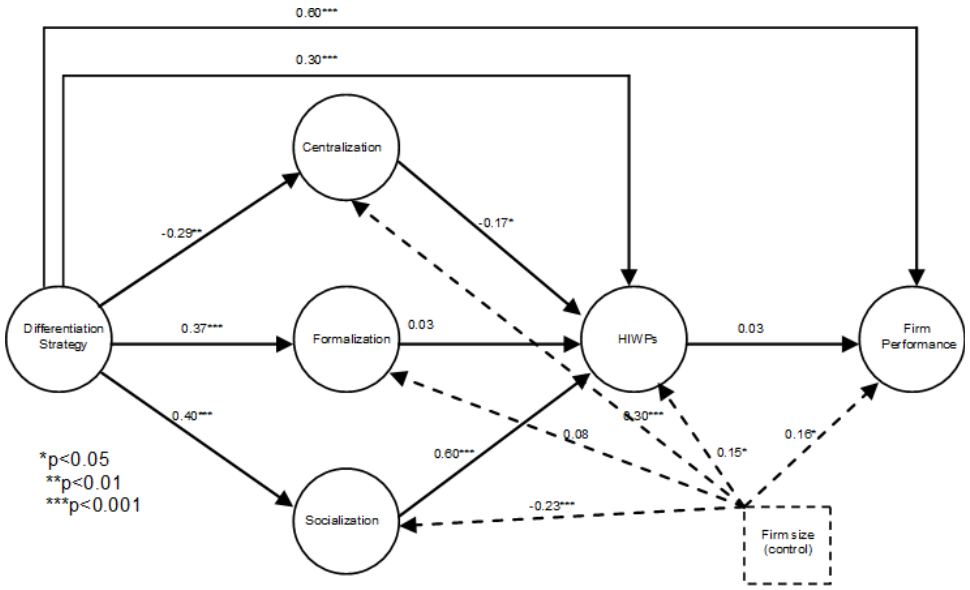


Figure 2. Model comparisons

Model	c^2 (d.f.)	c^2 difference (d.f.)	RMSA	CFI
Model 1: theoretical model	451.76 (379)		0.032	0.971
Model 2: centrali. → perform.		0.69 (1)		
Model 3: formali. → perform.		5.12 (1)*	0.032	0.973
Model 4: sociali. → perform.		0.18 (1)		

*p<0.025; each model compared to the theoretical model

mediating role of job satisfaction in the TM→ Individual performance relationship.

Studies suggest that HR practices affect organizational outcomes by shaping employee behaviors and attitudes (Huselid, 1995). More specifically, HPWS increase organizational effectiveness by creating conditions where employees become highly involved in the organization and work hard to accomplish its goals, in other words, by increasing their employees' commitment to the organization and job satisfaction (Eisenberger et al., 1997). When Varma et al. (1999) carried out research into 39 organizations in order to evaluate the effectiveness of HPWS initiatives, they discovered that organizations that concentrated their changes on the internal work-culture of the company as well as on their HR practices as part of HPWS design achieved important improvements in operational and financial performance.

Several studies have linked HR practices with individual work performance (Kuvaas, 2008; Edgard & Geare, 2005). The basic assumption is that the HR practices from the best practices perspective improve motivation, skills, attitudes and behaviours of their employees (Kuvaas, 2008). Although there are some controversial results Wright and Boswell (2002) indicate that HR practices impact on individuals constitute an opportunity to research in the future. Lee and Bruvold (2003) argue that investment in employee development facilitate more obligation by employees toward the organizations, and this elicitate employees´ motivation to effort and work hard supporting organizational effectiveness. Also MacDuffie

(1995) noted that to get a high performance organization linked to HR practices employees should be motivated to apply their skills and knowledge through discretionary effort. In this sense, TM is analysed as HPWS encompassing all the literature that links these practices with organizational performance. The added value from our perspective is a new model of HPWS called TM focused on a different general HR strategy. Also, the relationship between empowerment (development, one of the dimensions in TM) and performance has been contemplated in the literature (Logan & Ganster, 2007; Peccei & Rosenthal, 2001) (See Figure 3, Figure 4).

These results (Figure 3) reflect on the study that was presented at the International Human Resource Management Conference in Birminghan (Luna and Morley, 2010). Moreover, some new interesting research has been done by these authors relating also TM with Organizational Performance (growth and return of investment, perceived ROI) with the innovation strategy as mediator variable (Luna and Morley, 2011). Promising research is growing in the literature that sure will consolidate the talent management strategy concept and its powerful implications in the relation between micro and macro perspectives.

DISCUSSION OF RESULTS

Concerning the first research results from Camps and Luna (2009), the mediator role of organizational structure between organizational strategy and HR practices (in the sense used by Ferris et al., 1999 and Bowen & Ostroff, 2004) needs to be clarified in an empirical way. Much work has to be done in that direction. The intention in this first study is to advance in this effort by selecting an organizational strategy (differentiation), a construct of HR practices configuring a HPWS, and a component of the organizational structure (control mechanisms), and by trying to show the mediator role of these control mechanisms between the other two constructs.

Results obtained in this first study provide support for most of the hypothesized relationships presented in the model. First, this research

Figure 3. Path analysis 3 TPs -> POP mediated by job satisfaction. MADE-C talent model.

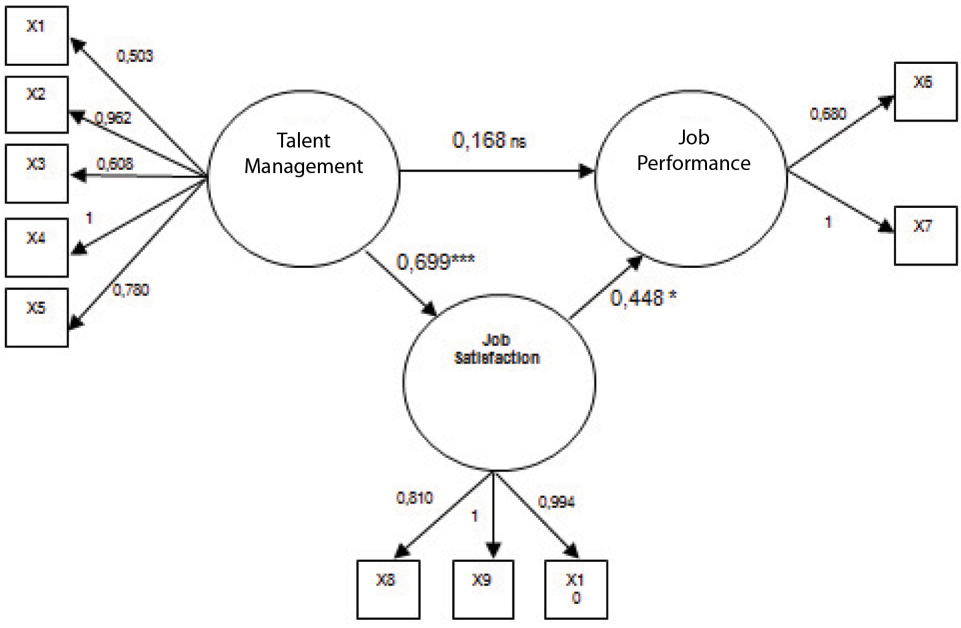


Figure 4. Path analysis TPs -> POP mediated by job satisfaction

Model	χ^2 (d.f.)	RMR	RMSA	GFI	NFI	CFI
Model 5: model	839,204 (45)	0,351	0,299	0,385	0,000	0,000
Model 6 TPs→ POP mediated by Job Satisfaction	89,159 (32)	0,052	0,095	0,916	0,894	0,928

provides empirical evidence that differentiation strategy enhances HPWS. The causal link between differentiation strategy and HPWS has been not completely validated in the literature. To date the evidence in favour of this connexion has been mixed at best (Becker & Gerhart, 1996; Delery & Doty, 1996; Huselid, 1995). This first study supports, in line with much of this literature, the positive direct relationship between these two constructs.

Also, the mediator role of control mechanisms between differentiation strategy and HPWS has been partially supported. This study supports the literature that established the negative relationship between centralization and differentiation strategy, and between centralization and HPWS (Govindarajan & Fisher, 1990; Ashmos et al., 1990; Wooldridge & Floyd, 1990). Therefore, centralization mediates, in a negative way, the relationship between differentiation strategy and HPWS implementation. Moreover, the results of this study support the causal positive relationship between differentiation strategy and formalization. In this sense, the results of the study support the causal positive relationship between differentiation strategy and formalization, in contradiction with other studies (Govindarajan y Fisher, 1990). However, the hypothetic relationship between formalization and HPWS is not significant. Therefore, we can conclude that formalization level in an organization which follows a differentiation strategy does not affect the implementation of HPWS in a significant way. Also in this study a strong organizational culture clearly mediates the relationship between differentiation strategy and HPWS.

Finally, in the same line that some works such as Ostroff (2000) and Lee and Miller (1999), this study found a positive direct relationship between organizational strategy and firm performance.

These findings can be interpreted as an indication that within the differentiation strategy context, HPWS implementation is easier when strong values and low levels of centralization are found in the organization. An eminently current HR literature is therefore corroborated, which favours the intensification of a "humanizing" work practice, especially if the aim is to achieve a correct implementation of competitive strategies which require the workers' implication in the process.

Nowadays, there is general agreement that human capital can be a source of competitive advantage, and that HR practices have a direct influence on the human capital of a firm (Delery & Shaw, 2001).

The results of the second study (Luna and Morley, 2010) are especially in line with extent contributions to the literature that focus on how a HPWS, in this case TM, influences individual perceptions of the psychological contract (e.g. Rousseau & Greller, 1994), in this case Job Performance. Therefore, we conclude that strategies centred on TM affect directly Job Performance, but thorough Job Satisfaction and this can be done if we attract people close to the values of the organization (Alignment). Moreover, this staff should be measured and developed (Developing TM) in competencies, and empowered (Empowerment) as much as the position can extend. But mainly, employees should have the talent mindset, that is, the competence of TM (Talent Competence). This Talent Model indicates the importance of job

satisfaction (JS) as a source of positive perceptions in organizations and points to how perceptions in this regard can influence the perceived individual performance of employees. The model does not postulate that we have to pursue JS as a main key to job performances (JP). On the contrary, it suggests that if we develop and institutionalise a comprehensive system of TM, this can affect both JS (directly) and JP (indirectly). Only in this sense we can understand both dependent variables.

More research should be done in order to integrate HPWS and TM literature. This will bring about practical implications in HRM. Also, recent studies are linking TM strategies with organizational performance. In this sense, TM literature has to demonstrate its contribution to the competitive advantage of organizations.

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KEY TERMS AND DEFINITIONS

Competency Based Management (CBM): Individual´s demonstrated knowledge, skills or abilities (competencies) aligned to organizational values and goals.

High Performance Work System (HPWS): Practices, as a system, directly related with organizational performance.

Human Resources System: Perspective of HR that considers all practices interrelated and influencing each other.

Talent Management (TM): Strategies developed in the firm to get the most for each employee in coherence with managerial goals.

Talent Mindset: Employee´s mentality focused on quality and excellence performance.

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Chapter 61
Research and Output Management in Digital Era: Emerging Challenges at UB

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ABSTRACT

The institutional commitment to research that was hitherto left to individual researchers and few research centres came with the University Strategy, 'Shape Our Future'. The Strategy, with clear mission and vision of research excellence, provided support for the development of a policy framework, subsequent research, output management infrastructure, and associated processes. This paper has reviewed these developments and emerging challenges posed by resource intensive paper based processes that need to be addressed inline with increasing aspirations for digital scholarship. Efforts to address these challenges are largely to reduce intensity of resource use inline with digital scholarship aspirations that embrace information and communication technology (ICT). However, the dynamism of developments and innovations in ICTs are characterized by high frequency of system obsolesce that could be costly to emerging resource poor Universities, particularly proprietary systems. This leads to the need of embracing the use of open source ware by investing in human resource development for capacity building and sustenance of digital scholarship.

INTRODUCTION

The turn of the century witnessed the development of commitment to research by the University of Botswana with the setting up of the Office of Research and Development (ORD). The office was charged with the responsibility of foremost formulating and implementing research policy that provided for research capacity and quality development and management through funding and training, as well as celebrating success in research. The impetus to this commitment was further boosted by the University's overall strategy 'Shaping

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Our Future' that identified research excellence as pone of its strategic goals that have now been clearly articulated in the Research Strategy (UB 2002, 2008). In line with the vision and mission of the University, the specific functions that have emerged from the initial policy and subsequent policies to support the development of research excellence include:

- Developing and coordinating a strategic research plan of the University.
- Facilitating the development of Departmental research plans.
- Facilitating the alignment of the internal research funding with research activities that support departmental research plans.
- Designing and implementing an effective funding system which sources research funds from internal and external sources.
- Assisting Departments to align their teaching and research activities so as to achieve research – led teaching.
- Increase research activity through various means including the creation of Centres of Study, post doctoral programmes, and collaboration with external partners.
- Establishment and implementation of a management system that provide for continuous rise in research quality.

Other functions focus on the outputs of research that include the dissemination of the findings by encouraging staff to publish research through peer reviewed channels that include well established external and internal University owned journals.. The effort is in support of the publication drive aimed at enhancing the University research visibility locally and internationally. The ORD also produces and publishes a comprehensive Annual Research Report which markets UB by serving as a tool for raising awareness locally and internationally about its research capabilities, and enabling it to attract consultancies for the mutual benefit of the University and its clients. This will also support the drive towards commercialization of research outputs, which is also the responsibility of the ORD.

Given this broad functions, the ORD has since been developing and articulating the necessary infrastructure that should support processes of delivering on the functions. This paper highlights some of the infrastructure components that include policy frameworks, institutional provisions and processes. Challenges that have surfaced are highlighted together with efforts put in place to address them by embracing technological developments that are continual supporting the digitization of research and information. While the paper shows the potential of digitization to enhance the management of research, it concludes by identifying challenges in the area of technology development that continue to experience rapid dynamism that may require high resource endowment to keep up with the global developments.

Research Policy Framework

As noted above, a policy framework that continues to improve with the strategic development of research and its support, signifying the University commitment, backs the ORD functions. The policies that are currently being implemented include: Research Policy; Policy on Ethics; Intellectual Property Policy; Policy on Centres of Study (UB 2002 and 2004). In addition, the recently approved Research Strategy provides an overall framework of which the implementation will be supported by these policies.

- ***Research Policy:*** This overall research policy was approved by UB Council in 2002, and it sets out the University position on research. It provides a framework for developing consistency, quality management, accountability and strategic direction for research activities. The Policy provides for the University Research Advisory Committee (URAC) to advise

the ORD, and has already been set up and operational.

- ***Policy on Ethics and Ethical Conduct in Research:*** The University Council approved this Policy in November 2004, and it defines the codes of practice that the University will adhere to in its research activities, and to make these binding to all staff. It takes due note of international and national expectations and customs, and provides clear guidance on the conduct and behaviour of staff. It also sets up mechanisms to ensure that the standards are met, through appropriate procedures and regulations that would ensure compliance. Efforts are currently on to set up necessary policy implementation structures that include Institutional Review Board(s) (IRBs).

The implementation of this policy will parallel the current Government of Botswana research permit system that is tantamount to some kind of research clearance. The UB based ethical clearance of research proposals will also have similar effect to the Government permit system. Streamlining the two processes would ensure minimum delays to the start of research activities. This initiative would be paramount to quality improvement.

- ***Intellectual Property Policy:*** The aim of this policy is to provide a mechanism for enabling discoveries and ideas created within the University community to be developed into products available for the benefit of society, and for any resulting income or rewards to be shared fairly between the stakeholders. It was approved by University Council in November 2004 to effect immediately.
- ***Policy on Centres of Study:*** The policy was also approved by the University Council in November 2004. It provides a framework and criteria that will enable new Centres of Study to be established and to be developed as a means of encouraging interdisciplinary research, teaching, outreach and scholarship, in harmony with the Vision, Mission and Values of the University

The implementation of the policies has led to the emergence of processes that underpin the activities that are necessary to implement the policies fully. The main flow in these processes is information that is currently mediated by paper which is increasingly becoming a challenge in its management.

- ***Processes:*** The research policies as highlighted above provide for activities in various areas identified as pertinent for the development of research culture. The overall policy identified research funding and quality management, research outputs reporting and management and also the need for ethical conduct in research that was later strengthened by a specific policy for it as areas for immediate attention. The processes of addressing the areas identified by the policies were mainly through the initiation of activities to improve on the situation as outlined subsequently.

Research Funding

The initiation of research funds management revealed a situation of uncoordinated research and a funding system that was not easily accountable centrally. It also emerged that the University research is funded internally and externally through donors and collaborative research. Further situational analysis showed that internal funds were given to Faculties without a management process that has clear accountability in terms of expenditure and research outputs. Externally funding was largely a matter between the researcher and funders/collaborators.

In order to improve on the situation, the Office of Research centralized the allocation of internal funds by setting up a system that has funding calls (funding rounds) for research proposals that are reviewed for quality and funded competitively. The proposals are submitted to ORD where they are recorded and photocopied for distribution to Faculties where the quality reviews by peers take place under the auspices of the Faculty Research and Publication Committee (FRPC). The potential winners in each Faculty are ranked and send back to the ORD which oversees the final assessment of the reviewed and ranked proposals for funding by the chair persons of the FRPCs.

The Faculties are also allocated part of the internal funds directly based on their research performance to support research proposals that are submitted to their FRPCs. This affords the Faculties the opportunities to strengthen their research performance by boosting certain areas of their research plans. The management of these funds has not yet been fully aligned to the ORD system to allow for coordinated and full reporting on the use of internal research funds.

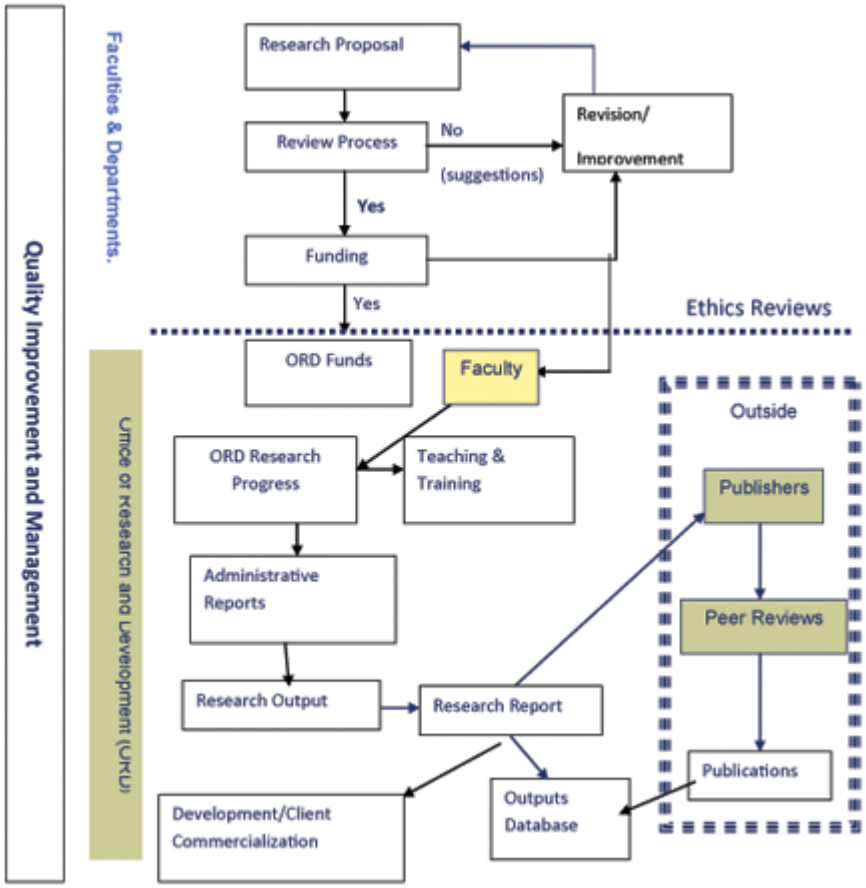
Similarly, externally funded research is not as yet fully integrated in the management of research funding such that the ORD is central to the processes as it does with the internal funding. It is envisaged that research proposals should receive comparable quality assurance irrespective of the funding sources as they all support the University institutional goal of research excellence. Hence the ongoing efforts of quality assurance through development and management of research quality as elaborated in the subsequent section.

Research Quality Management

The University of Botswana adopted 'fit for purpose' as a working definition of quality that can be interpreted to mean that all products of the teaching and learning and research processes must fit the purpose of which they are meant for. With regard to research which is the focus of this paper, a broader definition of quality has been adopted to include the whole processes as the product depends on it. The various stages of a research process are recognized, and quality assurance is intended for every stage once the quality framework has been finalized and an appropriate supporting infrastructure is in place. Currently this is done for proposals that are subject to academic quality and ethics reviews, and research progress monitoring that emphasizes timely reporting and completion of projects. Research papers emanating from the research are assumed quality assured by peer review mechanisms through publishing process (Figure 1).

- ***Academic Quality Reviews of Proposals:*** The review of proposals for quality focuses on theoretical rigor and scientific soundness based on the views of peers and experienced researchers in the discipline and area of the proposed research (Figure 1). The purpose of the reviews is to select the best proposals for funding and ranked according to level of quality on a scale of poor to excellent. Constructive feedback is given to unsuccessful proposals to build the skills of the researchers and improve quality of research at the University.
- ***Ethics/Safety Reviews (internal):*** As part of ensuring ethical and safe conduct of research, the ORD has started the implementation of the Ethics Policy alongside awareness raising through seminars on responsible conduct of research (RCR), and also developing guidelines on identifying misconduct in research. The implementation of the policy has required the setting up of the overall Research Risk Committee (RRC) responsible for insuring ethical conduct in research including conflict of interest that also covers financial matters. The committee operates through three subcommittees: Institutional Review Board (IRB) responsible for human subjects; Animal

Figure 1. Flow chart of management of internally funded research and quality assurance at University of Botswana (adapted from Sekhwela, 2006)

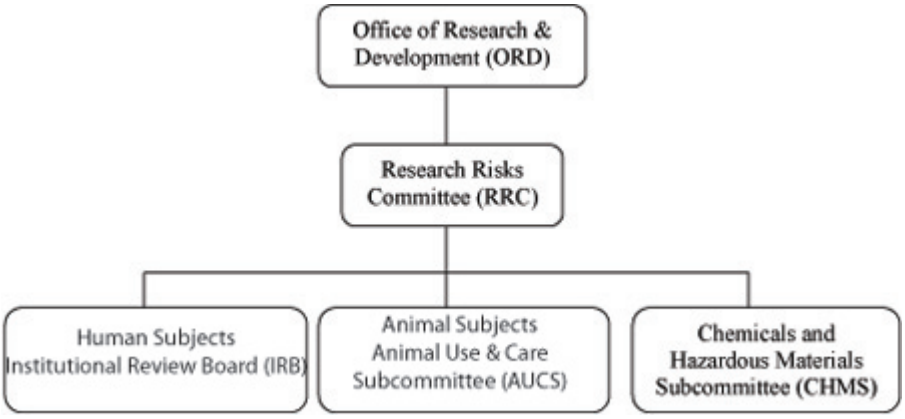


Use and Care Subcommittee (AUCS) responsible for research involving animals, and Chemicals and Hazardous Materials Subcommittee (CHMS) responsible for safe use and disposal of hazardous materials (chemicals and others) (Figure 2).

In addition to University based ethics reviews, Government Ministries have also been given mandate to review research proposals in their respect areas of responsibility and issue research permit which is mandatory for all researches carried out in Botswana (Government of Botswana 2003). The ORD funded research projects have to obtain research permit and comply with the obligatory repository condition of the permit. All University of Botswana projects funded internally or externally have to be permitted and comply with all conditions of the permit as required by law.

- ***Research Project Monitoring:*** Projects that have been permitted are monitored for progress 6 monthly and annually with reports required highlighting areas of progress in the project work plan. Researchers are also encouraged to disclose any problems or difficulties encountered in carrying out the project in order for the ORD to assist in improving the conditions of project

Figure 2. Ethics committees at University of Botswana



implementation. Prior to project implementation, researchers are work-shopped on project management that include the preparation of workplans with clearly outlined project milestones, budget and expenditure tracking, and reporting of both technical progress and financial accounting. Timely completion of research projects is regarded as paramount and part of research quality. It is also expected that all research findings are disseminated through reports, conference presentations and preferably peer reviewed journal publications.

- ***Research Support:*** The highlighted processes of research management are part of the developing support for high quality research at UB. In addition to training to develop the necessary skills, efforts are devoted to making information required by researchers easily accessible to empower them to act responsibly and be part of quality growth and assurance. Information availability on research governance, policies, procedures, guidelines, funding, research news, research outputs and expertise database has improved with a website created for the sole purpose of managing this information and making it easily accessible to the research community. The website provides such information for researchers carrying out or wishing to carry out research in the University; http/www.ub.bw/ORD/.

Emerging Challenges

While the ORD has made tremendous progress in developing research management and support systems, there are emerging and increasing challenges. The culture of individualized and 'self accountable' research that posed an initial challenge, is now revealing the fundamental problem of lack of research planning and supervision at Departmental and Faculty levels. Consequently all other processes of research planning, management and accountability as insisted upon by the ORD are not yet fully supported at these levels. This creates a gap for ORD that has no responsibility over researchers as they fall under Head of Departments and Deans of Faculties. The situation precipitates other challenges in the following highlighted areas:

- ***Research Proposition, Approval and Supervision:*** The lack of institutional research goals with prioritized research areas until the development and approval of the Research Strategy resulted in research

proposals that are not aligned to any desired long term planned research programme and competence building in given areas currently. While the strategy is still to be implemented, approval of proposals is largely on the basis of academic quality without any elaborate strategic criteria linked to long term desired achievements. This has undermined research supervision and the development of its leadership at Department and Faculty levels.

- ***Research Reporting:*** The reporting of research is not yet a priority or incentivised enough among researchers, and it is exacerbated by the highlighted lack of research planning and supervision. Currently internally funded researchers submit progress and final reports to the ORD directly and not accountable formally to their HoDs on their research as they do with their teaching and learning responsibilities. Similarly, externally funded research is largely the responsibility of individual researchers in terms of execution and reporting without the involvement of the HoDs or immediate supervisors, and the ORD has not been involved either. These gaps have increasingly made the collective reporting of research at UB very difficult as both the HoDs and Deans are not fully aware of all the researches being carried out in their Faculties and Departments as their researchers have not been eager to report on their research work. This is becoming a challenge as the University has started assessing its research performance, and the gap needs to be closed.
- ***Research Performance Assessment:*** The University has been putting in place processes of evaluating its achievements in pursuance of its strategic goal of research excellence. This depends on the availability of outputs for assessment, and the gaps highlighted above have been making this difficult because of incomplete research reporting. The adoption and implementation of the Performance Management System (PMS) for staff, has resulted in a research performance evaluation that will hopefully encourage research reporting as only one mandatory source of research outputs in the form of a database or institutional repository (IR) is under development (University of Botswana, 2008).
- ***Institutional Repository:*** The challenge posed by the development and operation of the institutional repository is the quality assurance of non published research outputs that are important in reflecting an overall University research activity. As a mandatory source of research information, all research activity of staff for annual assessment will need to be uploaded and quality assured. Hence the need for quality reviews at Departmental level where the upload will occur as the IR provides for Departmental collections.
- ***Research Quality Management:*** The achievement of the research excellence goals require the development and maintenance of research quality with internationally recognized benchmarking. While the PMS evaluation of research includes quality criteria and indicators, there are no appropriate structures at Department and Faculty level to support quality assurance.

The international recognition desired by the University in the area of research will require appropriate benchmarking as there are several research performance and quality indicators used that may not yet be applicable to emerging Universities such as UB, and these include:

- Total research expenditure.
- Total publications.
- Competitive central government funds.
- National science academy membership.

- External funding.
- Postgraduates (PhD) awards.
- Postdoctoral appointment.
- Citation indices of faculty.
- Patents, etc.
- ***Paper Based Processes***: The biggest challenge has been the resource use intensity of all the above highlighted processes that are largely paper based. The photocopying of proposals for the necessary quality and ethics review processes, and then disposal thereafter has been very costly. Similarly the reporting of progress of research projects is requiring more and more paper and filing that needs storage, and the situation is worsening with increasing research activity.

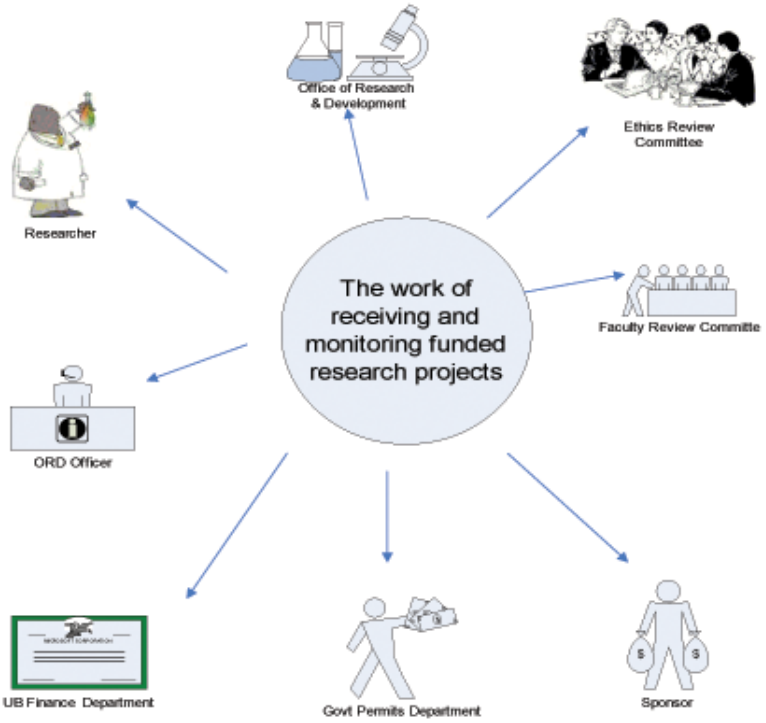
There is also need to reflect the reality of challenges nationally and Africa as a whole, and embark on appropriate responses.

Responding to Challenges

In order to address the highlighted challenges, efforts are being made in various fronts starting with coordinated strategic research planning lead by the ORD to provide for research planning, management and leadership at both Department and Faculty levels. This would provide a framework for quality reviews and assurance of proposals and research processes. In order to address the high paper and other demands of these processes as highlighted above, the ORD has embarked on developments that would addresses these challenges as outlined in the subsequent sections.

- ***Research Management System (RMS):*** The management of the proposal submissions, reviews (academic quality and ethics), approval, monitoring of research progress and other processes that are currently paper based and taking up lot of resources, are earmarked for computerization with the development of a Research Management System. The system is expected to manage the whole workflow from the time a proposal is submitted for funding through all subsequent processes till the project is completed if the research is funded (Figure 3). As a web-based system, authorized persons will have accesses at the various stages to perform whatever tasks necessary, as well as researchers for information about their research proposals or decisions on their research work The system is expected to be linked to the financial and human resources systems, as well as the staff performance management system and the Institutional Repository for research outputs when these are in place.
- ***Research Output Database/Repository:*** The research policy and subsequently the University Strategic Plan highlighted the need for research performance assessment and evaluation that were not easily done because of lack of collected research output. A modest web-based research output database developed in 2003 has since demonstrated the potential of digital information, and this is now being further developed to fully benefit from the versatility of this type of resources. The limitations of the facility that included few data entry points based on compiled data and lack of data manipulation and analysis for reporting purposes, are now being addressed to allow multiple data entry that include self up-loading by researchers and data analysis. This will be enable by the currently ongoing development of a web-based institutional repository (IR) through which self up-loading will be carried out, with necessary workflow management put in place together with quality assurance. Necessary links or interfaces will be developed for data harvesting or analysis for reporting purposes and other uses such output verification for

Figure 3. Examples of some the components of the research management system that is being develop for the ORD (Adapted from Mogwai, 2007)



staff research performance assessment for rewards and reviews for promotion.

The University through its Library, is one of the designated national legal research repositories in the Government of Botswana research permit system, and these collections are mostly in hard-copy and not easily accessible to researchers outside the University and the country. The IR as web-based information resources will allow access to all such collections and the University research outputs and ongoing work generally, increasing its visibility and thereby attract potential collaborators as well as customers for its demonstrated capabilities as reflected in its work (Figure 4).

- ***Draft Publishing Policy:*** One of the increasing challenges facing the University implied in the preceding section is the lack of national and international visibility of its research work. This has come to the fore nationally during the development of the Botswana National Research, Science and Technology Plan that pitied the University against other national research providers. While its voluminous research output was comparable to none, the lack of its impact or visibility in the national innovation systems was a far cry in the light of it being supported by public funds (Government of Botswana, 2005). At the same time, the report could not find any respectable presence of the University in the international research landscape assessed using indicators of research strengths as reflected by peers, e.g., citation indices. Hence the University is now responding to this challenge through the development of the IR above as part of its publication drive and a publishing policy to support these efforts.

Figure 4. The University of Botswana Institutional Repository (IR) Prototype Page



The overall aim of the Policy will be to create a context in which the scholarly communications and publications of the University of Botswana can be enhanced at all levels, national, regional and international. While recognizing various channels of research dissemination, the University has its own journals that the policy is providing for their further development that will include digital formatting and online accessed. It is also envisaged that submission of manuscripts, reviews and other publishing processes in respect of the journals will eventually go online as part of embracing digital scholarship that has already a task group working on (Figure 5).

- ***Quality Management:*** The imperatives of encouraging and developing quality in research to inspire public confidence in the research findings and assurance that funds are invested in the highest quality investigations are no longer a matter of choice. While the research strategic planning offers a framework for research management, the research management system highlighted above needs practical arrangements on the ground that are guided by certain expectations as part of quality management. Hence the development of a framework that provides for research quality assurance through the structures that will manage the workflow in the system.

The framework seeks to encourage the development and sustenance of high quality research by promoting and insuring the following as critical cornerstones:

- Research leadership and management.
- Clear allocation of responsibilities and research supervision.
- Transparent decision- making processes.
- Development and adherence to set quality criteria and standards.
- Clearly laid out quality reviews and procedures.
- Clearly laid out monitoring and evaluation arrangements.

Figure 5. Examples of University of Botswana journals being considered for digital formatting as part of further development in digital information management



- Measurement and reward for research success.
- Research support that include adequate allocation of resources.

It is expected that the structures that are set up will ensure the above cornerstones, and play a major role in the RMS when it is finally put in place. The quality framework is supported by the University of Botswana Quality Strategy, research and other policies as well as national and international laws that provide for healthy and safe conduct of ethical research.

Yet Biggest Challenges

While digitization of research and output management processes will address various challenges highlighted above, there are still further challenges posed by the digital environment and supporting technologies that are under constant evolution. The potential and benefits provided by the digitization can be realized if capabilities are developed to continual address the following:

- ***Interfaces:*** The highlighted research project management systems under development or being resourced will need interfacing the personnel and financial systems for automatic updates of project expenditure and staff employment status. Similar interfaces will be required for linking with the institutional repository to update research outputs at the completion of the projects and the PMS online performance agreements for verification of the reported research outputs for rewards.
- ***Lifetimes and migrations of databases:*** The lifetimes and migration of information databases created with digitized systems will remain a constant challenge as technology changes, and require 'in-house' capability and capacity to adjust and develop as necessary.
- ***Speed of resourcing technological changes:*** The dynamism of technology development may render newly and costly acquired technology/systems absolute before fully benefit has been derived and needing further and speedy development for con-

tinued use. This may be costly to lowly resourced institutions/organizations such as UB, and this need to be considered in the development and fully embracing digital scholarship.

- ***Platforms ± Applications ± Open sources?*** The question of what platforms and applications for use in digital information technologies is increasingly arising as more choices are made available. The cost implication of proprietary systems and software applications have led to more efforts devoted to open sources that allow for cheaper application of technology. This however, require self supporting in further development and customization to enable use as needed, hence the need to invest in appropriate human resources. The highlighted dynamism of technological innovations are further challenged by development in digital scholarship that increasingly support open access to scholarly information, at the same time assuring the protection of intellectual propriety that is also being commercialized. Once again emphasizing the need for adequate human resources.
- ***Human Resources:*** The major challenge in technological development remains the human component that drives both the innovation and application of the same. The development aspects tended to be highly competitive with systems becoming absolute quickly and increasingly expensive for low resourced suppliers who close shop, leading to the dominance of bigger companies producing proprietary systems/ware. However, alternatives that have emerged in the form of open source systems for continual 'cooperative' and shared development require input from users. Hence the need to have adequately developed human resources to drive both the development and application of the necessary innovations for the digital scholarship from open sources. Therefore emerging Universities such as UB should aim to maximum the potential of open sources by emphasizing human resources development in the area of ICT so that its aspiration of digital scholarship could be fulfilled.

CONCLUSION

The aspirations of research excellence have resulted in the development of institutional strategic research goals and supportive policy framework inline with the mission and vision of the University of Botswana. The implementation of the strategies and policies led to the development of research and output management infrastructure, and associated processes that have exposed challenges that need to be addressed in order to promote digital scholarship. Much of the challenges are related to high resource use by paper based processes which appear to be a draw back in the digital era, and efforts are under way to address them. However, the high diversity of systems and dynamism in technological innovations pose further challenges for resource poor emerging Universities such as UB, and it is proposed that the solution could be found in open source wares coupled with adequate human resource development for self sustenance in ICT. The need for in house capacity is also supported by the challenges posed by the increasing move towards open access to scholarly information, and the need to protect intellectual property that is also being commercialized.

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Chapter 62
Recruiting, Selecting and Motivating Human Resources: Methodological Analysis and Case Studies Applications

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ABSTRACT

This paper's aim is to analyse practices adapted by different enterprises regarding personnel motivation and human resources approaches to increase their productivity and profitability while examining the methodology of human resources recruitment and selection used by different kinds of enterprises, which cannot exist without human manpower. The objective of this paper is to analyse methods and tools used by several enterprises in motivation and in human resources recruitment and selection. Regarding motivation, the basic aim of the process adapted was to define whether each enterprise was closer to the participating or to directive management model. Especially in the recruiting and selecting process IT could add important value since adapted IT processes could lead to quicker and more successful transparent results. IT professionals could organise these processes for every enterprise in order to become standard, formulated, and even more accredited procedures which would lead to successful recruiting and selecting results.

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INTRODUCTION

The environment in which enterprises are operating is extremely competitive and in order to survive, they have to react to the new circumstances, including globalisation, new technologies, innovation and collapse of economic barriers. Moreover, low productivity is a common problem faced by an increasing number of organisations world-wide. When in an enterprise the productivity is not managing to keep up pace with the increasing work cost, then effectiveness, but also the existence of the enterprise, is under important threat.

Requirement for each enterprise is competitiveness, productivity, quality and finally efficiency. The objective of this paper is to analyse methods and tools used by several enterprises in human resources recruitment and selection, taking into consideration the aforementioned requirements (Vaxevanidou, 2008; Chitiris, 2001) and, moreover, to examine motivation methods used by them.

For this scope important is the role that the human resources recruited provides. The human resources, in the field of organisations and enterprises or the human capital, in the field of society in general, are considered as basic pivot of development and whilst up to now they were defined inductively, a tense is presented to be assessed in knowledge (new and dissemination of existing) and skills (education and training).

Human resources are the only factor that could activate and develop all the production elements, in order an enterprise to operate and successfully accomplish all its objectives. Great and successful enterprises are formed by human capital, whilst enterprises fail or are low efficient, as employers could not or are not willing to participate in the objectives' accomplishment.

Machinery, computers, installations and the rest factors of production, do not think, learn, try and of course do not set objectives in order to decide what and how to perform. Furthermore they are not motivated, they do not act collectively and they do not have expectations and needs to de fulfilled. All these characterise the human nature and action (Chitiris, 2001).

The quality of Human Resources is characterized, without any doubt, first priority for a "competitive economy" and for balanced social development. This recognition is depicted in operational level, through the quest and adaptation of methods used for investment's value assessment and for education and training of production mechanisms.

Regarding motivation, the question that derives is what the reasons of low productivity are. A number of executives are pointing as reason for low productivity the decrease of personal motives and the minimisation of "will to work". Moreover, the decline of devotion to the organisation in correlation with weakening of their commitment to the ethical laws for work is another important factor. The aforementioned explanation has been challenged repetitively by experts on human resources management, based on an important number of results. According to these results, it is proved that, as a rule, an individual human being "wants" to work, "wants" to be productive and to contribute to the organisation's development. Supporters of the so called "motivation school" support that if the productivity of employees is inadequate, management has not succeeded to apply in a right way the conclusions of the modern science related to work environment attitudes. Rivals as the aforementioned lead to the conclusion that it is difficult to define what the "real" answer for low productivity is. To succeed a common accepted answer, a number of parameters should be taken into account as the possibility that motivation experts and academics could be wrong and the option that individuals are not willing to work or are obliged to work and for this reason do not perform in an efficient way.

It is easily perceptible how important Human Resources Management is when it is applied in the right way, in order an enterprise to acquire, preserve and develop capable employers, who will execute their role efficiently and success-

fully. Indicatively actions that Human Resources Management includes are (Chitiris,2001):

- Planning of Human Resources
- Job analysis
- Recruitment and selection of capable human resources
- Education and Training
- Employers' efficiency evaluation
- Employers; wages
- Employers' protection
- Negotiation of working relations

The aforementioned actions are interrelated and inter-depending in such a degree that the successful or not execution of one influences the rest. It is obvious that the on time and rational planning of human resources influences the efficiency of actions of recruitment, selection and education, whilst the inefficiency of the system influences human resources planning.

In order to highlight the interrelation of human resources actions, it is deliberate to consider them as subsystems of the human resources management system. Each transformation of one of the aforementioned sub-systems (or of their elements) influences the operation and efficiency of the whole system. Human Resources Management, considered as an open system, accepts inputs (human resources) and is being influenced by factors and limitations of the external business environment. Adapting the appropriate processes seeks the accomplishment of specific outputs-objectives, as the qualitative and quantitative performance of the employers, the positive working conditions, high motivation level (Werther, 1996).

As it can be conclude, Human Resources Management is a tough project, multi-sectoral, requiring knowledge and art by all involved individuals (Human Resources Managers or not) (Chitiris, 2001).

Basic factors for the successful and effective function of an enterprise or organisation constitute the recruitment and the selection of ideal executives and workers for any level of hierarchy. The basic aim therefore is that all stages can be comprehensible for an objective and effective selection of the particular candidate for the particular vacancy should be accomplished.

It is vital, that the qualifications and the experience which an enterprise requires to be precisely determined, before the enterprise commences to search for the suitable candidate for the job vacancy. This can be achieved with the meticulous job-description and the thorough definition of the candidate specification (Chitiris, 2001; Hindle, 2001). The job-description is useful as a map and as a compass on the direction that each employee is obliged to have for the implementation of the work. It describes in every detail all the content and the breadth of work that it should be executed by the holder of the position (Vaxevanidou, 2008). The candidate specification, or personnel specification, as it is frequently called summary of the knowledge, skills and personal characteristics required of the job to carry out the job to an acceptable standard of performance (Cole, 1999).

The next step is the attraction/seeking of human manpower, as it is called the process of inviting of suitable individuals with regard to their knowledge, experience and skills, so that they can correspond to the job required (Leigh, 2001). There are two basic methods of seeking ideal candidates for covering the vacancies: 1) the Internal Attracting/Seeking with the exploitation and upgrade of the existing personnel, and 2) the External Attracting/Seeking via the external environment of the company. Both sources of attracting/Seeking have advantages and disadvantages; thus their combination helps the enterprises to remain competitive in a rapidly altered environment.

The observation of an electronic database with the characteristics of the employees, the notification of the vacancy via the company's table of statements or the company's publications, the internal system of promotion, the workers' references and finally the recruitment of former workers of former candidates constitute the in-

ternal seeking process. The external sources of attracting are various and differ in terms of cost and effectiveness. The most usual are the following: the contact with the Offices of Interconnection of the Universities and Polytechnic Colleges of the country, the contact with technical and professional faculties of specialisation, the communication with the Organisms of Employment of Workforce and the local unemployment agencies, the interaction with the private agencies, the collaboration with companies of benefit of services and selection of executives, the communication with relevant enterprises of the branch that proceed in redundancies, the transcription of executives from corresponding competitive enterprises of the branch (Vaxevanidou, 2008; Chitiris, 2001; Hindle, 2001).

Then the process of the selection follows. According to the requirements of each vacancy, a practical combination of examining methods – steps is used, so that all essential information for each candidate arises. In each one of those steps it is possible that the candidate could be rejected; the analytic description of these steps is: First of all, the person in charge (interviewer) examines the CVs and the applications of employment (accompanying letters) that the candidates have sent and divides them into three groups as follows: very suitable - must be interviewed, quite suitable - call for interview if insufficient numbers in previous category, or send holding letter, not suitable - send polite refusal letter, thanking them for their interest in applying (Cole, 1999). If there are numbers of very suitable candidates, then it may be necessary to have one "first" interview of short duration, aiming at the reduction of the suitable candidates who will pass from the "main" selection interview in an acceptable number (Chitiris, 2001).

The next step is the second phase of the selection process, the interview, which is the most common technique used for selection purposes. It is very important to be properly prepared before an interview. It enables the interviewer to feel confident in himself about his key role in the process, and enables him to exploit to the full the information provided by the candidate. It also helps to minimise embarrassment caused by constant interruptions, inadequate accommodation and other practical difficulties.

Questioning plays a vital role in a selection interview, as it is the primary means; which information is obtained from the candidate at the time. Questions have been categorised in a number of different ways, however it is enough to distinguish between closed questions, which require a specific answer or a Yes/No response and open questions that require a person to reflect on, or elaborate upon, a particular point in his own way. Open questions invariably begin with what? How? Or why? It is usual to ask closed questions to check information which the candidate has already partly supplied on his application form, and to re-direct the interview if the candidate is talking too much and/ or getting off the point. Open questions tend to be employed once the interview has got under way, with the object of getting the candidate to demonstrate his knowledge and skills to the interviewer (Cole, 1999). Open questions are probably more useful in the interview, since they allow the interviewer to observe the communication dexterities of the candidate (Hindle, 2001).

There are three conduct methods of an interview: one-to-one basis, a two-to-one situation and the panel interviews. By the panel interviews it is ensured the fairness of the proceedings, since more interviewers evaluate the candidates and finally agree for the suitability of the candidate. From researches it has been found that it is required relatively few time in order the interviewers to reach a consensus over the suitable candidates. What is critical for the effectiveness of the interview of this type it is the good collaboration and the co-ordination of the examiners. There are several disadvantages, however - the candidate will find it difficult to feel at ease in such a formal atmosphere; the individual; panel members may be more concerned about being cued for their

questions than being concerned to listen to what the candidate is saying (Cole, 1999; Roth, 1992).

There are three basic types of an interview; the standardised where concrete rules for all candidates without exception are applied, the structured where predetermined structure is followed but not necessarily common for all candidates, and the "free" interview, with the form of a free flowed dialogue between the interviewer and the candidate.

Besides the interview, the candidate can simultaneously pass from various tests, according to the nature and the requirements of the vacancy. The basic function of the tests is the measurement of the dexterity and the behaviour of the candidate in different cases and under special conditions (Vaxevanidou, 2008).The tests can be divided in a lot of ways; however, the most acceptable way of classification is in two big categories; the attainment tests and the personality tests. With the attainments tests can be measured the possibly highest performance of the candidate, while with the personality tests can be examined the main characteristics of his personality.

The assessment centres is an alternative way of selection in which the candidates for high graded vacancies are subjected to an amount of questions and exercises. The processes, which are applied, are about the evaluation of the candidates' skills with regard to important sectors of professional activity. It is found from researches that the assessment centres, as a selection method, give reliable and valid results. The disadvantage of this method is its high cost and that it time consuming process.

It is vital, after every interview, concerning the suitable evaluated candidates, that a confirmation of the information they give in their CV or during the interview be done, on terms of their signed authorisation.

As far as the selection decision is concerned, there are two methods; the subjective, which is based on the personal evaluation and the objective, which is based on the results of a statistical analysis (Chitiris, 2001).

Furthermore, it is vital for particular jobs that medical examinations are done by the new employee, either because there is a relevant relation to the implementation of his work, or in order to exclude the possibility of transmission of dangerous illnesses in the working place. In any case, the physical health of the candidate should be controlled after offering the job.

The recruitment under trial gives the opportunity to the company to examine the new employee in practice, to find his skills and to be sure that he possesses the ability to perform the job required. This method is applied for a period of time (one or two years) mainly by the most banks and the biggest organisations.

Finally, the employee's integration is the last and most important step, that the companies usually neglect, since it is between the end of the selection process and the beginning that that the employee undertake his new role (Leigh, 2001). The new-employees' integration in the company constitutes one of the main functions of the Personnel Management, since it has an essential role, not only for the employees' performance, but also for their long stay in the company.

Managing a company or an enterprise and achieving its targets requires the cooperation of human resources. The administrative actions are characterized by the efforts to motivate work force and to equate company's objectives with workers' objectives. The presence of a worker in a company's project does not contribute towards the promotion of company's objectives. The contribution could be either positive or negative, depending on the similarity of objectives.

Every project team member is considered to be basically a passive element that could be motivated, could produce, but could not undertake initiatives. Thus the activation of the work force in order to produce is the baseline of every managerial effort. Two are considered to be the basic issues that preoccupy the administrative hierarchy of a company:

1. The finding of the level that employees could support efficiency or could increase efficiency in correlation with overall objectives accomplishment.
2. What are the motives related to the efficiency of the employees, in which level these are related to work productivity and in what degree a motivation system could be adapted, in order to support the effective motivation of human resources towards a predetermined direction.

METHOD

Participants

The scope of the approach adapted was not to compare organizations of similar characteristics but organizations of different fields that could be activated in the same industry (especially in the construction industry). The reason of such a selection was the fact that the type of the offered services affects in an important degree the recruitment and selection process and, moreover, the motivation policy and the level of employees' participation.

Two groups of organisations under investigation were created; one in order to examine recruitment and selection and one in order to examine motivation.

Selecting the organisations that formed the sample for distributing the questionnaires was based on the aim to cover the following 4 axes:

1. Local Characteristics
2. Construction industry.
3. Private and public sector.
4. Word wide range local enterprises.

The sample of Human Resources' Selection and Recruitment Sample was consisted of the following enterprises:

- A Societe Anonyme of the public sector, with 278 employers. The Human Resources Manager and responsible of administrative matters answered the questionnaire, whilst more details of the organisation are not publicised due to their request.
- An important technical construction company, activated and constructing important projects all over Greece and abroad, either by itself or conglomerating with other companies of the sector. It has 100 employers, whilst this number could be increased depending in the number of the undertaken projects. More details of the organisation are not publicised due to their request.
- The third company was a local development agency. Its activities are prescribed by the wider European philosophy, for more essential decentralisation, with active contribution in the planning and management of the development resources, through the coordination of all local institutional authorities. The detection, research, promotion, support and realization of integrated proposals for the growth is achieved through the productive exploitation of national and European financial support and development programs. It has 32 employers, depending in the number of projects undertaken.
- A medium-sized company of the sugar products' sector. 50% of its production is sold in Greece whilst the rest 50% abroad. It has 40 employers. More details of the organisation are not publicised due to their request.
- A local branch of a private bank (established in 1982). It has 10 employers and the answers were given by the 2nd manager.

The sample of Human Resources' Motivation Sample was consisted of the following enterprises:

- A technical company constructing private projects (Organisation No.1). The company is activated mainly in the sector of building constructions, covering issuing building permits and constructing private owned buildings (either as constructors-design and build or as developers-design, build and sell). The company employs ten individuals and is operating for more than twenty years. The selection of this company was based on the fact that it reflects the typical example of a small company with two owners (engineers with horizontal relationship). The company is considered as medium sized, at local level.
- An important technical company of general construction operations (Organisation No. 2), employing more than forty individuals. The company is producing private and public works nationally. Moreover, they own concrete production premises, for internal and external, to the company, projects.
- A factory (Organisation No. 3) producing ready to use concrete (last of the construction industry sector). The company employs ten individuals and is operating for more than twenty years.
- A participative company which produces, standardises and trades local agricultural products word widely (Organisation No. 4). It constitutes a pilot pioneering company at national level, exporting products in important markets, as the European Union and Russia. The company employs forty to fifty individuals, depending on the production level.
- As typical sample of the private sector, the local branch of an important Greek bank (Organisation No. 5) was selected, having fifteen employees.
- The local branch of a public sector organisation (Organisation No. 6). For this specific organisation, it must be noted, that the director responsible of answering the questionnaire could not answer all questions, as some of them could not be applied in the public sector. These questions were answered by a private sector expert, of the same profession discipline as the responder.

MATERIALS AND PROCEDURE

Regarding recruitment and selection three types of questionnaires were produced (closed type graded, closed type of two alternatives, open type). The questionnaires were produced for the scope of this paper and were used for first time within this paper's framework.

Regarding motivation, the questionnaire was based on the research work of Dr. E.S. Stanton (1982), Professor of Management in the Business Administration School of St. John University-New York. The initial thirty questions were adapted at local level and the questionnaire was enriched with fourteen more questions. Each question-proposal is graded from one to four depending on its subject. The possible answers to these questions were: totally agree, generally agree, generally disagree and totally disagree. In the end the grades are added, leading to a possible range of total grade between 44 and 176. The answers were weighed in the way that the lowest total grade results to adaptation of directive management model whilst the highest grade results to adaptation of participating management model, by the organisations under examination. All enterprises under examination were based in the same local environment (Pieria, Greece) and a predefined questionnaire of closed type was addressed to them.

Procedure

The completion was consisted of the following steps:

1. Questionnaire composition
2. Distribution of the questionnaires to the executives responsible for human resources management and employment relations.
3. Provision of time in order the questionnaires to be studied and analysed.
4. Predefined on-site meetings and interviews for possible specifications.
5. Questionnaires collection.

RESULTS

Human Resources' Selection and Recruitment Analysis

Graded closed-type questionnaire offered four different possible scaled answers: Always-Often-Sometimes-Never. Regarding the 25 questions of the graded closed-type questionnaire, these were divided in 4 categories: firstly the questions which displayed "absolute identification" of answers; all companies answered "Always" or "Never", secondly the questions which displayed "identification" where the companies answered "Always-Often" or "Sometimes-Never", thirdly the questions which displayed "big dispersion"; in this category the answers "Always" and "Never" occurred simultaneously (possibly the intermediary answers occurring as well) and finally the questions that displayed "small dispersion" with the answers "Often" - "Sometimes" - "Always" or "Often" - "Sometimes"- "Never". Grouping as aforementioned, led to the following results: 12% of the answers displayed "absolute identification" and "identification", while 32% of the answers displayed "big dispersion". The highest percentage of the answers showed "small dispersion", which is 44%.

As far as the closed-type Questionnaire of two alternative choices is concerned, the 12 questions were grouped in 2 categories: in the questions with two alternatives choices as an answer and in the questions with the additional choice "Combination" of the above mentioned answers, as some of the under investigation companies couldn't give as an answer one of the two alternatives excluding the other.

The questions of the opened type questionnaire couldn't be possible to be grouped in any way; thus its answer are analysed further below.

Closed-Type Graded Questionnaire

The answers provided by the under investigation companies/organisations in the closed-type graded questionnaire are presented according to the grouping aforementioned; identification and dispersion of answers.

Absolute identification was pointed in the fact that for each enterprise the general direction is always responsible for the selection process; whilst interviews are always take place within the enterprises premises.

Identification was presented in the fact that the recruitment of formerly rejected candidates is sometimes necessary because of the specialised

Figure 1. Graded questionnaire - Grouping of answers based on identification-dispersion factor

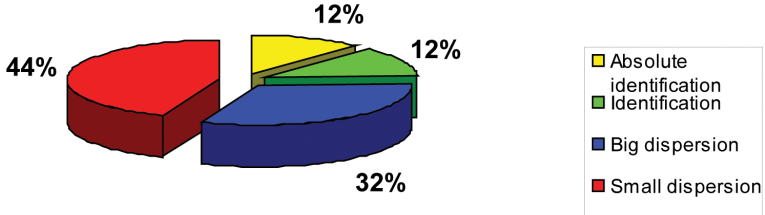
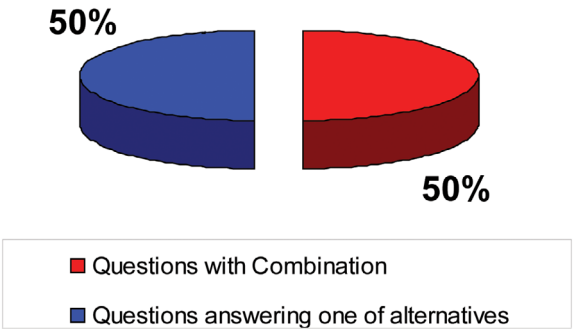


Figure 2. Two alternatives questionnaire – Grouping of answers based on combination or selection one of the answers



type of the services (local development agency and public sector company).

Regarding big dispersion, in three companies, the responsibility for the selection process is not taken by the Department of Human Resources Management. This was expected for the two of them (industry of food, local development agency), since they do not have such a Department. The Human Resources Management Department always decides for the selection only in the Public sector company, where the decision of the selection belongs equally to this department; perhaps because of the enormous size of the human resources that recruits. Relatively to the available database, a high dissemination between the answers is observed. As it is also observed, the companies with limited workforce do not hold a database with the characteristics of its each employee or they occasionally hold; while the companies with considerate workforce do that, always or often. An exception of the sample constitutes the local development agency, which despite the limited number of its personnel, always holds a database, because of the specialised type of services and the limited offer of work at local level.

Regarding small dispersion, the internal recruitment of human manpower is being preferred by the companies that allocate a high number of human resources, compared to the external recruitment (technical company and public sector company). When the personnel is vast, there is the possibility of allocating different responsibilities to people of different sectors, according to the requirements of each position and the experience that they acquired during their professional background in the company. This is a little more difficult to be achieved by a small sized company, which prefers the exterior attraction of human manpower. Nevertheless, most of the companies often give the possibility of recruitment to candidates from other country - members of the European Union. The reason is the international dimension of the used methodology and the use of the English language that is required for the management of many projects, as well as the use of standardised personnel. Only two companies exclude that possibility (bank and the food industry). For the most companies, former employees of a company are never being recruited again. The companies which are excluded have a lot of contract based projects (local development agency, technical company), so it is very likely that a former employee with experience on that specific field will be recruited. In the rest of the companies the employment is depended, which means that the employee resigns either with his will, or is being fired because his employer is not satisfied with his performance.

General identification can easily be observed in the answers of the local development agency, the Public sector company and the technical company. It can be ascertained that the common characteristic, which the three companies have, is the formality that distinguishes them with regard to practically but at the same time very important subjects of the selection process. It is also remarkable the recruitment of former employees by these companies; a reasonable explanation for that constitutes the specialised work in these companies that requires specific qualifications. Finally, an obvious identification in the negative answers of the food industry company and the bank is equally observed because of the standardised work that is considered at the recruitment of personnel.

Closed-Type Questionnaire of Two Alternative Choices

The conclusion that anyone can easily reach is that most questions - proposals that required the addition of the answer "Combination" concerned the qualifications that the ideal candidate should possess in order to be recruited by the company; such qualifications are for example the experience, the specialisation, the quantitative and qualitative characteristics, the technical and communication skills. Furthermore, the question concerning the preference of men or women for the recruitment constituted an issue of major interest.

The questions that were answered with the two alternative choices concerned the highest percentage the elements of the selection - interview, as for example the type of the questions, the method of the interview and the tests.

The conclusions about the answers that were given in all questions - proposals are presented in groups.

With regard to the qualifications that the ideal candidate should have, the overwhelming majority (60%) of the companies (technical company, food industry company and bank) considered that the time experience at work is more important than the specialization. The 20% (public sector company) considered that the specialisation is more important; while also at the same percentage (local development agency) didn't trace any difference in the degree of the importance between the two qualifications and both of them are being required.

The technical dexterities outweigh the communicational skills, according to 40% (Public sector company and technical company), while just the 20% (bank) answered the opposite. It is also remarkable that the 40% of the companies (the local development agency and the food industry company) answered that both dexterities are equally important; that shows that the candidate is examined on terms of technical and communication skills.

The companies with low manpower are these companies which considered equally important both dexterities. They included the communicational skills, perhaps because in a small working environment proper working relationships and friendly atmosphere enhances performance. On the contrary, in the big enterprises is given priority in the technical dexterities, as usually impersonal relations prevail between the workers.

Particular interest presents the fact that mostly (60%) (technical company, food industry company and bank), the candidates who are overqualified are rejected because of their high economic requirements they will probable demand. The public sector company recruits them only, as the more

Figure 3. Important qualifications

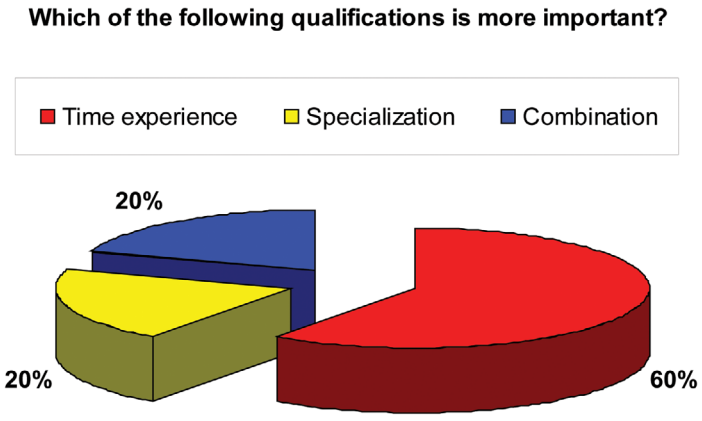
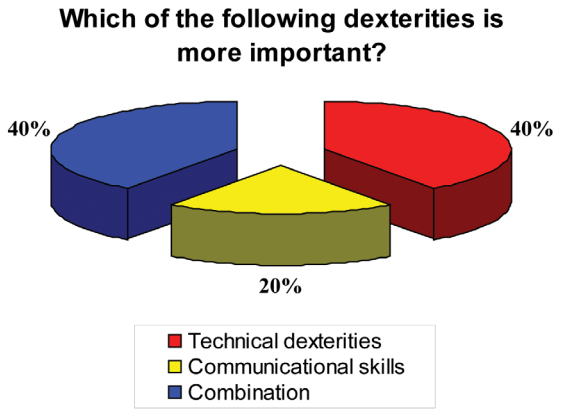


Figure 4. Important dexterities



qualifications do not play any particular role in the salaries of the public sector. Even if it influences the salary, the state budget has the possibility of covering the difference. Whether overqualified candidates will be recruited by the local development agency, depends on each project case and on their specialized services.

Particular interest presents also the fact that, the majority of the companies (60%) (public sector company, technical company and local development agency) does not present any certain preference regarding the recruitment of men or women, while 40% (food industry company and bank) prefer men. As it appears, in the companies

Figure 5. Overqualified candidates



with high manpower and the necessary academic background a certain preference does not exist. This shows that the women have been henceforth equally accepted with the men in the professional sector. A reasonable explanation for the preference of men over women by the industry of food is perhaps the limited presence of women in that field.

In what concerns the subjects of the selection interview process the following factors should be taken into consideration: The companies use mostly (60%) (technical company, local development agency and food industry company) the method of the "free" interview, while a lower percentage (40%) (public sector company and bank) use the standardised interview. The public sector functions are, in general, more standardised than the private sector. That is also observed in the bank because of its obligatory organisational structure. All companies prefer to conduct "open" typed questions. All companies also consider the personality tests more important than the learning aptitude tests. On the contrary 80% of companies consider the attainment tests more important than the personality tests. An obvious exception constitutes the bank, as it gives priority to the communicational skills contrary to the technical dexterities.

There is an absolute identification in all answers between the technical company and the food industry company, apart from the question that concerns the preference of men or women at work. In what concerns the interview part absolute identification is traced in the answers among the above mentioned companies and the local development agency. It is remarkable that the public sector company shows an absolute identification with the bank on the interview grounds, whereas an exception is the preference of the attainment tests instead of the personality tests, while in what concerns other issues there is total incoherence. Finally, there is a relative harmony at the answers of the public sector company and the answers of the local development agency.

Open-Type Questionnaire

Although the open-type questionnaire is not susceptible to standardised answers, the following conclusions have been reached after the relative analysis.

As for the question whether the companies have a Department of Human Resources Management, the answers are mainly positive. Only two of our sample (local development agency and food industry company) do not have such a Department and do not also consider its existence important. These companies have a common characteristic which is the small size of their personnel (30-40 individuals); this number is not sufficient to justify the operation of such department. An exception constitutes the bank, which despite the few individuals of its personnel (10 individuals) does have a Department of Human Resources Management, because of its obligatory organisational structure and its total size of the personnel at national level.

The individuals who carry out the interview are mostly two or three. There is always a representative of the Human Resources, if there is such a Department or from the administration of the company (the Director or a C.E.O.), if there is not. There are also one or two executives from the corresponding sector. In the case of the technical company the interview is conducted by the Director of the corresponding department.

Initially most companies always or sometimes recruit the candidate for a trial period of 4 to 12 months. Only the local development agency does not follow this method of recruitment, because the contracts of the company have concrete time duration and keep pace with the programmatic periods which are financed by the European funds.

The examiners are mainly influenced by the combination of the curriculum vitae and the impression that they acquire about the candidate's personality during the interview.

The candidate's body language during the interview has a major impact on all companies provided that the candidate corresponds in the requirements of the position. Characteristically, public sector company supports that the body language may reveal more than the interview itself.

Finally, the candidate is submitted in attainment tests only in two companies (the public sector company and the local development agency), when it is required by the work-position; because the public sector is more standardised, the submission of candidates in tests is expectable. Likewise tests are expected in the local development agency, where specified knowledge is demanded due to the specialized type of the services which offers.

It is therefore concluded that there is an agreement in the majority of the answers that the companies provide. General identification is found in the following companies: food industry company and the bank, the public sector company and the bank. Considerable disagreement is observed in the following companies: the local development agency and the technical company, the public sector company and the technical company.

HUMAN RESOURCES' MOTIVATION ANALYSIS

All organization under examination have gathered total grade above 110 (average grade:(44+176)/2), characterizing their management style closer to the participating model.

Despite the differences of each organization under examination, mainly due to the fact that they have different size, they are activated in different industries (construction, agriculture, finance) or in different sectors of the same industry, the grade range was rather narrow, 122-112=10, leading to 10/176=5,68% of total range.

In the organizations of the construction industry (No.1, No.2 and No.3) there is an important spread, mainly based in the different size but also in the different sector of action (private construction, public construction, concrete production). In this way, organization No. 1 is defined as the most participating, as personal relations are important

between the owners but also within the hierarchy. Moreover, the organization size is not so enormous, especially in comparison with organization No.2.

Rather higher than expected proved to be the participation level in the local branches of the private bank (organization No.5) and of the public sector organization (organization No.6). The reasons could be the increased level of familiarity due to local based environment and the obvious tense for participation and collaboration. The higher grade was the one of organization No.4, which was an expected result, since this organization operates based on quality management systems (for management and production) as HACCP and ISO 9001.

Another interesting point that resulted from the analysis is the percentage of coincidence in the answers of all organizations, examining the percentage of coincidence and dispersion in their answers. This analysis was based on the grouping of the answers in four different categories: those that presented total coincidence (either totally agree or disagree), those that presented important coincidence (agree either totally or generally and disagree either totally or generally), those that presented high dispersion and those that presented important dispersion (one of the answers were different than the others).

Six of the forty four questions presented total coincidence of answers, leading to a percentage of 13.64%. The proposals with coincidence are those stating that: the income is determining independently of the age and family status, the employee who works hard should be rewarded accordingly and in time, when tasks are appointed full details should be described, employees should be asked regarding their tasks and plans, not only financial factors affect the employees.

Although the range of total grades is limited to 5.68% (Fig. 6), the total and important coincidence is not proved to be so high (13.64+25.00=38.64%). Generally, high dispersion (36.36%) exists, nevertheless all organization were laying in the side of participating model. It is proved thus, that no "rule" exists to characterize a participating organization, due to the existing disperse of opinions.

Regarding the type of organizations, important results emerged. Local characteristics outweighed the possible barriers of participation in the national public and private bodies (organizations No.5 and No.6). Multi-sector action (even in the same industry) leads to more directive manage-

Figure 6. Total grade of each organization

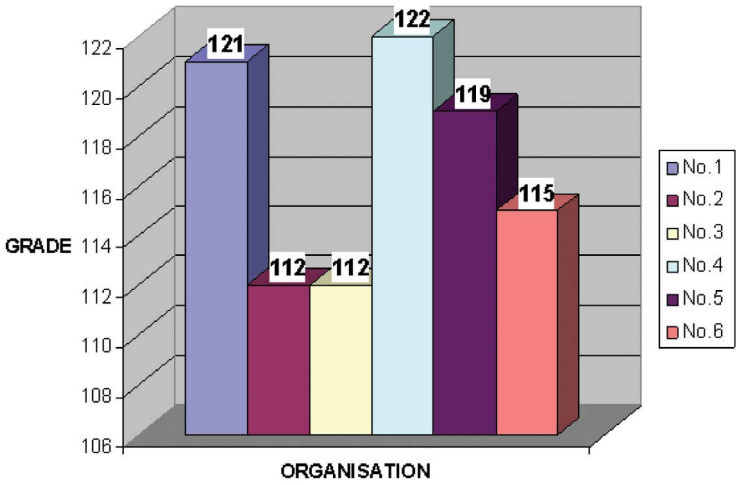
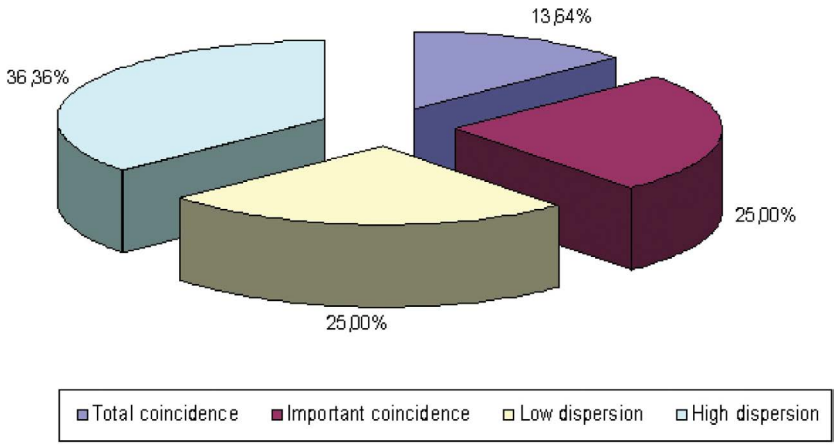


Figure 7. Coincidence-dispersion of answers



ment of human resources (organization No 2). Organizations with typical production process (organization No.3) present limited participating style due to the standardized production process. The requirement for ideas and proposals (organization No.1) leads to higher participation level. Finally, all responders were rather cautious, whilst public sector responder required full discretion.

All responders agreed that they do not recognize threat as a motivation method, which is rather satisfactory. The sector of Human Resources Management including motivation is not incorporated in the wider management framework of the organizations, which could be expected for local based organizations. Human Resources Management is implemented (in the level that it is possible) by directors-founders-owners and not by experts of the discipline.

DISCUSSION

The general conclusion drawn for human resources' selection and recruitment is that the companies that follow a similar, if not a common process of personnel recruitment are the following: the public sector company and the local development agency, the public sector company and the bank, the food industry company and the bank.

Regarding the recruitment and selection process, the highest percentage of the enterprises applies the following: Firstly, a form of description is drawn up. The internal attraction of the human manpower is preferred especially by those companies who detain a database with the characteristics of the candidates. In general the personal contact does not influence the companies about the selection – decision. Furthermore candidates who were rejected or released in the past are not being recruited. The percentage of the recruitment of women is the same as men. Remarkable is that candidates from other country - members of the European Union are also being attracted. The newspapers are being used more as a source of attracting, whereas under no circumstances the radio is used. With regard to the qualifications that influence the selection - decision, the experience in the subject of the position is more important than the specialisation. The possession of a postgraduate title constitutes an extra qualification and not a condition for the recruitment. The technical dexterities are also very important, without undermining the importance of the communication skills. Overqualified candidates mostly are not being recruited because of their high economic

expectations. The interview is carried out mainly by a committee (a representative of the Human Resources Department and two from the responsible department of the position) in the working place. The method of the free interview with open typed questions is used. The personality tests and the attainments tests are being considered as the most important, although these are not being applied in most companies. Furthermore the initial recruitment is under trial for a period of time. Finally the Management of the Company rather than the Human Resources Department holds total responsibility for the final decision.

IT processes could support several of the aforementioned steps of a selection and recruiting procedure. IT professionals could support these steps by providing tools and methodologies that could add value to the processes but also increase the transparency factor, along with the procedure speed and, overall, lead to successful selection of the more suitable candidate for each working position.

Outcome of the analysis regarding motivation processes was that although organizations motivate their employees, mainly by prompting them to participate in different levels of decision making, and are positioned closer to the participating management model, their approach was rather un-organised and based mainly on interpersonal relations. Generally, it is proved that organizations although positioned closer to the participating management model, they have important opportunities for adapting and developing motivation models and organising leadership tactics. These tactics could be supported by IT professionals that could introduce the required IT tools for successful results in leadership and motivation.

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Chapter 63
Human Capital Management and Optimization:
A Resource-Based View

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ABSTRACT

Recent work in human resource development emphasises the fact that individual skills are strongly oriented towards the future. They enable a person to tackle upcoming challenges in a self-organised manner. So both the current requirements and the skills necessary in the future have to be seen as a strategic competitive advantage for the company. This change in perspective makes it possible to use further education as a strategic instrument of management development.

INTRODUCTION

Human capital has emerged as one of the most compelling sources of comparative advantage in the modern corporation. (Nahapiet & Goshal, 1998) In contrast to transaction cost theory, which is grounded in assumptions of rational and opportunistic behavior, human capital theory aligns with the resource based view of the firm. This perspective emphasizes that human capital subsumes the acquired knowledge, skills and capabilities enabling employees to serve as innovative entrepreneurs within their companies. Human capital is therefore strongly intertwined with organizational learning and corporate strategy. After discussing this integrative approach to human capital, we explore different perspectives on the management of human capital. Finally, we examine how a fit was established between human capital and organizational strategy at the Bank of Montreal. (Gorsline, 1996)

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HUMAN CAPITAL AND THE RESOURCE-BASED THEORY OF THE FIRM

The first approach to see human capital as a competitive advantage showed that companies do not only have advantages based on the different quality of their initial resources, but also and mainly through the better utilization of these, which derives from the use of specific competencies within the enterprise (Penrose, 1959).

Against the backdrop of this insight, the knowledge-based approach split from the transaction cost approach. (Foss, 1996) Following this new approach, the actors' actions are not driven by self-interest and contractual relations anymore, but the actors look for specific corporate cultures that fit their own norms and values. The division of labour makes possible not just a specialization according to individual areas of interest, but also the development of an internal hierarchy. In exchange for work rendered, the company offers – apart from remuneration, which has already played a dominant role in the transaction-costs approach – also additional help in coordinating co-operation, finding one's identity and individual learning. All these functions are in this case seen as part of corporate culture (Kogut & Zander, 1996).

From these diverging approaches, a resource-based theory of the firm has been developed, which is to free the transaction-cost approach mainly from the explicit rule of opportunistically rational behavior based only on self-interest. The most important assumption for this new perspective is the argument that by means of autonomous (and not necessarily contractual) bundling of individual competencies, synergy effects are achieved that exceed an individual's performance by far. Thus, thanks to individual specialization and the coordination of a variety of individual services, modern industrial enterprises can meet the requirements of a mass market at relatively little cost, which is impossible for sole traders (Conner & Prahalad, 1996).

Building on this finding we can conclude that particularly the heterogeneity of individual competencies in an enterprise results in a comparative competitive advantage. The main advantage is mainly the planned coordination of the different competencies. Depending on the "mobility" of specific competencies – i.e. the ability to buy these quickly on the labour market or the necessity to develop these in the company itself in the long run – the company-internal solution focuses on stable "distinctive competencies," which can hardly be imitated by the competitors. (Nordhaug & Grønhaug, 1994) From this, we created Table 1.

The change in perspectives illustrated in Table 1 results in an enormous increase in importance of classic personnel measures, leading to a strategic competency management. The new definition as a strategic core process – which is proac-

Table 1. Traditional and alternative perspectives of competency managements according to Nordhaug & Grønhaug (1994)

Human Capital Management	Traditional Perspective	Alternative Perspective
Status	Operative	Strategic
Role	Support process	Core process
Main responsibility	Middle management and HRM Department	Top management
Orientation	Reactive	Proactive
Economic evaluation	Costs	Investment
Recruitment focus	Technically best-qualified person	Best fit of task and person
Competency base	In-house	Expanded

tively handled by the top management and should not simply be delegated as a support process to the middle management – shows this clearly.

HUMAN CAPITAL MANAGEMENT

As stated by Edwar Lawler an important differentiation regarding human capital is that between the "job-based approach" and the "competency-based approach" within human resource management. The former can be seen as the traditionally prevailing approach, in which – based on a job description – a suitable employee is searched for. This approach has its roots in "scientific management." It is based on the assumption that tasks and requirements are stable in the long run. Only this makes it possible to generate cost advantages through specialization and division of labour. Given the mass production of the past century, this approach was indeed justified. However, in a more and more complex and dynamic environment that increasingly calls for individual solutions, it is advisable to focus more on the competencies and responsibilities of the individual employees (Lawler, 1994).

The "Competency Scope"

Based on these deliberations, Paul Green developed a typology – linking organizational strategies and human resource systems – that clearly shows the connection between the terms core competency, (core) values, qualifications and competencies in a company and once again highlights the differences. The central feature is the customers' needs (Green, 1999).

The upper half of this circle represents the organizational characteristics delimiting the options available. These are the technological core competencies and the values of a company that determine the purpose and the objectives. Core values complement the technical aspects of work by explaining why the work is performed. This sector comprises both values and norms of corporate culture and the vision and strategic aims. In this area mainly the decisions of the top management regarding positioning and future development of the organization should be made.

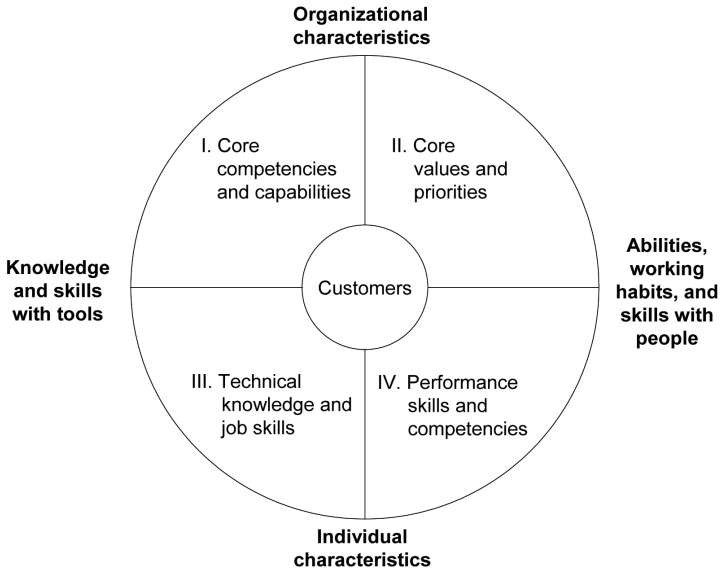
The lower half focuses on the individual characteristics. As regards unwanted changes, in this area participation and integration of the employees is essential. Measures of personnel development should be aligned with the organizational characteristics and also be taken up by the individuals. From the point of view of education controlling, it would be advisable to promote mainly measurable and observable qualifications and competencies.

The vertical line in Figure 1 points at another distinction. On the left hand side we thus find mainly those areas of personnel development that reflect the classic work of many HR departments. Here, a specific (technology or method-oriented) requirement profile is foregrounded. The right hand side, on the other hand, reflects the self-organised fulfilment of tasks within the given norms and objectives. As a conclusion for this model, it is not sufficient to simple move the focus from the left to the right hand side, but it is necessary to work out an integrative solution across all four sectors, which then rightly deserves to be called organizational competency management.

As a first step towards this change, the human capital of an enterprise should be seen as a competitive advantage rather than a cost factor. This can already be observed in knowledge-intensive service enterprises such as consulting. Unlike individuals that are just doing their jobs which are designed to be easily filled through selection and training processes, they become key success factors (Lawler, 1994).

Finally, it can be concluded that only developing competencies can maintain and increase company's flexibility and ability to innovate. (Staudt & Kriegesmann, 2002) On these two factors the long-term survival of the whole company depends and, thus, it is imperative to promote them

Figure 1. The competency scope according to Green (1999)



by means of special measures – as the following section shows.

COMPETENCY AND CAREER MANAGEMENT

It is the employees' competencies that build a significant competitive advantage and particularly these are highly at risk in the next few years: because if the employees leave the company, they take their implicit knowledge with them. For some US companies this means they lose practically half their knowledge base when the baby boomers retire. But how can a company escape this trend? The central paradox in transferring effective, implicit management- and procedural-knowledge is that constantly reinventing the wheel is inefficient, but people learn only by doing. So the best way to get them up to speed is the employment of knowledge coaches – experts who were motivated to share some of their experience with protégés (Leonard & Swap, 2004).

In addition, permanent organizational change – caused by restructuring, mergers or alliances, as well as the effects of lean management – clearly indicates that it is important rather to promote the employees' ability to organize themselves and their sense of responsibility regarding costs and performance. For this reason, the development of extensive competencies – primarily the ability to learn and to adapt – in organizations has to be rewarded much more in future. This is not the case yet, as in most companies: On the one hand pay systems work against it by punishing individuals who make lateral or horizontal moves as well as individuals who broaden their skills instead of taking more responsibility. On the other hand, selection and further career of employees ought to prefer generalist workers with a very broad range of competencies. Only for the position of functional experts the depth of their knowledge is important.

How can such a development be supported? First, alternative career paths have to be developed, so that project work and participation in competency centres are appropriately recognised – not just financially, but also in regard of career opportunities. This is already the case at the top management level. Their industry experience is

more important than their functional background. This should also be taken into account for other executives. Of course, it must be pointed out that in doing so economies of scale and expert knowledge might get lost. The challenge is to create structures which simultaneously maintain functional excellence while integrating functional expertise into processes, teams, products, or structures. (Lawler, 1994) Two examples of such structures are process organization (Daft, 2001) or hypertext organization (Nonaka & Takeuchi, 1995). Both concepts focus on the integration of knowledge and competencies by promoting team and project work and compensating for possible disadvantages in efficiency by using central functional departments for operative support.

Second, in addition to the classic "job descriptions," detailed competency models are needed. Therefore, appropriate competency development planes have to be developed in alignment with the company's strategic objectives, individual career goals and opportunities, as well as the employees' need for growth (Lawler, 1994).

Eventually it is essential also to adapt remuneration and incentive systems. Instead of short-term bonus payments, compensation (e.g. stock options) should focus on the long-term success of the companies and the interest of strategic stakeholders. Such systems also demand a competency management system that turns into a comparative competitive advantage, as it links the employees' competencies with the company's objectives.

According to Hodgetts, Luthans & Slocum (1999) three measures can be used to meet this requirement:

1. Venture Teams,
2. Multirater Feedback (360° Feedback) and
3. A both performance-oriented and learning-friendly corporate culture.

Venture teams are to be assigned a specific, continuous sub-task or -unit of the organization, which distinguishes them from classic project teams and makes them more similar to process teams. These teams consist of two or more entrepreneurs within the company. They have the authority to operate autonomously – structures, formal rules, and procedures are held to a minimum. This allows them to formulate their own objectives, based on their budgets, and makes them responsible for the success of their task or unit (Hodgetts, Luthans & Slocum, 1999).

Development and improvement proposals are to be generated from institutionalised 360° feedback. This not only guarantees staying close to the customer and integrating local employees, but also minimises the hierarchy's influence, which is one of the central tenets of this approach. In this context, however, the following points have to be taken into consideration (Hodgetts, Luthans & Slocum, 1999):

- Each person involved should know in advance for what and how the data will be used.
- The modes of behavior and competencies to be evaluated have to be specified in detail.
- Apart from members of the organization, also customers and suppliers are to be questioned.
- The results are to be returned as feedback and are the basis for planning future, mutually developed action plans.
- Results, decisions based on them and their effects are recorded and analysed over a longer period of time.

By thus pushing back the hierarchy and the influence of individual assessors (mostly the immediate superiors) a corporate culture open to criticism and learning is to be ensured. This has then to be combined with the corporate strategy in order to establish a long-term change in the company's human capital – as the approach in the following section shows.

HUMAN CAPITAL AND CORPORATE STRATEGY

In the work of Morgan McCall on developing the next generation of exceptional business leaders, we find multiple frameworks relevant to the connection between human capital and corporate strategy. (McCall, 1998) Based on the observation that the same manager can be perceived as more or less successful in different situations, it becomes important to include situational influences from the company and its environment in the analysis of essential managerial competencies. The classic competency models apply to stable environments. When situational variables change, so can the assessed managerial strengths and weaknesses as shown in Table 2.

Based on these findings, we have to move away from stable models that centre on the manager and increasingly focus on the interaction between the status quo of a person's competencies and the challenges of a dynamically changing environment. The core element of any competency development is the concept of "action learning." So the main focus of competency development shifts from standardised learning programmes to practice-oriented learning from experience (McCall, 1998).

There are similar arguments, when calling for a clear focus on the meta-competency of continuous learning, consisting of adaptability and identity (Briscoe & Hall, 1999):

Adaptability learning competencies include behaviors like:

- Flexibility,
- Exploration,
- Openness,
- Dialogue skills, and
- Change Management skills.

Identity learning competencies are based on:

- Self-assessment,
- Personal feedback,
- Authentic behavior,
- A great variety of personnel development activities within the company,
- Rewarding subordinates for developing their skills,
- Actively seeking out relationships with diverse people (e.g. in cross-cultural teams), and
- Being willing and able to modify self-perception, if necessary.

These deliberations underline the call for assigning a higher value to practice-related learning from experience in order to creating competency, by establishing an explicit link between individual behavior on the one hand and a learning-friendly

Table 2. Competencies and their dark sides (McCall, 1998)

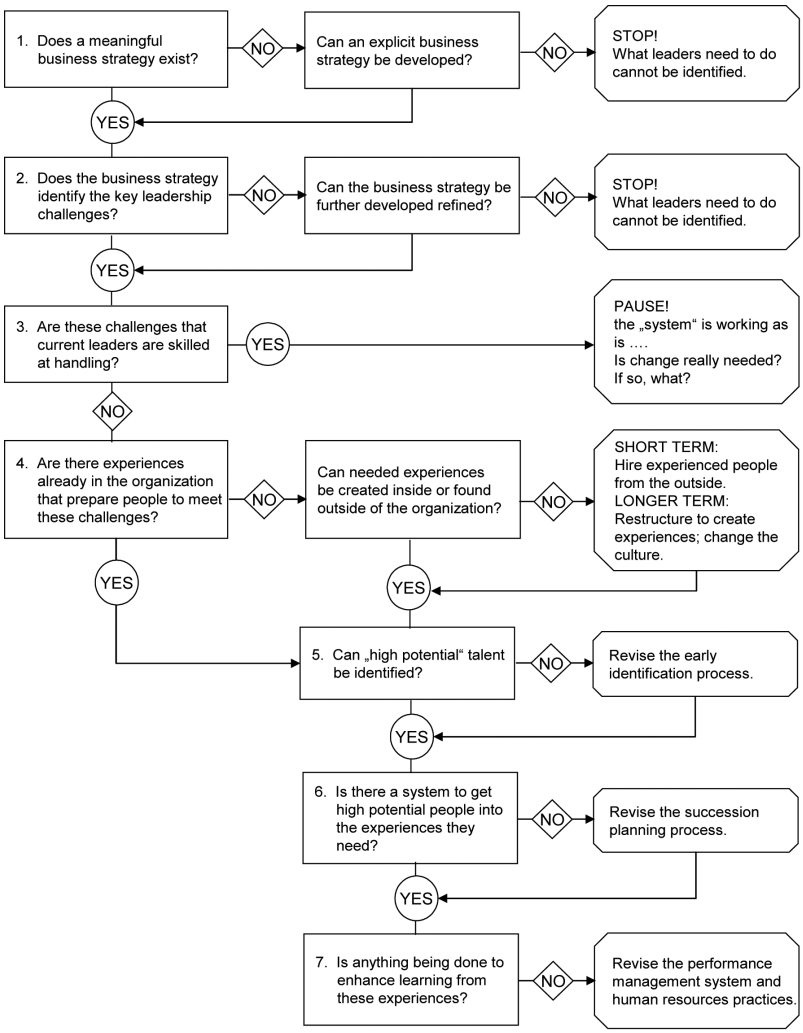
Competency	Potential Dark Side
Team Player	Not a risk taker, indecisive, lacks independent judgement
Customer-Focus	Can't create breakthroughs, can't control costs, unrealistic, too conservative
Output Orientation	Reckless, dictatorial
Analytical Thinker	Analysis paralysis, afraid to act, inclined to create large staffs
Integrity	Holier than thou attitude, rigid, imposes personal standards on others, zealot
Innovation	Unrealistic, impractical, wastes time and money
Global Vision	Misses local markets, over-extended, unfocused
People Orientation	Soft, can't make tough decisions, too easy on people

(adaptability learning competencies) corporate culture that also creates identity (identity learning competencies), on the other hand. It clearly shows, however, that adaptability without identity only results in a reactive adjustment to the environment, or uncritical activism, and identity without adaptability leads to the fossilization of corporate culture and paralysis in the long run. For this reason, the interplay between individual actions and corporate strategy has to be considered as a central item.

Based on these considerations, a model has been developed by Morgan McCall, that aims to help translating corporate strategy into an "executive development system." On the basis of 7 questions it is determined if and to what extent the interplay between these areas exist in the enterprise (McCall, 1998) (see Figure 2).

If the answer to the first two questions is no and no useful strategy can be defined, the required competencies cannot be determined. If there is a strategy and the challenges can be met with management's existing competencies (question 3), this "quiet phase" should be used for a time-out and reflecting on future requirements. Within a strategic meeting, the company's objectives should

Figure 2. Translating business strategy into an executive development system according to McCall (1998)



be operationalized and a comparison of the tasks required and the employees' competencies should be made. Only if the answer to question 3 is "no" a survey will take place on whether competencies required in future already exist in the enterprise, or can be purchased from outside sources at short notice. In the long run it is always important to create competencies within the company in order to thus achieve a strategic competitive advantage.

The next questions (4 to 7) concern mainly the identification and development of competencies on the individual level, as well as the systematic and continuous promotion of creating competencies in the company. Here the model makes use of classic competency lists and highlights learning ability as the central competency, because according to the basic rules of "action learning," individual development of competencies takes place mainly on the basis of the tasks assigned. Classic education and training measures are to support this process. Regarding the final securing of a systematic and continuous establishment of competencies throughout the company, again a focus is laid on extensive feedback, target agreements and the incentive measures connected with it as well as mutual support in the form of learning and development networks.

Although showing the connection between corporate strategy and necessary competency is interesting, this would ultimately result in a complete fragmentation of competency development. Each industry, even each company, would have to develop its own competency model depending on its environment and the strategy chosen. Therefore McCall focuses on 11 basic competencies, which are the basis of successful executive development programs and the identification of high potentials. By means of a survey of 838 managers in six internationally active groups in the USA, Europe, Australia and New Zealand, Table 3 has been developed on determining the potential of junior managers.

This approach clearly shows how important continuous evaluation of competencies in the companies is. In general, a first step has to build on an analysis of the current situation – which is to safeguard a connection to corporate strategy. Then, in a second step, a competency model is to be created that reflects the activities requires and shows these as observable modes of behavior, in order to make it possible to make changes in the employees' behavior assessable and to link them to an appropriate incentive system. In the third and final step, support measures are to be taken in order to establish the new modes of behavior in the company. Only this enables a long-term and sustainable optimization of human capital, as can be seen in the concluding case of the Bank of Montreal.

OPTIMIZING HUMAN CAPITAL: THE BANK OF MONTREAL CASE

One of the first organizations that consciously took action on this problem was the Bank of Montreal. As early as 1990 it began a change management project which came to the conclusion that with traditional human resource management, only 20% of all measures enable an efficient link between individual performance and strategic corporate objectives. (Gorsline, 1996) Thus, they started to connect these corporate fields more closely (see Figure 3).

In order to realise this project, the competencies required were determined in interviews and summarised in the new role model of "relationship manager." (see Figure 4) In this model, particularly the competencies of "conceptual thinking" and "information seeking" are to support the alignment of personnel development measures with the future requirements of corporate strategy – in the sense of "best practice sharing." For this reason, an appropriate program is developed together with the respective employee, which neces-

Table 3. Eleven dimensions of early identification of global executives (McCall, 1998)

Seeks opportunities to learn.	Has demonstrated a pattern of learning over time. Seeks out experiences that may change perspective or provide an opportunity to learn new things. Takes advantage of opportunities to do new things when such opportunities come along. Has developed new skills and has changed over time.
Acts with integrity.	Tells the truth and is described by others as honest. Is not self-promoting and consistently takes responsibility for his or her actions.
Adapts to cultural differences.	Enjoys the challenge of working in and experiencing cultures different from his or her own. Is sensitive to cultural differences, works hard to understand them, and changes behavior in response to them.
Is committed to making a difference.	Demonstrates a strong commitment to the success of organization and is willing to make personal sacrifices to contribute to that success. Seeks to have a positive impact on the business. Shows passion and commitment through a strong drive for results.
Seeks broad business knowledge.	Has an understanding of the business that goes beyond his or her own limited area. Seeks to understand both the products or services and the financial aspects of the business. Seeks to understand how the various parts of the business fit together.
Brings out the best in people.	Has a special talent with people that is evident in his or her ability to pull people together into highly effective teams. Is able to work with a wide variety of people, drawing the best out of them and achieving consensus in the face of disagreement.
Is insightful; sees things from new angles.	Other people admire this person's intelligence, particularly his or her ability to ask insightful questions, identify the most important part of a problem or issue, and see things from a different perspective.
Has the courage to take risks.	Will take a stand when others disagree, goes against the status quo, perseveres in the face of opposition. Has the courage to act when others hesitate and will take both personal and business risks.
Seeks and uses feedback.	Pursues, responds to, and uses feedback. Actively asks for information on his or her impact and has changed as a result of such feedback.
Learns from mistakes.	Is able to learn from mistakes. Changes direction when the current path isn't working, responds to data without getting defensive, and starts over after setbacks.
Is open to criticism.	Handles criticism effectively: does not act threatened or get overly defensive when others (especially superiors) are critical.

Figure 3. Connection between corporate strategy and human resource management at the Bank of Montreal (Gorsline, 1996)

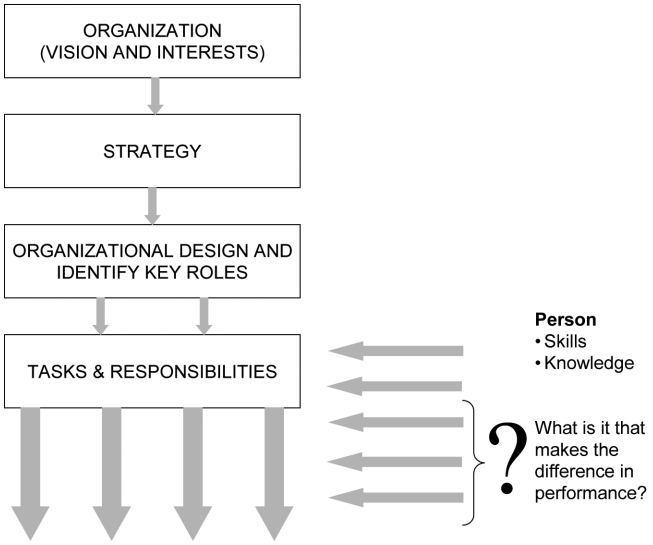
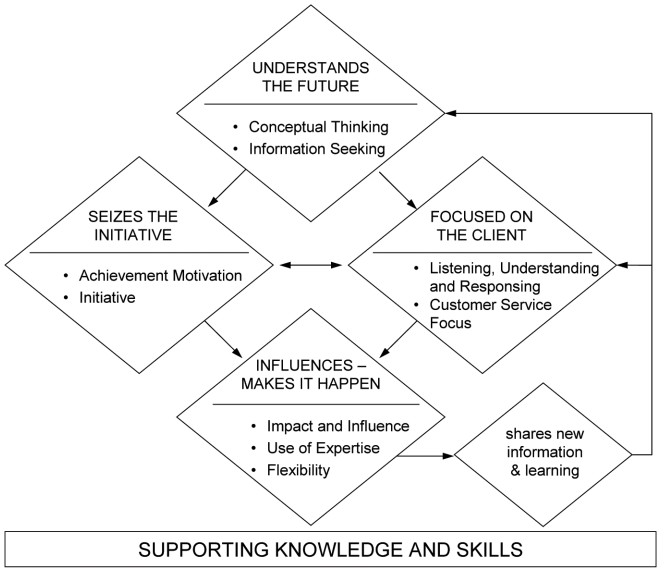


Figure 4. Tasks and competencies of relationship managers at the Bank of Montreal (Gorsline, 1996)



sitates the use of the competencies "listening, understanding and responding" and "customer service focus." Additionally, initiatives should be taken to actively utilise any opportunities regarding strategic positioning. Therefore, "achievement motivation" and "initiative" should be put to better use. This should positively influence the implementation with the help of "impact and influence," "use of expertise" and "flexibility." Finally, the competency "shares new information & learning" can be interpreted as a communicative feedback loop, which is the basis for further learning. Thus, apart from an increase in efficiency throughout the organization, it is to be safeguarded that employees are not demotivated through constantly recurring weakness analyses (Gorsline, 1996).

CONCLUSION

The planning of personnel development takes place within this new perspective with the aid of structured talks with the employees, which are connected to the company's knowledge base. The active competency for control is intentionally kept within the employee and his/her immediate superior. Only overall key qualifications as absolute requirements are defined top-down. Demand itself is controlled decentrally. This requires a qualitative tool for prognosis that – open to modifications – records the strategic demand for competency from the employees' perspective on a regular basis (Wilkening, 2002).

In addition, it can be seen that human capital management is of an interdisciplinary nature. Areas of corporate culture and strategy, personnel and organizational development as well as information systems should be aligned – e.g. by establishing competency centres that are to develop the knowledge required for core processes. Controlling these heterogeneous organizational units takes places via corporate strategy and resource allocation – similar to the profit centre approach.

Only by means of a clearly defined and communicated corporate strategy can relevant knowledge be identified and developed in line with the strategic objectives, as well as subsequently supporting the employees as the proper carri-

ers of knowledge, as well as adapting corporate structures and processes, in order to create and optimise competitive advantages. Human capital management in this sense can be seen as a strategic business process and implemented within the company accordingly. The use of IT systems, often seen as the only and ultimately futile solution, is just an "enabler," intended to facilitate the implementation in the company.

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Section 7
Critical Issues

This section contains 11 chapters, giving a wide variety of perspectives on Human Resources Management and its implications. Such perspectives include reading in fair compensation, fulfillment, ethics, and several more. The section also discusses new considerations within organizational culture and group dynamics. Within the chapters, the reader is presented with an in-depth analysis of the most current and relevant issues within this growing field of study. Crucial questions are addressed and alternatives offered, such as "information processing theory and incentivizing."

Chapter 64
Issues Influencing Electronic Commerce Activities of SMEs: A Study of the Turkish Automotive Supplier Industry

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ABSTRACT

This study aims to investigate the issues of electronic commerce activities in small and medium sized enterprises as a consequence of organizational change initiated by the adoption of information technologies. The fundamental issues influencing electronic commerce practices of SMEs are their insufficiency of cognitive learning and organizational strategy, financial and distribution problems specific to SMEs, limitations of supply chain management, reluctance of organizational culture for electronic change, problems of information technologies usage, insufficiency of human resource, resistance of top management to organizational change as required by the adoption of information technologies, integration problems of new technologies with the existing systems, lack of confidence on the side of customers towards electronic commerce. A study of the Turkish Automotive Supplier Industry has revealed that electronic commerce has been adopted and its benefits are accepted. However, the industry has to overcome some technical and managerial difficulties to implement it more efficiently and effectively.

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INTRODUCTION

In societies where commercial competition is accepted as an economic system, there is a close relationship between the healthy operation of the system and the existence and power of small and medium sized enterprises (SMEs) within the system. Most SMEs positively contribute to the system since they can fulfill several functions not achieved by large enterprises (MacGregor, 2004, p. 10).

SMEs are not merely economic elements; they also have vital roles in social life. Because of the fact that SMEs spread to a large area in the country, they act as a critical power in lessening regional developmental differences, spreading ownership to a vast area, creating and sustaining employment opportunities, and keeping democratic life alive.

Currently, SMEs play a fundamental role in terms of employment and macro- economic balance by increasing their shares in global economy and thus enabling high levels of employment. Overall contributions of SMEs to the economy can be outlined as the following: (Kleindl, 2000, p. 75; Walczuch et al., 2000, p. 568):

- Depending on labor intensive work and efficiency in resource use, they contribute to creating employment opportunities and lessening unemployment nationwide.
- They adapt quickly and comfortably to demand changes and variations.
- They help to balance income distribution.
- They enable making decisions quickly. Since they are mostly structured as family companies, there is a tendency to make centralized decisions (Evans and Wurster, 1997, p. 72).
- In the long run, they are in a position to become manufacturers of the inputs and intermediary goods of large industrial enterprises.
- They are flexible and supportive of innovations.
- They are effective in improving life quality by providing opportunities for the socially and politically disregarded labor force, raw materials and financial sources to operate by smaller investments (Levy et al., 1999, p. 249).
- They acquire a critical role in transmitting small funds and family capital directly to investments.
- Through manufacturing inputs such as raw materials, intermediary materials, and semi-finished products consumed by large scale enterprises, they contribute to their development and also the national economy.
- They contribute significantly to increasing regional employment opportunities since they are labor intensive; therefore prevent migration from small cities to big city centers and construct a base for self development of the region within its own potential.
- By positively affecting income distribution, preventing the accumulation of capital in the hands of large industrial organizations or a minority, they increase societal income both functionally and regionally.

SMEs are also effective in providing new ideas and inventions and adopting new technologies (Kleindl, 2000, p. 76). New technologies enable SMEs to perform more creatively and flexibly with lower costs. Small enterprises are effective in transferring various technologies to national economy and in the process of modernization traditional technology or adaptation to the transferred technology; they act as a bridge between new and traditional technologies (Evans and Wurster, 1997, p. 74). On the other hand today, the rapidly increasing automation and demand for more qualified employees force SMEs to adopt new technologies. SMEs face difficulties, basically due to lack of sources, in following new technologies, acquiring technological materials, finding and employing qualified technical personnel to

implement new technologies. Qualified employees generally prefer job security of large enterprises, corporate reputation, and high salaries.

The ability of SMEs to survive in a highly competitive environment depends on the extent and speed in activating the changes that will make their products and / or services noticeable and preferable. As SMEs achieve these goals in establishing and sustaining enterprise's relationship with the outer world by benefiting from the opportunities of technology, they make use of information technologies and its elements. At this point electronic commerce is helpful in achieving innovations and improvements rapidly and safely (Hawkins and Prencipe, 2000, p. 24).

SMEs AND ELECTRONIC COMMERCE

While globalization and technological changes create new opportunities for SMEs, at the same time they create new risks and threats. It is considered that SMEs, due to their flexibility, can meet customer expectations more quickly and they are more advantageous than large enterprises in utilizing electronic commerce (Dandridge, 2000, p. 87; Daniel et a., 2002, p. 261). Because of competition and pressures of software providers and system integrators, several SMEs search for new ways to increase their market shares by implementing electronic commerce solutions. Besides, while large companies already have necessary personnel and financial sources to implement electronic commerce, capital limitations of SMSs restrict their investments for electronic commerce (Stansfield and Grant, 2003, p. 16).

On the basis of discussions so far, it is possible to summarize the contributions of electronic commerce to SMEs as the following. Electronic commerce enables SMEs to enter new markets and thus competition gains impetus. Since it speeds up operations and lessens demand for labor, it decreases costs. As it provides effective communication between buyers and sellers, it helps to improve service and product quality. Enhancing data share it contributes positively to the efficiency of work processes and overall economy (Eikebrokk and Olsen, 2007; Van Beveren, 2002; Levy et al., 1999).

Generally speaking, all of the contributions listed above can be deemed convincing. For instance the fact that with a lower investment SMEs can reach the markets which they can never attain through other ways seems rather feasible. Yet when this issue is discussed elaborately, the matter surfaces in a more complicated manner. Quite probably SMEs will face a difficulty in employing qualified human resources that can develop the information system within its own structure. In that case, the enterprise will be forced to employ people / companies out of the enterprise for the sales website. Employing people outside the enterprise makes it difficult to have a flexible and expandable performance applicable in their own sector. The fact that system is established / organized in a separate location will bring drawbacks in terms of updating and securing commercial safety (Dans, 2001, p.77). As it is illustrated in this scenario, several cultural, economic and commercial reasons may hinder SMEs' electronic commerce performance. Let aside all these points, it is not for certain that even a well prepared website – or other digital tools, can immediately find a market or open inaccessible markets (Liew, 2009, p.17).

Successful implementation of electronics is related to a multivariate and complicated process, which is connected with social and economic elements as much as with technical, technological, physical and legal infrastructure. In this section, the objective is to comparatively analyze the factors that affect / prevent SMEs' successful implementation of electronic commerce activities and to discuss sample cases unique to several SMEs operating in different sectors.

THE EFFECTS OF ELECTRONIC COMMERCE APPLICATIONS IN SMEs

Electronic commerce provides important opportunities to SMEs in reaching new markets and competing with rivals. Virtual shops on internet enable SMEs to reach distant markets by offering an effective and economical marketing channel. Therefore SMEs obtain a chance to enter global markets without necessitating high investments and expenditures and offer inexpensive, fast, and high quality products in these markets (Evans and Wurster, 1997:77). On the other hand product development and marketing processes are shortened in SMEs, where electronic commerce is actively used. In the past, thanks to the application of information technologies, SMEs that followed / copied large scale enterprises, obtained critical time advantages in product development and marketing processes (Heijden, 2000, p. 41; Walczuch et al., 2000, p. 570; Levy et al., 1999, p. 252; Coppel, 2000, p. 17; Porter, 2001, p. 67).

Regardless of the fact that electronic commerce contains in itself various advantages for SMEs, still it is hardly possible to assert that SMEs make enough use of electronic commerce. Researches on this issue reveal that SMEs generally use Internet as a basic communication means and regard it as an alternative communication tool that cuts off costs more than traditional communication mediums such as fax and telephone (Kleindl, 2000, p. 78; Fisher, 2000, p. 61; Soliman and Yousef, 2003, p. 548).

It is clear that job opportunities for electronic commerce provided to SMEs vary at different levels for each sector. Among the reasons, there are the type of commerce, technological infrastructure of the country, Internet utilization ratio, and cognitive literacy. Within this scope it is crucial that SMEs take into consideration several factors effective in their investments for electronic commerce. These factors can be outlined in general as the following issues (Liew, 2009, p. 25):

Target market and geographical region where business is concentrated: Today a great majority of SMEs produce for national markets and most of the exporting enterprises also have domestic market oriented commercial expansion. Orienting towards foreign markets by using electronic tools and methods renders it a requisite for an enterprise to change its basic job performance applications such as product marketing, managing customer relations, and securing after-sales customer assistance (MacGregor, 2008, p. 47).

Products and services offered through electronic channels: Enterprises in developed countries have required infrastructure and sufficient experience in selling products and services through electronic commerce. Electronic commerce can be effectively activated particularly in service industries, where information provides significant added value.

Internet based commerce opportunities and compatibility of production chain systems as business development method: A good deal of industrial products may not be suitable for direct sales on Internet. The reasons may be specified such that seller has a limited number of buyers with web page access, physical contents of product, specific features of product, or restrictions for marketing. Considering the fact that enterprises will keep on using traditional marketing and distribution methods, holding a position on web and catalogues, being a part of commercial opportunities and presentation chain webs can be valued as supportive services for commerce (Van Beveren, 2002, p. 253).

A research - Digital Marketing Compass - conducted in the beginning of 2009 focused on substantial investments, budget plans for future, and attitudes concerning electronic marketing of the total 783 decision makers. In Digital Marketing Compass, unlike many studies on electronic marketing, it has been pointed out that not only “large scale” companies, but also SMEs increased their electronic marketing investments a significant amount. According to the research,

various opportunities provided through electronic marketing is generally known well by SMEs and used appropriately. In 2008 web based marketing utilization was 32%. The most striking outcome of this research is related to the orientation of SMEs towards international markets. Electronic based marketing activities of export-oriented SMEs were ahead of traditional marketing methods in 2008 (http://www.ogilvy.com.tr/digitalmarketingcompass/).

Cost and suitability of Internet access / hosting services: Under the condition that Internet access costs are reasonable, enterprises will more extensively use electronic mail, which is faster and less expensive than communication by telephone and fax. Besides, the costs of creating and supporting a website increase in line with the contents of site and the level of applied technology (Sadowski, 2002, p. 80; Quayle, 2002, p.1151).

The cost of accessing data for the market and potential partners: Private websites offering commercial data perform this mission in return for a certain price, which may be unaffordable for some SMEs. However, most public institutions provide supportive information for commerce free on Internet. Sustaining these services and reducing the cost of paid services in the long run will help SMEs to detect their target markets, access reliable data concerning their partners, determine the correct distribution channels, learn legal and regulative rules, reach financial sources, risk management, and logistic services (Colombo, 2001, p. 179).

Moreover particularly for SMEs with a unique product and operation model, it will be possible to finance electronic commerce investments in a short period. Because the extensive size of the market achieved through electronic commerce provides a market these enterprises can never reach with the help of traditional methods. Freeing themselves from the obligation of being local can create a global-scale breakthrough for companies with the best product and business performance (Stansfield and Grant, 2003, p. 17)

THE PROBLEMS AFFECTING ELECTRONIC COMMERCE ACTIVITIES OF SMEs

The basic problems affecting electronic commerce applications of SMEs are inadequacy of cognitive learning and organizational strategy, financial and distribution problems specific to SMEs, restrictions in supply chain management, reluctance of organizational culture for electronic transformation, problems in the application of information technologies, lack of qualified personnel, resistance of top management against organizational transformation necessitated by applying information technologies, integration problem of new technologies with available systems, customers' lack of trust towards electronic commerce, and their worries concerning privacy (Vinberg, et al. 2000; Oyelaran-Oyeyinka and Kaushalesh Lal, 2006).

Janenko (2003) believes that one of the most important problems SMEs face in electronic commerce activities is "automatic success deception". According to Janenko, many SMEs have automated several aspects of their work processes through websites and are convinced that success will come automatically (2003). Varianini and Vaturi (2000) have found out similar causes for the problems affecting digitalizing process of SMEs such as to sustain a fixed market information flow, not possessing a flexible organization structure, not detecting clear targets, and lack of safety and integration. Farhoomand and Lovelock (2001) also, has discovered numerous negative elements affecting electronic commerce in SMEs such as poor income / outcome / profit model, lack of competition advantage, insufficiency in providing benefits to customer, organizational problems, and the conflict between website and current business partners.

As stated by Kshetri problems affecting electronic commerce negatively are mostly concentrated on economic and social areas (2007, p. 446). Economic problems can be outlined as low level of

information technology applications, inadequacy of Telecom infrastructure, lack of capital, low level of credit card usage. The social problems are low level of cognitive literacy, foreign language (mainly English) insufficiency, promotion and marketing problems of local websites.

According to Kshetri the problems affecting electronic commerce can be categorized under three groups such as pre-electronic commerce, in electronic commerce processes, and post-electronic commerce (2007, p. 447). Pre-electronic commerce problems are mostly related to the adequacy of a country's cognitive infrastructure. Credit card usage nationwide and financial problems are observed in the electronic commerce process phase. Post-electronic commerce problems are distribution infrastructure and after-sales services. Within a macro point of view, Kshetri bases this grouping mostly to the technical problems associated with information infrastructure of countries. Peterson et al. (1997, p. 337) classify problems in electronic commerce as financial, legal, infrastructure, safety, customer privacy, protection of intellectual and industrial rights, problems faced during delivery, and customs operations. Dornan (2001, p. 27) on the other hand groups problems affecting electronic commerce just like Peterson et al.

While some authors point out that in electronic management activities of SMEs, efficiency of non-commercial based transformation will increase, traditional commerce will at the same time affect / delay / repress the development of electronic commerce activities (Heinen, 1996; Chaffey, 2007, Li, 2006; Chen and Siems, 2001; Sadowski, 2002). Some authors advocate that the development of electronic commerce in the entire organization will be experienced faster at the end of e-commerce based transformation process (Jelassi and Enders, 2008; Bayles, 2001; Strader and Ramaswami, 2002).

According to McGregor and Vrazalic in terms of adopting electronic commerce, SMEs can be categorized into two groups such as potential adopters and non-adopters. The non-adopter group cannot use electronic commerce due to internal causes of enterprises and external causes related to technological, economic, politic, legal, social, and cultural problems (2006, p. 7). Kapurubandara and Lawson advocate that in overcoming these obstacles methodologically "decision taking" and "adoption" processes take place (2006, p.2). Stockdale and Standing categorize all the factors under four main groups such as "lack of resources and data, skill levels of employees, safety issues and preparation of small enterprises" (2004). Kurnia and Johnson include supply chain structure in this grouping as well (2000). In Table 1, it is possible to summarize the different views mentioned above.

In this study, we evaluate the problems affecting successful electronic commerce applications of SMEs – as it is widely accepted in relevant literature; under two groups such as cultural and technical problems (Rowley, 2002; Warren and Hutchinson, 2005; Gottschalk, 2005; Combe, 2006).

CULTURAL PROBLEMS

Top Management Support

Management support is the driving force in electronic commerce applications in corporations. According to Delone top management support is the most crucial factor for information technology applications in SMEs (1988). In particular, without the support of top management in decision-making process, it is not possible for SMEs to realize structural and technological transformation in electronic commerce by making required decisions and moreover without their support, any initiative regarding this matter may become unsuccessful (Grandon and Pearson, 2004).

Table 1. Review of literature

High cost of electronic commerce tools, hardware/software cost of Internet technology.	Jacovou (1995), Quayle (2002), Puaro and Campbell (1998), Lawrance (1997), Riquelme (2992) and Van Akkeren and Cavaye (1990)
Problems originating from size of small enterprises.	Webb and Sayer, (1998), Van Beveren, (2002)
Closeness to innovation and information technologies.	Van Beveren, (2002), (Davis, 2000), Dandridge, (2000)
Adoption problems to electronic commerce.	Walczuch et al., (2000), Webb and Sayer, (1998)
Complex structure of electronic commerce.	Quayle (2002), Chaston, (2001).
SMEs' family company structure and lack of institutionalism.	Dandridge, (2000), Sadowski, (2002), Colombo, (2001).
While SMEs have development necessity in a short term, the fact that electronic commerce acquires its feedbacks only in the long run.	Lawrance (1997)and McGowan and Madey (1998)
Low level of cognitive literacy among employees and resistance.	Lawrance (1997), Van Akkeren and Cavaye (1999)
Preferring traditional methods such as telephone, fax, and face-to-face communication.	Lawrance (1997), Vankatesan and Fink (2002) and Poon and Swatman (2000)
Safety problem of electronic commerce.	Quayle (2002), Puaro and Campbell (1998), Riquelme (2002), Van Akkeren and Cavaye (1999), Poon and Swatman (2000) and Hadjimonolis (1999).
Lack of integration among customers, suppliers and business partners who all have critical roles in implementing electronic commerce.	Hadjimonolis (1999), McDonagh, (2000)
Lack of adequate trust towards external consultancy firms	Lawrance (1997), Van Akkeren and Cavaye (1999), Chau and Turner (2001).
Deficiency of electronic commerce standards.	Tuunainen (1998), Dandridge, (2000), Webb and Sayer, (1998).

Source: Robert C.MacGregor, Lejla Vrazalic, "A Basic Model of Electronic Commerce Adoption Barriers", School Of Economics and Information Systems, University of Wollongong, Australia, p. 515

Imperfect Entrepreneurship

Social habits originating from the past of a country are among the main factors determining the implementation speed and form of new technological developments. These habits, which determine the confidence of people to their environment and economy, particularly to money earning process, are also basic causes lying behind economic differences among countries.

Unsuitability of Organizational Culture for Electronic Commerce

One of the potential problems almost any organization aiming electronic commerce implementation is that organizational culture may not be suitable for organizational transformation necessitated by electronic management. Technological transformation and electronic business environment as required by electronic commerce will cause vital changes such as developing infrastructure and training activities compulsory particularly for organizations where bureaucratic work is dominant (Chen, 2004).

Ambiguity of Benefits

Another problem for SMEs is the ambiguity of benefits that will be gained through electronic commerce implementation. Since electronic commerce is a recent phenomenon, it is hard to compare successful examples of SMEs. Small enterprises in particular are inclined to be more influenced by tangible practice results rather than theoretical knowledge.

On the other hand, although it can be possible for almost any field, electronic commerce may have high success in certain products but low in others. For instance in intangible goods such as music, software etc. that can be easily transmitted from one place to another through websites, electronic commerce provides numerous advantages. However, for products which are hard to be transmitted physically, the advantages of electronic commerce are relatively limited (Levy et al., 1999, p. 244).

Innovativeness and Insufficiency of Innovation Management

According to Zhao, similar electronic management applications that have become widespread in companies decrease the effectiveness of competition tools. They seriously differ from traditional business models, and their advantages and similarities reduce benefits of suppliers and customers (2006). Since innovation strategies in electronic management applications will provide quick and flexible dynamism necessitated by the demands of shareholders and electronic transformation, SMEs will have to prioritize their innovative activities (Singh and Waddell, 2006).

Difficulty of Changing Shopping Habits

This problem is particularly valid in countries where traditional life style is dominant. Transformation in shopping habits takes place at a slower pace than electronic commerce development of any country. It is common that people prefer to buy from people they already know after seeing and touching goods. Shopping from a virtual environment, not knowing the nature of the product or its delivery conditions may not be quite acceptable for some people.

On an Internet shoe seller zappos.com established in 1999, there are more than 3 million pairs of shoes. One of the most important features of this company which ensures 365 day refund guaranty is its free cargo service for both customer deliveries and returns. Seventy-five percent of all orders come from satisfied customers. Following his / her first shopping a customer makes 2.5 times more shopping in the next 12 months after the first order. Forty-three percent of the recently gained customers are from WOMM (word of mouth marketing) process. They provide a toll-free call line. Unlike other big e-commerce sites (Amazon, overstock, e-bay etc.) they place their number on each page. If their product does not meet the requirements of customers, they recommend other competitor sites. So far none of its customers, by providing their name or no name, has made any complaints (www.zappos.com).

Locality

For enterprises, one of the most significant economic developments introduced by Internet is the expansion of local markets to a global scale. Economic activities such as web-based advertisements, promotions, job offers, marketing activities, and sales are accessible for any Internet user enterprise and customers. Thus, it becomes easier for enterprises expanding towards foreign markets to sustain and enlarge their activities. Besides it is regarded as an opportunity not to be missed for medium and small sized enterprises, which have fully utilized foreign market potential (Reynolds and Mofazali, 2000; Combe, 2006).

TECHNICAL PROBLEMS

Inadequacy of Human Resources

Human resources management approach and its applications have now become effective in a new field described as electronic human resource by the influence of information technologies. Basically electronic human resource concept means supporting human resources management approach by

a new structuring in the electronic environment. It is viewed as a way to support human resource oriented strategies, policies, and applications through Internet based channels (Williamson et al., 2003, p.247).

As an outcome of current use of information technologies in enterprises, new employment opportunities emerge in the relevant sectors, and demand for expert technology personnel increases in return. However, throughout the world parallel to the fast development of electronic commerce, new job opportunities and demand for human resource increase, but the supply of qualified human resource does not grow at the same pace (Lai and Chen, 2009).

Electronic commerce applications require changes in the commercial and organizational structures and qualifications of personnel. In several countries, lack of information personnel has turned out to be a critical problem. Although it is early to make a guess on the future demand for qualified labor force, it can be regarded as an indicator that of all the personnel working in electronic commerce related enterprises, an average of 45-50% are employed in sales and marketing, 25-35% in research-development, and the rest in management, finance, and other areas (Zerenler, 2007, p. 223).

Insufficient Marketing Strategies

The popularity of electronic commerce as a business medium is related to the capacity of Internet, namely its future potential, its attractive qualities, its dynamism in providing global share of information and resources, and Internet's power in offering an effective channel of advertisement, marketing and direct distribution of certain products and / or services. In his book titled "Supra-Competition" Edward de Bono states "despite everything you must not fall behind your rivals otherwise you cannot sustain your presence. Price, quality, product differentiation and setting special markets are all traditional mediums serving this objective" (1994, p. 27). Indeed, enterprises competing in today's modern world are obliged to implement electronic based marketing activities, which have turned out to be a necessity rather than an advantage in competition that is becoming increasingly violent and different. Thus in such an environment where even electronic commerce is dedifferentiated, followed, and imitated by rivals, differentiating electronic marketing to adapt them to the basic qualities of enterprise would reply to the predictions of Bono, namely being supra-competition.

Electronic marketing is regarded as a revolutionary tool transforming all business processes of enterprises. Electronic marketing also, causes transformation of the traditional market structures (Calin et al., 2001, p. 36). The central role of this transformation belongs to Internet. Internet's progress is the most vital determinant of electronic marketing development. In addition, electronic marketing transforms purchase decision process of buyers as well. As buyers get involved in electronic marketing, they catch a chance to examine more options than traditional markets and thus able to make quicker decisions.

The fact that electronic commerce is full of opportunities for enterprises and it has risk minimizing quality account for the reasons not to be used. The answer for the question how to use and how to make the best of it, is related to strategy formulation. Fearing that other enterprises will seize their own markets through Internet and planning the cost of not using Internet as a defense reflex, several enterprises choose to find methods to use Internet more effectively. To achieve this end, conscious application and marketing strategies unique to Internet use should be developed (Zerenler, 2007, p. 267). If electronic commerce or cognitive business processes are, above all, established on the information bases of sector and markets, then these enterprises starting business without sufficient pre-researches may face failure. To make a right start, it is a must that enterprises planning to operate in this field should conduct

pre-researches and also forms the required information infrastructure.

The Size of Enterprise and Lack of Knowledge

Parallel to the phase of entering information based economy, for the purpose of adapting SMEs to the new work conditions introduced by this economic system, both national governments and international corporations initiated activities to inform enterprises about electronic commerce. A great majority of relevant literature points out the fact that in most countries, except USA, a great portion of SMEs is not yet totally aware of electronic commerce benefits (Coppel, 2000, p. 71). On the other hand, some authors hold the view that enterprise size also, has an effect over cognitive literacy and electronic commerce competency. As the enterprises get smaller in size, it is witnessed that Internet use that constitutes the base of electronic commerce falls backward. According to a research conducted by Levy et al., in enterprises with more than 1000 workers Internet usage ratio reaches to a level of 42%, whereas this ratio decreases to 14% for SMEs employing 1-49 workers (2001, p. 135).

Inability of Managing Technology

Selecting the technology required by SMEs to achieve their strategic and short-term goals, planning the required technology applications, deciding for transfer or manufacturing and realizing the activities for implementing this decision within the framework of a plan and program are among the basic activity issues of technology management. Strategic technology selection and goal-oriented work planning will ensure successful application of technology management.

Although electronic commerce offers wider range of opportunities for enterprises where information technologies are intensively implemented or manufactured, the very same advantage is hard to be viewed in the sectors far away from these technologies. In short, sector features may be restrictive in electronic commerce applications (Zhao, 2006, p.47).

Language and Cultural Elements

In the Internet environment, making it possible to access resources from all over the world, it is observed that language and cultural elements also demonstrate significant effects. Although 70% of Internet contents are in English, half of Internet users do not understand English. Still as stated by Coppel, even without this language problem, customers are more eager to shop from websites in their native tongue (2000, p.21).

English that is spoken like a native language in almost any international activity is dominant in electronic management operations as well. Yet companies marketing to regions where Spanish, Chinese, and Urdu languages are common should direct their marketing activities by taking regional languages into account.

Aside from the language problem, cultural elements also greatly affect electronic commerce activities of SMEs. Since many visual elements from colors to symbols present cultural differences among societies, many SMEs willing to benefit from global nature of Internet encounter difficulties.

Infrastructure and Environmental Problems

The foundation of electronic commerce is structured over communication infrastructures and information technologies. Particularly in developing countries communication costs are high and technological infrastructure falls short. High communication cost is one of the most important problems in electronic commerce applications. Generally, it is possible to comment the following suggestions for solving infrastructure problems

(Reynolds and Mofazali, 2000, p.81-83; Chen, 2004, p.161):

- Telecommunication infrastructure should be improved; and it should be possible for SMEs to benefit from these services in private.
- All forms of electronic commerce; particularly commerce through Internet, can be conducted by providing information flow through communication infrastructure. In cases where only Internet centered structuring is an issue, potential cutbacks and problems on Internet may cease commerce. Hence, alternative connection forms should be structured.
- The obstacles keeping communication and markets of information technologies away from competition should be abolished.
- Technical standards in communication should be determined.
- Environment of confidence should be established for service providers, users, and consumers taking place in electronic systems and operations.

Connection Problems

Connection problems are among the most frequently faced obstacles on Internet in electronic commerce applications. This problem, which does not merely restrict electronic commerce but all types of Internet use, is a deficiency causing information access efforts to become fruitless (Nusair and Hua, 2009).

There are attempts to simplify Internet connection and increase the access speed of countries. Failure to provide an effective infrastructure and telecom activities, which are public in many countries, restrict the operations of private sector. Restricted activities introduce high costs, poor quality yet costly access options. Recently the attempts to enable access through satellite and improving the present options by using high quality cables have been speeded up by private sector.

Legal Problems

Legal problems are the foremost reason critically determining the transformation of electronic commerce implementation into a global structure. Many issues such as the validity and binding of a computer based contract, validity of data kept in computer environment and their power of evidence, validity and applicability of digital signature, protection of intellectual and artistic works on Internet environment, legal recognition of information based crimes and prevention of unfair competition affect SMEs greatly. The main legal problems in electronic commerce applications can be outlined as the following (Kalakota and Whinston, 1997, p. 33):

a. Intellectual ownership rights,
b. Taxation,
c. Approval procedures,
d. Deficiencies in international laws,
e. Privacy rights of people,
f. Validity of electronic documents problem,
g. Validity of digital signature problem,
h. Determining responsibilities of service providers,
i. Necessity to review laws by considering electronic environments,

Although so far insignificant developments have been achieved in universalizing legal infrastructure of electronic management operations among countries in areas such as digital signature, reliable third party, information management and safety, information crimes and coordination of electronic commerce, still some critical legal expansions have been achieved.

Safety Problems

Just as in traditional commerce, the basic condition in electronic commerce is the users' trust to the system. In a commercial procedure necessitating any contract or electronic communication even just for information transfer, the users (individuals or companies) on rightful grounds do not want third parties accessing to their private personal / corporate information, namely commercial, financial. Besides in communication that is open to third parties aside from privacy of personal data, integrity of transferred information (or in other words receiving the knowledge as it is originally) and confirmation of the identities of parties should also be guaranteed. The condition, which is being discussed in terms of technique and basic human rights, is to utilize which technique, administrative and legal tools to guarantee desired levels of privacy, information integrity and identity confirmation. Unless they are provided in sufficient levels, global development of electronic commerce will be affected significantly (Sadowski, 2002, p. 81).

Safety problems SMEs can face in commercial activities during electronic commerce operations can be expressed as indicated below (Palvia and Palvia, 1999):

- Access to web sources, which have no access authority,
- Damaging information and web resources,
- Changing, mixing or making additions to information,
- Transferring information to unauthorized personnel,
- Stealing information and web sources,
- Denying purchased services, transmitted or received information,
- Claiming to have received or transferred information, not received or transferred at all (Kraemer and Carayon, 2007).

According to the estimations in U.S.A., the value of the data stolen in one year is above 10 billion US dollars. As stated in a research conducted in 1996 on 1320 firms; 78% of participants declared to have lost money due to safety break, 63% asserted to have faced loss due to viruses, and 20 users stated to have lost at least 1 million US dollars (Singh and Frolick, 2000, p. 58).

GENERAL REVIEW

Developments in electronic commerce provide brand new advantages in terms of SMEs information technologies usage and access to global markets. However, SMEs have many problems including lack of technological infrastructure and locality, language, infrastructure, environment, legal, safety as categorized under two groups namely technical and cultural. Except U.S.A. and Singapore, which are developed countries regarding information technologies and electronic commerce, SMEs stick to the "wait and see" policy in many other countries. Governments and certain international organizations concerned with this issue have been working on comprehensive projects on a global scale to enable active participation of SMEs in electronic commerce. Furthermore, the fact that SMEs free themselves from traditional commerce practices and adopt new methods thoroughly seems to be closely related to the drive in market conditions and transformation in current business culture.

Prospective contributions that will emerge with electronic commerce implementations in SMEs are presented below (Burgess, 2002, p. 79; Kotler, 2000, p. 519; Mehrtens et al., 2001, p. 169):

Improved customer base: Enterprises may implement their electronic commerce activities without any regional boundaries, time or country limits. Hence, they may obtain important advantages in global activity by carrying their operations across the borders of region and country.

Time saving in delivery of product and services: Industrial market movement of goods and delivery time may cause great commercial

problems. Since almost any enterprises avoids keeping stocks and thus order only when necessary, delivery time gains more attention. Web-based orders, compared to traditional orders, are provided and processed more quickly.

Increased sales: An increase trend in the sales of enterprises is observed at the end of electronic commerce process. Increased sales incomes are even more important for small enterprises. Online sales to customers, order chances and online check of the status of orders would add to customer satisfaction and sales.

Deactivation of mediators: The spread of Internet based electronic commerce has deactivated the mediators operating from producer to customer in the supply chain. Hence, producers offer cheaper, quicker goods and services to customers. Continuous and more appropriate information flow is attained.

Increased customer satisfaction: One of the most important outcomes of electronic commerce is increased customer satisfaction and service level. Because of electronic commerce, customers receive products and services on time; acquire online information, are connected directly to a customer based communication system. The needs of customers are determined by customers themselves and thus increase customer satisfaction.

Improved efficiency and reduced costs: Decreased use of paper and manual operations, automation of electronic commerce, news, business and operation processes play vital roles in reducing operation costs of enterprises.

Increased competition: Because of Internet, all enterprises regardless of their size, acquire equal conditions while accessing their customers. By electronic commerce, SMEs will be able to compete against large-scale enterprises with their recognized trademarks, purchase power, and mature structure (Poon and Swatman, 2000, p. 247).

Decrease in Order Processes and Bureaucracy: It is inevitable that once orders are transferred to the Internet, the size of personnel will decrease as compared to the traditional method of receiving and registering orders. In the same way, due to electronic works in place of paper work, enterprises will focus on stocks and inventory and search new ways to develop more creative cooperation with their suppliers. In this way, simplification occurs in routine orders processes and repeated works are automated. Thus, unnecessary applications are eliminated.

Trained customers: Electronic commerce will enhance cognitive literacy of customers and thus they become intellectually more capable. In order to make use of electronic commerce, customers are expected to possess Internet knowledge and computer skills.

Trained employees: Electronic commerce has positive effects on knowledge accumulation of employees as well. To ensure the success of electronic commerce, continuous training programs should be implemented and employees should adapt to the organizational transformation introduced by electronic commerce.

Basic economic effect of electronic commerce is that it creates an economic activity area where handicaps are less in number. This particular effect is basically an outcome generated by rapidly developing information technologies. Since electronic commerce uses this rapidly developing infrastructure, it will have such a great effect on economic life as well. Electronic commerce integrates potentially all the producers, suppliers, users and customers. Hence, it may be acknowledged that it is endowed with capabilities providing many forms of satisfaction that has been dreamed ever since the beginning of industrial revolution.

A STUDY OF THE TURKISH AUTOMOTIVE SUPPLIER INDUSTRY

A. Scope of the Research

The purpose of this research is to study the influencing factors, obstacles, and reasons for initiating electronic commerce in SMEs that are active in

2008 as suppliers of the Automotive Industry in Turkey. Population being too large in size, the sample of the research is arbitrarily chosen from the data base of TAYSAD, which is the Association of Automotive Suppliers in Turkey. The reasons of referring to the TAYSAD data base are as follows:

a. All organizations active in the industry are legally required to become a member of the Association,
b. its data base is frequently updated, and
c. information about the member profiles is easily accessed.

Examination of the TAYSAD data base has revealed that 268 organizations are currently registered. The suppliers not fitting the criteria or scale, or currently inactive have been eliminated and thus only 192 organizations are included in the research.

TAYSAD established in 1978 and a member of CLEPA - the European Association of Automotive Suppliers (www.clepa.be) - is the only authorized association representing the suppliers in the Turkish Automotive Industry. The Association is creditable in all automotive part and component transactions by the foreign and domestic organizations.

The product range of the TAYSAD members is sufficient to create 85-90 percent of the Turkish Automotive Industry production locally. The 268 registered members of the Association provide parts and components for the Turkish Automotive Industry and create 65% of the production and 70% of the exports. Eighty-five percent of the members are active in the Marmara region, 10% in the Aegean, and 5% in the others. The registered 268 companies of TAYSAD employ 72 000 workers and provide employment for 127 000 people including its suppliers. Fifty-eight registered companies have foreign partners with varying degrees of capital share.

The questionnaires were distributed to 268 companies as e-mail attachments, surface mail, face-to-face interviews, or by invitation to visit the website www.selcuk.edu.tr/zerenler/anket.01.html in the months of May and June 2009. As 31st of July 2009, 192 responses have been received(a response rate of 71.6); but twenty-four of the organizations registered in the data bank of TAYSAD could never be reached. Eighty-five responses were received as e-mail attachments, 42 by surface mail, 36 face-to-face interviews, and 29 by website visits.

B. Findings of the Research

As it is seen in Table 2, 33.6% of the organizations involved in the study have been active in the last 10 years. The companies with employment 200 and above are not included in the research. Hence, the study encompasses only small and medium size enterprises. The results illustrate that most of the respondents in the survey are top level professionals.

The implementation level of the electronic commerce instruments in the companies involved in the study is illustrated in Table 3. Comparing the current level to the level three years ago in-

Table 2. Characteristics of the companies

Operation period	**Frequency**	**Percentile**
Between 6-10 years	79	41.2
Between 11-25 years	73	38.0
More than 26 years	25	13.0
Between 1-5 years	15	7.8
Total	**192**	**100.0**
Status of the respondent	**Frequency**	**Percentile**
General manager	51	26.6
Information center manager	47	24.5
Marketing manager	32	16.7
Public relations manager	22	11.5
Owner	17	8.9
Information expert	14	7.3
Board member	9	4.5
Total	**192**	**100.0**

Table 3. Implementation level of electronic commerce instruments

Electronic commerce instruments	Three years ago		*Current*		Change	Wilcoxon Test	
	Average	Std. Dev.	Average	Std. Dev.		Z	P
Internet	4.36	0.68	4.83	0.84	0.47	-2.172	<.001
Telephone (deck)	3.92	0.72	4.02	0.90	0.1	-3.264	<.001
Electronic mail	3.87	0.88	4.76	0.72	0.89	-4.634	<.001
Fax	3.76	0.64	3.28	0.94	-0.48	-3.268	<.001
Electronic data interchange	3.41	0.82	3.56	0.88	0.15	-4.264	<.001
Electronic payment and money transfer systems	3.29	0.90	3.85	0.73	0.56	-3.825	<.001
Television	1.63	0.74	1.72	0.96	0.09	-4.106	<.001
Telephone (mobile)	1.18	0.62	2.23	0.58	1.05	-3.634	<.001

dicates an increase in the implementation of electronic commerce instruments. As is it discussed in the previous sections, significant increases of implementation are expected in the near future as the SMEs gain more awareness. SMEs may gain competitive advantage against large scale enterprises and access to markets at low cost performance through increasing their electronic commerce abilities. As it is known, one of the major obstacles constraining electronic commerce activities of SMEs is distribution systems. However, it is possible to overcome this obstacle through utilizing distribution chains of large scale companies or outsourcing from the service suppliers in this field.

The results in Table 4 indicate that the companies aim to utilize time advantage of electronic commerce for accessing new markets. In general, SMEs face problems in accessing new markets because of reasons such as limited financial resources, insufficiency of qualified labor, and locality of marketing and distribution systems. Electronic commerce seems to provide advantages to overcome these problems. If compared to traditional commerce, SMEs obtain significant benefits of electronic commerce implementation against large scale companies as they move from local markets to global competition. Indeed, SMEs have acquired important advantages against large scale companies through electronic commerce despite the differences among industrial sectors.

The results in Table 5 reveal that the most important impact of electronic commerce is enhancement of business activities. In addition, issues such as better access to global markets, improvement of customer services, increase of competitiveness, increases in future revenues through creating new products and services, increases in future revenues through creating new products and service, more options provided to customers at cheaper prices, increase of delivery speed, and better inventory performance have provided benefits to companies in their electronic commerce activities. On the other hand, better understanding of customer demands and

Table 4. Importance level of electronic commerce implementation

Opinion	Arithmetic average	Standard deviation
Accessing new markets	4.68	0.90
Achieving competitive advantage	4.43	1.04
Gaining extra revenues	4.19	0.78
Cost reduction	3.95	0.92
Impact of rivals	3.76	1.07

Note: (i) n=143; (ii) In the scale, 1 indicates no impact, 5 definite impact; (iii) Friedman two way ANOVA test (χ^2=482.256 and p<.001), the results are statistically significant.

expectations, better distribution performance, and achievement of more effective knowledge management seem to influence less than the other factors. However, overall all factors being above average indicates that electronic commerce generate some significant effects on SMEs. In fact, electronic commerce implementation has created some positive major impact on areas, which face many problems and limitations. The automotive suppliers industry provides parts to the major industry. Hence, it has a significant value because of its volume of transactions, but limited in terms of its customers. The automotive suppliers industry utilizes the benefits of electronic commerce implementation in order to enhance business, to facilitate business processes, and access to customers.

In Table 6, the importance level of obstacles constraining electronic commerce activities is shown. The companies point out that lack of three dimensional visual, touch effects, and test drives for automobiles and parts is the major obstacle constraining electronic commerce activities. As stated in the previous sections of the study, commodities such as automobile and real estate are not the goods that can be easily purchased because of their value and consumption. Hence, their purchasing process is more complicated and requires longer time as compared to non-durable goods purchased and consumed more frequently. In the light of these circumstances, the situation is quite the same for the products of automotive supplier industry. Even though the model, type, price, and other characteristics of the demanded products are well known by customers and providers, the lack of three dimensional visual, touch effects, and test drives significantly influence electronic commerce just like in traditional com-

Table 5. Impact of electronic commerce

Impact	Arithmetic average	Standard deviation
Enhancement of business activities	4.17	0.92
Better access to global markets	4.02	0.90
Improvement of customer services	3.86	1.02
Increase of competitiveness	3.77	0.84
Increases in future revenues through creating new products and services	3.55	1.06
More options to provided customers at cheaper prices	3.19	1.10
Increase of delivery speed	3.12	0.76
Better inventory performance	3.04	0.88
Better understanding of customer demands and expectations	2.93	1.02
Better distribution performance	2.85	0.94
Achievement of more effective knowledge management	2.72	0.98

Note: (i) n=173; (ii) In the scale, 1 indicates no impact, 5 definite impact; (iii) Friedman two way ANOVA test (χ^2=386.721 and p<.001), the results are statistically significant.

Table 6. Importance level of obstacles constraining electronic commerce activities

Obstacle	Arithmetic average	Standard deviation
Lack of three dimensional visual, touch effects, and test drives for automobiles and parts	4.43	1.88
Lack of customization for automobile parts	4.29	0.94
Internet not being reliable	3.86	0.86
Requirement of Internet address for the companies	3.71	1.04
Lack of technological infrastructure of the major industry	3.58	0.90
Major industry preferring traditional commerce	3.36	1.12
Lack of face-to-face communication with sales people	3.09	0.76
Insufficiency of Internet payment methods	2.91	0.81
Small number of product varieties	2.85	1.02
Poor designed websites	2.62	1.13
Insufficiency of websites	2.57	1.06

Note: (i) n=192; (ii) In the scale, 1 indicates no impact, 5 definite impact; (iii) Friedman two way ANOVA test (χ^2=724.363 and p<.001), the results are statistically significant.

Table 7. Opinions about the future of electronic commerce

Opinion	Arithmetic average	Standard deviation
Organizations will become more dependent on electronic commerce.	4.62	1.06
Electronic commerce will provide strategic competitive advantage.	4.31	1.02
Electronic commerce will impact organizational structure of the companies radically.	4.17	1.08
Electronic commerce will be a part of conversion for our business.	3.79	0.92
Currently, electronic commerce is part of our business.	3.38	0.90

Note: (i) n=192; (ii) In the scale, 1 indicates not accept, 5 definitely accept; (iii) Friedman two way ANOVA test (χ^2=682.136 and p<.001), the results are statistically significant.

merce activities. However, companies nowadays can easily monitor the products they want to purchase in the Internet and place their orders.

Lack of customization for automobile parts is another major obstacle to foster electronic commerce. However, as mentioned in the previous sections, mass customization practices are increasingly employed in many industrial sectors, including the automotive industry. In the automotive industry, it is extremely important to meet and even exceed customer expectations and needs. Lack of customization for automobile parts as pointed out by the companies may be attributed to an important limitation of technological capability. Hence, the Industry is required to develop its technological infrastructure, qualified manpower, and sophisticated information systems.

Table 7 exhibits the opinions of the companies about the future of electronic commerce. The companies have pointed out that organizations will become more dependent on electronic commerce in the future. In addition, it is generally agreed that electronic commerce will increasingly provide strategic competitive advantage. SMEs generally consent that electronic commerce will impact organizational structure of the companies radically, be a part of conversion for our business, and already plays a significant role in today's business.

CONCLUSION

Globalization and intensive influence of information technologies renders it indispensable to carry out commercial activities in electronic ways. Small and medium enterprises (SMEs) are increasingly utilizing the electronic commerce for their commercial activities. Hence, electronic commerce is developed almost in every industrial sector as witnessed by the increasing number of examples. It provides too many advantages and benefits to companies and other organizations.

Electronic commerce has significantly transformed the way in which firms conduct business, allowing them to gain more business opportunities and competitive advantage. However, the results from the study have revealed a lack of or slow uptake of electronic commerce technologies among the local SMEs. The objectives of this study were to understand and determine the importance of internal and external barriers; and thus provide support to overcome their problems. Among the different variables studied, technical, financial and social/ cultural barriers have been reported to create significant influence in the context of electronic commerce development in the SMEs.

The study conducted in the Turkish Automotive Supplier Industry has revealed that electronic commerce has been adopted and its benefits are accepted by the companies. However, the industry has to overcome some of the difficulties to implement it more efficiently and effectively.

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Chapter 65
People, Technology and Human Resource Development (HRD) Philosophy

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ABSTRACT

Technology and people are present in all organizations. How they are managed and developed is essential to the competitive advantage of organizations. Understanding the dynamics of this relationship is an area that needs to be better understood within the Human Resource Development (HRD) field. This chapter will explore the extent that HRD philosophy addresses the relationship of people and technology. Comparing people and technology has been a debate since the industrial revolution occurred in America (Swanson, 1982; Swanson, & Torraco, 1994). Man and machine are as essential to organizational prosperity as air and water is to living; yet, it is not often researched and published in HRD literature (Githens, Dirani, Gitonga, and Teng, 2008). Could this be why HRD professionals do not have a seat at the proverbial table in corporate America? Are HRD professionals and researchers denying that there is a relationship between people and technology in organizations? Are HRD professionals and researchers limited by their beliefs concerning the comparison of people to technology?

INTRODUCTION

According to Zakaria (2010) "technology and globalization are shattering the middle class" in America (p. 31). American workers are being displaced by the productivity gains of technology and the competition for cheap laborers in a globalized economy. Until these issues are acknowledged and addressed within the field of HRD, middle class workers will remain at a disadvantage within the global job market.

The field of HRD covers training and development, career development, and organization development (Mankin, 2001; Swanson & Holton,

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2001). All of these areas are vital to employee development within organizations. Employees want to be trained and developed so that they can build successful careers and work within viable organizations. The current global recession with its high number of unemployed workers has shined a light on the need for HRD. Aguinis and Kraiger (2009) suggest that there is "[a]n important challenge for the practice of training… to integrate the training function with employee selection, performance, management, rewards, and other human resource practices (Aguinis, 2009; Aguinis & Pierce, 2008; Cascio & Aguinis, 2005)" (p. 467).

Since the industrial revolution, when Henry Ford introduced the production line into the manufacturing of cars, technology has a huge presence within organizations. With the introduction of robots, computer technology, simulations, and avatars, employees are being realigned and displaced by the use of technology in the workplace. Yet, the impact of technology on the development of people has rarely been discussed within the HRD literature (Githens, Dirani, Gitonga, & Teng, 2008).

Organizations and theories that define or explain human behavior within organizations has been the focus of research studies in fields including sociology and business. HRD is a relatively new field of study and its theories and philosophy are dynamic and continuously under debate. Organizations are mutable and have goals of success through the people and technology that are present within all organizations. The management and development of both people and technology is essential to the competitive advantage of organizations. Understanding the dynamics of the relationships and influences upon the relationship of people and technology within organizations is an area of study that should be explored within the HRD field.

This chapter will explore the extent that HRD philosophy addresses the relationship between people and technology. We will examine if HRD professionals and researchers deny that there is a relationship between people and technology, and if HRD professionals and researchers are limited by their beliefs concerning the comparison of people to technology.

BACKGROUND

The field of HRD has made its way from sociology, to business, to education and is still looking for a place of its own (McLean et al., 2008). HRD has rich history that is not well known or explained in the HRD research literature. Without an explanation and chronicling of its history, HRD's search for a clear philosophy of HRD is ongoing, and remains under debate amongst HRD researchers and professionals.

HRD Theory Building

Swanson (2001) identifies three foundational theories of HRD: psychological theory, economic theory, and systems theory that make up the legs of his three-legged stool model. These three theories are important to HRD and many theories have been derived from these three to support the development of HRD as a discipline; however, they are not the only theories that can support the field. The following theories are some that have been used to contribute to defining HRD:

1. Commonly held theories of HRD (Weinberger, 1998);
2. Operational definitions of expertise and competence (Herling, 2000);
3. Organization development: An analysis of the definitions and dependent variables (Egan, 2000);
4. An investigation into core beliefs underlying the profession of HRD (Ruona, 1999); and
5. Philosophical foundations of HRD practice (Ruona & Roth, 2000).

There are also examples of HRD theory building efforts which include:

1. Systems theory applied to human resource development (Jacobs, 1989);
2. Foundations of performance improvement and implications for practice (Swanson, 1999);
3. A theory of intellectual capital (Harris, 2000);
4. A theory of knowledge management (Torraco, 2000); and
5. The development and validation of a model of responsible leadership and performance (Lynham, 2000).

All of these theory building efforts have contributed to the emerging field of HRD; however, McLean etal. (2008) suggests that HRD has much to learn from "EVERY field and discipline that touches on human behavior" (p. 249). Remaining open to new concepts and formulations provides opportunity for continuous debate and development within HRD. Following is a brief discussion on two theories and their potential correlation with HRD theory and practice, as well as a discussion of some of the roots of HRD in the behavioral and business sciences.

Organization Theory

Organization theory is important to HRD because of its focus upon organization development. Organization development has been defined by many and involves the principles, processes, and performance within organizations (McLagan, 1989; McLean & McLean, 2001; Egan, 2002; Cummings & Worley, 2005; McLean, 2006). McLean (2006) broadly describes organization development as:

... any process or activity, based on the behavioral sciences, that, either initially or over a long term, has the potential to develop in an organization setting enhanced knowledge, expertise, productivity, satisfaction, income, interpersonal relationships, and other desired outcomes, whether for interpersonal or group/team gain or for the benefit of an organization, community, region, or, ultimately, the whole of humanity. (p. 9)

Hinings and Greenwood (2002) trace the history of organization theory from its roots (Weber, 1964) as a discipline in sociology to its migration in business. HRD as a field finds itself in a quandary of identification. It is housed in colleges of Education, Business, and Human Services among others, with each college potentially exploring the philosophy and practice of HRD in slightly different ways. It does have as one of its aims, however, an understanding of organization development.

Institutional Theory and HRD

Bush (1987) defines an institution as a "set of socially prescribed patterns of correlated behavior" (p. 1076). He then states that the concept of correlated behavior consists of two key tenants; behavior within an institution is not random but purposeful and correlated, and values are the "correlators." In Bush's definition one can detect the role of HRD in an organization and a plausible explanation for the genesis of HRD as a discipline within corporate institutions.

Bush then later identifies two types of values; ceremonial and instrumental. He states that ceremonial values "provide the standard of judgment for invidious distinctions, which prescribe status, differential privileges, and master-servant relationships, and warrant the exercise of power by one social class over another (p. 1080)." Could this, in a corporate institution, be defined as "culture?" And, could one of the responsibilities of HRD be the dissemination and legitimization of an institution's culture? Buchholz (1977) suggests that HRD's purpose is to support "a set of beliefs regarding the nature of work …" (p. 585); in essence a corporate culture.

Bush defines instrumental values as "the standard of judgment by which tools and skills are employed in the application of evidently warranted knowledge to the problem-solving process of the community (p. 1080)." He notes that these values are not unchangeable, that they can evolve with time as the needs of the organization change. Could instrumental values be operationally defined as competencies? Regardless of if the competency is job-specific or a universal competency to the organization, it seems consistent with this concept of instrumental values. Once again, HRD is the keeper of this type of organizational meme (Clardy, 2008).

Davis and North (1970) attempted to develop an institutional theory model that roots the motivation for innovation in financial concepts. The authors identify three exogenous change agents that potentially put at risk institutional innovation. They are:

1. Potential income from arrangemental innovation might increase because some exogenous change could lead to the emergence of an externality where none existed before, to a restructuring of risks, to a shift in transaction costs, or to the application of a new technology subject to increasing returns.
2. The costs of organizing and/or operating a new institution might change because of the invention of a new arrangemental technology, of institutional change in the non-economic sector, or because the price of the factors used in the new or in competing existing institutions may change.
3. Some legal or political change might alter the economic environment and make it possible for some group to effect a redistribution or take advantage of an existing external profit opportunity. (Davis & North, 1970, p. 139)

Items two and three indicate the need for HRD (particularly 3). As cost and organizational leverage factors change or come at risk due to innovation (or potential innovation) HRD becomes a risk-mitigating factor. HRD as a function manages human capital risk (Bhattacharya & Wright, 2005) and thus allows organizations to maximize profit (which, per Davis and North, is the goal of any organization). How does HRD accomplish this? A myriad of ways; HRD in an organization may be tasked with managing through change, thus assisting in ensuring its acceptance within the organization. It may assist the organization as a whole in learning new technology or ways of behaving that the overall organization has identified as critical for innovative change. It may aid in mitigating external risks such as political or legal pressure by assisting the organization in complying with legal or political mandate.

Scott (1987) describes institutionalization as

the social process by which individuals come to accept a shared definition of reality – a conception whose validity is seen as independent of the actor's own views or actions but is taken for granted as defining the 'way things are' and/or the 'way things are to be done.'(p. 496)

Perhaps this definition of institutionalization best illustrates the link between HRD and Institutional Theory. HRD, through the lens of Institutional Theory, becomes the operational arm by which the "shared definition of reality" is propagated throughout the organization.

Kuchinke (2000) argues that HRD is spending too much time debating what HRD "should be" and not enough time figuring out "what it is." He proposes that institutional theory be the theoretical framework from which empirical research be hung, and that HRD scholars begin to focus on empirical research that explores this framework. Institutional theory is, in essence, a systems theory coming out of sociology.

HRD Philosophy

Philosophy has been defined by the Greek as the love of wisdom (Jasper, 1951). HRD professionals and researchers consider it an accomplishment when they inspire the love of learning in individuals. Wisdom is derived from what one knows and experience, thus everyone has a personal philosophy. Jaspers (1951) stated "There is no escape from philosophy. The question is only whether a philosophy is conscious or not, whether it is good or bad, muddled or clear. Anyone who rejects philosophy is himself unconsciously practicing a philosophy (p.12)." If we are to take Jaspers at his word, HRD does have a philosophy of theory and practice. Uncovering that philosophy, however, has proven troublesome. Jaspers also notes

"This meaning of the word still endures: the essence of philosophy is not the possession of truth but the search for truth, regardless of how many philosophers may believe it with their dogmatism, that is, with a body of didactic principles purporting to be definitive and complete. Philosophy means to be on the way. Its questions are more essential than its answers, and every answer becomes a new question." (p. 12)

HRD, and the accompanying philosophy that defines and informs it, is very much "on the way." Over the course of its existence a host of HRD philosophic principles have, as Jaspers suggests, purported to be definitive and complete. As the discipline has grown and matured, so have the underlying philosophies changed and expanded.

Slichter (1920) in his early 20th century article explored the relationship between business philosophy, in this case capitalism, as the potential genesis of low worker morale. Morale is now known as "engagement," an area generally associated today with HRD. In the formation of a philosophy of HRD, it is impossible to ignore the economic philosophy of capitalism from which it sprang.

As McLean et al. (2008) previously noted, HRD can learn from and is informed by all of the behavioral sciences. Slife and Williams (1995) investigated the major theories of behavior science: psychoanalysis, behaviorism, humanism, cognitivism, eclecticism, structuralism, and postmodernism. Of these major theories, Vince (2003) suggests that "HRD policies and practices have traditionally been informed by a tired humanism that imagines [employee] development separately from the social, political, and emotional dynamics of organizing as well as the economic pressures on business (p. 559)." Consistent with Jaspers' "philosophy of philosophy," however, such an approach to HRD appears to be diminishing and a more holistic philosophy is taking its place. Institutional theory, as a branch of systems theory, demonstrates this shift.

Ruona and Lynham (2004) provide an in-depth, three-pronged approach to the philosophy of HRD: Ontology, Epistemology, and Axiology. Ontology is how we see the world. Epistemology is how we come to know and think about the world. Axiology is how we should act in theorizing, researching about and practicing in our world. The authors suggested that these three components make up a philosophical framework by which all of HRD can be examined. The authors also suggested such a framework to benefit the individual practice of HRD, the research and theory building associated with the profession of HRD, and the evolution of HRD.

As HRD continues to evolve one of the major issues of concern is the ability of researchers and professionals to bridge the gap between research and practice. Short (2006) states that

despite increased research activity in the field, few advances in practice have been clearly grounded in research (Jacobs, 1999), and it would be optimistic to claim that HRD research is influencing practice in meaningful ways (Berger, Kehrhahn, & Summerville, 2004). In fact, it has been expressed that the gap has been around for as long as we

can remember (Short, Sherlock & Sugrue, 2004), and it is not going away anytime soon (Yorks, 2005). (p. 344)

Kuchinke (2004) discusses three reasons the tension exists between theory and practice. They are:

1. Proximity of theory and practice. (Theory and practice aren't a duality but a continuum, thus it becomes difficult in the middle to distinguish between the two.)
2. Theoreticians and practitioners as denizens of separate communities.
3. The limitation of social science research.

Recognizing the gap, many HRD scholars are searching for meaning and methods to close the research practice gap and implement research techniques and strategies developed in academia within the workplace (Hughes, Wang, Zheng, & McLean, 2010). Torraco (2004) and Storberg-Walker (2006) mention a general lack of *actionable* theory-building in the discipline.

People, Technology, and HRD

Much of the research regarding technology and HRD centers upon computer technology and how it relates to educating employees in the workplace. Learning Management Systems (LMS's) that manage employee training and development are important tools for HRD professionals in the workplace. However, HRD professionals and researchers must go beyond managing the systems to helping employees operate technological equipment within the workplace. These are the systems that are displacing most of the middle class workers (Zakaria, 2010) because they are not equipped or educated to operate high technology and cannot be trained quickly enough to meet the global needs of organizations. Instead companies are bringing in foreign workers to meet immediate workplace needs in the US. Githens, Dirani, Gitonga, and Teng (2008) conducted a meta-analysis of technology-related research in HRD publications from 2000 to 2006. Their findings that only 10% of 1675 articles in five journals were related to technology imply a lack of interest in technology by HRD researchers and professionals. This is discouraging because Swanson (2008) notes the following assumptions regarding the role of human expertise and skill they bring to organizations. They are follows:

1. Organizations are human-made entities that rely on human expertise in order to establish and achieve their goals.
2. Human expertise is developed and maintained through HRD processes for the mutual long-term and short-term benefits of sponsoring organizations and individuals involved.
3. HRD professionals are advocates of individual, team, work-processes, and organizational integrity.(p.331)

If HRD is to advocate the success of work-processes, how can they do so without an understanding of technology's role in workplace success?

People and technology are essential to the functioning of an organization. Hughes' (2010) People as Technology Conceptual Model is an integrative part of an organization's value creation strategy. The PT conceptual model describes the potential value that technology development and people development can bring to and organization. Operationalization of this model has the potential to be a promising management practice (Espedal, 2005) that will provide a solution when organizations struggle to implement their best practices without the best people in the right jobs at the right time and the best technology (Brache, 2002; Espedal, 2005; Martelli, 1998; Pfeffer, 1994; Stewart, 1997). People and technology must blend to the extent that the process is a win-win for employees and organization (London & Diamante,

2002). This concept is useful within all business strategies including JIT, Lean manufacturing, ISO, TQM, and Six Sigma because it enhances the foundation of the strategy, the people, and the process (Snell & Dean, 1992).

Much of the HRD technology related research "focused on educational technology in higher education settings, while non-profit organizations and government/military settings were underrepresented. Overall, non-training topics were [also] underrepresented" (Githens, et al., 2008, p. 1). The opportunity for research in technology related research within HRD is extensive and needed. Re-training of the American workforce in high-tech skills is an area where HRD researchers and professionals' skills are warranted.

Training and development and career development areas of HRD are being influenced by the technological advances that are being made in the global economy (Zakaria, 2010). Robots and other simulation systems have been introduced into workplaces and are displacing the need for employees. This is not a new phenomenon, but is much more recognizable during this economic downturn. How organizations adjust to these developments impacts the future of its employees and its existence.

FUTURE TRENDS

The future of HRD is continuously evolving. Organizations are continuously changing processes and procedures, developing employees, and trying to remain competitive in a global economy. HRD professionals and researchers must also be willing to continuously change and evolve to help organizations achieve their goals. Some of the key strategies are:

1. HRD professionals and researchers must end the debate (Kuchinke, 2000; Murphy & Garavan, 2009) and begin to, as noted by McLean et al. (2008) learn from every field that touches human behavior. In this case, a focus on the history or organization theory and its evolution from sociology to business to HRD would enhance the development and understanding of HRD philosophy.
2. HRD professionals and researchers must find a way to bridge the gap between research and practice. They must come to terms with the fact that while their focus is on the gap, organizations are struggling to reach their goals without effective and efficient strategies from the HRD field.
3. HRD professionals and researchers must understand the relationship between people and technology and not focus on one or the other in isolation. They must develop methods of valuing both people and technology within the workplace.
4. Technological innovations in the workplace are on an explosive upward trend. HRD researchers and professionals must understand these innovations to ensure that as people are developed their roles are not diminished or further eliminated but enhanced by technology.
5. HRD professionals and researchers must work to meet the business needs of workers in all organizations and provide technological based solutions along with their people based solutions. The same way that engineers cannot accomplish their design goals without people implementing their designs, HRD professionals and researchers cannot plan people strategies without understanding technological implications (Betz, 1993).
6. Ultimately, HRD must consider public policy as a potential future area of research. Understanding the broader labor relations and economic implications of their decisions within the public policy arena can only strengthen HRD practice.

CONCLUSION

HRD professionals and researchers do not appear to deny that there is a relationship between people and technology there is very limited research that supports their effort to understand the relationship of people and technology within organizations. HRD professionals and researchers are limited by their beliefs concerning the comparison of people to technology because their ability to expand their research and practice is limited by their beliefs or focus upon issues that are not adding to the knowledge base in these topic areas. A mind shift needs to occur before progress can be made in this area of inquiry: people, technology and HRD.

Understanding the history, philosophy and theories of HRD provides an opportunity for HRD researchers and professionals to build a solid foundation upon which they can enhance human behavior within organizations. They can begin to blend research and practice in a way that allows individuals and organizations to thrive and achieve competitive goals. It will also allow them to value the relationship between people and technology so that organizations can maximize the efforts of both people and technology and not one or the other (Carrig & Wright, 2006). Without these changes HRD professionals will never win a seat at the 'table' in corporate America or any other organization even though it is central to training and development, career development, and organization development.

The future is optimistic for HRD researchers and professionals. There are numerous ways that HRD can be developed to transform institutions to meet organizations' needs for global competitiveness. Without competent, well-trained employees, organizations will not be able to compete to win (Welch, 2005). Welch (2005), states "To manage people well, companies should [e]levate HR to a position of power and primacy in the organization, and make sure HR people have the special qualities to help managers build leaders and careers. In fact, the best HR types are pastors and parents in the same package" (p. 98). He suggests the pastors and parents type because they "*know* the business - its every detail" (p.102).

Knowing the business implies knowing, the people, the technology, and the organizational strategies for success in a competitive marketplace. HRD with its emphasis upon training and development, career development, and organization development has the capacity to know the business. However, their philosophical shift must lean towards institutional and organization theory while standing upon the three-legged stool of psychological theory, economic theory, and systems theory (Swanson, 2001).

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KEY TERMS AND DEFINITIONS

Axiology: The study of the nature, types, and governing criteria of values and value judgments.

Epistemology: The branch of philosophy that studies the nature of knowledge, in particular its foundations, scope, and validity.

Exogenous: Originating outside an organism or system.

Globalization: To become international or start operating at the international level, or cause something, especially a business or company, to become international.

Mutable: Tending or likely to change.

Ontology: The most general branch of metaphysics, concerned with the nature of being; the study of existence.

Operationalize: To put something to use or into operation.

Philosophy: A set of basic principles or concepts underlying a particular sphere of knowledge.

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Chapter 66
Knowledge Worker Faire Compensation:
Ethical Issues and Social Dilemmas

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ABSTRACT

One of the key characteristics in knowledge management is the importance of human resources. Therefore, main stream literature has been discussing the concept of knowledge worker, its characteristics, and duties versus rights, and human resources policies in its dissimilar perspectives (knowledge workers retention, personal mastery, intellectual property rights, among others). Although, empirical studies seem to disregard if knowledge workers feel that are well compensated, or what dimensions entail faire compensation. Hence, this chapter aims to recognize knowledge workers feeling about faire compensation, and what elements are essential to achieve it through a conceptual framework. For that, the chapter is divided into six sections: the research questions; knowledge worker (key characteristics and responsibilities versus rights); fairness (etymology and the contribution of Rawls); linking the theoretical basis; empirical results (methodological remarks, findings and discussion); future research directions (the surrealist assumption, Dali surrealism and the metaphorical assumption).

INTRODUCTION

The last decades have witnessed production of research on knowledge work, due to a conviction that economic achievement of post-industrial societies progressively depends on skills to utilize knowledge (Stehr, 2001; Castells, 2000). Therefore, beyond manage knowledge organizations need to realize that human resources are essential to promote knowledge creation, utilization and sharing. In spite of this level of criticality that human resources introduce the concept of "knowledge worker" entails an ambiguous perception (Pyöriä, 2005; Alvesson, 2004; 2001). This is a consequence of an attempt to resume its distinctive

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features, as for instance: processes information (Davenport, Järvenpää & Beers, 1996); utilizes information and communication technologies (Garavelli *et al.*, 2003); has problem-solving skills (Tsoukas & Vladimirou, 2001); produces non-routine work (Lillrank, 2002); has increasing levels of autonomy (Darr, 2003); and, is collaborative (Kristensen & Kijl, 2008).

Furthermore, in order to attract these workers (Gayton, 2008) with high levels of personal mastery (Senge, 2006) it is essential to create an effective Human Resources policy. Literature has been recognizing this quandary and assumes that human resource management practices need to be internally consistent so that they mutually reinforce each other, namely career structure and reward systems (Currie & Kerrin, 2003). In that sense, an array of organizational incentives can be highlighted: monetary and non-monetary rewards, as well as intrinsic and extrinsic (Bartol & Srivastava, 2002); despite dissimilar motivation strategies for knowledge workers (Petroni & Colacino, 2008).

As a result, this contribution endeavours to discuss knowledge workers feeling about faire compensation, and what elements are essential to achieve it through a conceptual framework based on the theory of justice (Rawls, 1971). The author still refers that the argument will consider the concept of fairness about compensation as a combination of three dimensions of organizational justice: distributive, procedural, and interactional (e.g. Cropanzano & Randall, 1992).

THE RESEARCH QUESTIONS

Since this contribution is not promoting a traditional approach to human resources managing, namely knowledge workers. Despite the novelty of the subject it entails a minor component of the author PhD research project (for further details chapter 16), leading to the following research questions:

1. Do you consider that knowledge creation, management and sharing into the organizational environment are fairly rewarded?
2. State what is meant to be a fair compensation regarding knowledge creation, management and sharing in an organizational environment?

The initial research query examines if knowledge workers feel that are fairly rewarded, as well as the question was also posed to middle managers and top managers in order to understand each group perception. Yet, it is compulsory to notify the potential Readers that is an open choice question with the subsequent answering possibilities: never, rarely, usually, often, always, and I do not respond. On the other hand, the second question seeks to recognize fair compensation dimensions through an ask for agreement option.

KNOWLEDGE WORKER

Key Characteristics

Following Kelloway & Barling (2000) it is possible to illustrate knowledge workers as investors, because these choose when they want to use their knowledge. So, knowledge workers are likely to employ their knowledge as an extension of their skills, motivation and opportunity. Or, Davenport & Prusak (2000) define knowledge workers as those who create knowledge, or the prevailing component of their work is knowledge. Although, this definition was enhanced in order to include the ones who also distribute and employ knowledge (Davenport, 2002). Concluding, the author will follow Horvath (2001) definition: "anyone who works for a living at the tasks of developing or using knowledge". Additionally, for Efimova (2003) knowledge work can be explained through the iceberg metaphor: unlike traditional work its interactions seem invisible, because informal circumstances may represent until 80%.

Thus, knowledge workers impose a shift in the balance of organizational power, because power in social contexts assumes three primary sources (Nickols, 2003, pp. 5): "politics (i.e., power derived from relationships among people); position (i.e., power derived from formally constituted authority); and profession (i.e., power derived from specialized knowledge)."

Responsibilities vs. Rights

Bearing in mind that every worker is bounded to duties and rights, it is reasonable to claim that a trade-off arises. For The Free Dictionary (2010a), trade-off can be defined as an exchange of one thing in return for another, especially relinquishment of one benefit or advantage for another regarded as more desirable.

For the purpose of this analysis the author introduces the work of Storey (2005) as regards to knowledge worker requirements:

- behaviour- resumes the organizational expectation that workers have the ability to be creative and proactive instead of complying with repeated custom actions. Another prerequisite is to present educational qualifications along with pertinent professional experiences, as well as the possess the ability to learn constantly;
- capabilities- ability to deal with large amount of complex data or information, as well as to learn from it in order to respond to the external environment challenges through semi-structured organizational routines;
- motivations- knowledge workers need to be motivated in order to enhance their personal mastery, and for that the organizational values, culture and climate are vital.

FAIRNESS

Etymology

According to the Wiktionary (2010) fairness is the property of being fair; and fair means free of bias, which evolved from an earlier meaning "morally pure" (Online Etymology Dictionary, 2010). Moreover, fairness or fair entail a similar definition in nowadays: having or exhibiting a disposition that is free of favouritism or bias; impartial: a fair mediator; just to all parties; or even, equitable: a compromise that is fair to both factions (The Free Dictionary, 2010b).

The Contribution of Rawls

John Rawls (1971) defined justice as fairness: "it conveys the idea that the principles of justice are agreed to in an initial situation as fair." (p. 12). Rawls still claims that individuals decide under the veil of ignorance, meaning that are not entirely aware of their personal features and role in society. Hence, this assumption leads us to conclude that people do not pursue personal interests, and by that mean assuring equality. In addition, this author refers three psychological factors that sustain the principle of justice: morality of authority, morality of association, and morality of principles. Therefore, Okin (1989) criticizes Rawls moral development assumptions namely the duty to teach morals and gender neutrality. Although, the author will disregard Okin criticism as pointed out by Hartline (Hartline, 2008).

LINKING THE THEORETICAL BASIS

After framing the theoretical components it is time to understand how these variables interact, and most importantly which key issues promote the existence of a fair compensation within knowledge environments.

Remembering Horvath (2001), "anyone who works for a living at the tasks of developing or using knowledge" is considered a knowledge worker. This statement induces to the following assumption: knowledge process (creation, retention/utilization, and sharing), meaning that Rawls (1971) macro analytical guidelines will be:

- justice and knowledge creation and sharing;
- justice and fair protection and retribution;
- justice and fair compensation;
- justice and recognition of human dignity and autonomy.

Justice and Knowledge Creation and Sharing

According to Hurley (2005), knowledge workers are morally accountable with reference to knowledge production and sharing within the organizational environment. In addition, that moral accountability is also bounded to organizations (Costa, Prior & Rogerson, 2008a), because it is compulsory the existence of a knowledge sharing environment. Nevertheless, to promote ethical environments concerning knowledge sharing is extremely difficult, and not utopian like Wilson (2002) points out. The answer relies on balancing the ethics of self-interest versus knowledge sharing (Wang, 2004).

Justice and Fair Protection and Retribution

Lambert *et al.* (2005) defends that exclusively spotlighting upon employee rewards or outcomes, is expectable to deal with sanction in a fair and just manner, which is consistent with the claim of Costa, Prior & Rogerson (2008). The focus on fairness should act for rewarding and sanctioning, because workers have a moral responsibility not simply to be productive but also share the produced organizational knowledge (O'Neill & Adya, 2007). The following example resumes the previous arguments:

an employee might compare the pay and benefits received by their fellow employee and make a comparison of their effort at work with their rewards. As a result of this comparison, individuals decide to exert more or less effort, or change their perceptions of inputs or outcomes. Equity is perceived when the input/outcome ratio of the individual is equal to those of others compared with. Perceived inequality, for example, an employee who perceives rewards are inequitably distributed among employees in their organization, might react with seeking employment elsewhere. (Haar & Spell, 2009, p. 1829)

Justice and Fair Compensation

Distributive justice principles would acknowledge that a worker deserves additional compensation, however does not portray the reasons to such claim. In fact, distributive justice frequently evaluates job satisfaction and workers intentions to continue working (Greenberg & Cropanzano, 2001). Although, workers are also concerned with the fairness of procedures that enable compensation systems, which according to these authors are: be a consistent process, free from bias, correct, participative and ethical.

On the other hand, procedural justice will shed some light over the impact of organizational values and mutual trust, because workers that are fairly treated easily accept if necessary a decreasing in their payment (Turillo *et al.*, 2002). Furthermore, fair compensations must reproduce desirable values and ways of achieving organizational goals (Verplanken & Holland, 2002), since compensation systems structure typically reflects the underlying organizational ideology. Therefore, these systems must entail acceptable ethical and moral values (Cropanzano *et al.*, 2001), which for example CEOs exorbitant wages are an example (Lavelle, 2002).

Justice and Recognition of Human Dignity and Autonomy

Miller (1999) refers that a core component of any theory of justice embraces human rights, which in this case configures the following dimensions:

- the right to life- includes the right to feel secure and safe, which means that organizations ought to inform society about potential harm (Ryan, 2002);
- the right to the freedom of expression of ideas- is bounded to the moral accountability of knowledge workers produce knowledge, as well as organizations create a knowledge environment (du Plessis, Britz & Davel, 2007);
- the right of access to those ideas- debates the existing trade-off between personal effort and benefit (Ford & Staples, 2005);
- the right to protect and control expressed ideas- resumes the trade-off among workers faire compensation, and the organizational moral right to protect its economic interests (Blyth, 2005);
- the right to privacy recognizes the autonomy and dignity of individuals- knowledge environments must respect individual privacy rights (Baskerville & Dulipovici, 2006), which leads to a necessary discussion about privacy (Stahl, 2007).

Intermediate Conclusion

The quotation of O'Reilly III & Pfeffer (2000, pp. 3) summarizes in an interesting way the overall discussion: "great people want to work at great places where they can actually use their talents, where they are treated with dignity, trust, and respect, and where they are engaged by the values and culture of the organization."

Theoretical Framework

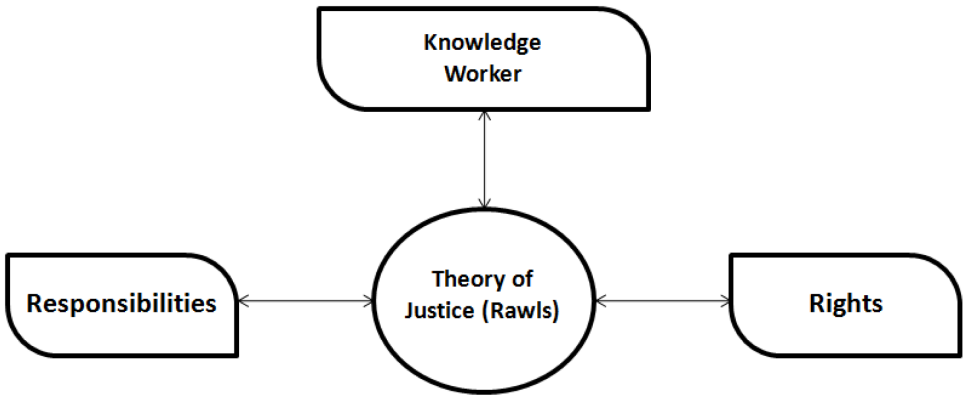
As a final remark, the author refers that Figure 1 depicts these concepts and their relationships (theoretical framework).

EMPIRICAL RESULTS

Methodological Remarks

Creswell (2003) refers that a qualitative research may induce several angles of analysis. For that, in order to explore an event from an in-depth insight the researcher might choose a diminutive but informative case, or might perform a simple inferential numerical analysis. On the other hand,

Figure 1. Theoretical framework



Miles & Huberman (1994) denote that descriptive research intends to make complex issues logical by reducing them to their fundamentals; or, if the researcher is not entirely conscious of the facts, in spite of recognizing the research issue (Zikmund & Zikmund, 2000). And, explanatory research endeavours to exemplify certain phenomena from contrasting insights (Yin, 1994), which entails the research problem.

In addition, to consent subjective and inquisitive outcomes a blend of interpretative and critical theory is consistent with look for meaning in context. So, to identify how a reality appeared is imperative to analyse the social and historical environment (Klein & Myers, 1999), regardless the possibility to question the output (Sandberg, 2005). Likewise, the study of social reality is inner to critical research as acknowledged in numerous narratives of critical research (Hirschheim & Klein, 1994).

Finally, empirical data was collected throughout questionnaires and interviews (PhD research project- see chapter 16), and informational conversations. Semi-structured interviews sponsor a method to acquire the informants beliefs and opinions through a verbal exchange (Burns, 2000); a questionnaire can serve as an inductive method with the aim to formulate new theory with higher or lower levels of validity according to the type of questions (Gill & Johnson, 2002); and, informational conversations intend to discover, understand and gain insight of people experiences (Paton, 1980).

Findings

PhD results

The empirical outcomes highlighted in this section involve two levels of analysis: pre-tests and pilot studies results. In short, pre-tests were performed to 50 individuals with divergent professional and educational backgrounds during February 2009; and, the pilot studies have occurred in June 2009 within a learning organization that operates in Portugal, being their sample size objective 25 per cent of the organizational population. Moreover, for further details as regards to the methodological and analytical procedures read chapter 16; although, an important remark is: the results for each procedure will be divided into simple inferential numerical analysis (global and by focus group- top management, middle management, and workers) for research question 1, and content analysis for research question 2 (just focus groups).

The results demonstrate the denial of a fair compensation, and it is interesting to denote that middle managers seem to share workers perspec-

Table 1. Research question 1 results

Pre-tests		**Results**
Global		The generic results were: never (8%), rarely (50%), usually (22%), often (16%), always (4%)
Group	**Top management**	More than 80% believed that workers are fairly compensated (combining usually, often and always)
	Middle management	60% referred never and rarely
	Workers	The combination never and rarely entailed over 85%
Pilot studies		**Results**
Global		52% acknowledged rarely, 24% usually and 20% often
Group	**Top management**	100% argued that workers were fairly compensated
	Middle management	Combining never and rarely
	Workers	62% claimed rarely

tive with reference to this topic. Nonetheless, a higher detail of analysis is decisive for understanding these results (observe the following sections), and the dimensions of faire compensation (content analysis). Hence, some keen examples of fair compensation and its dimensions are illustrated in Table 2, as well as translation was not performed in order to avoid the lost of sensitive meanings.

Academic Experiences

This subsection endeavours to shed some light over the author personal experiences in his lecturing or participation in worldwide conferences, and a major conclusion seems to arise: fair compensation tends to demonstrate extreme positions! The expression "extreme positions" intends to portray the existing gigantic gap about faire compensation: managers' assumption is that workers are often fairly rewarded; and, workers acknowledge the absence of a fair compensation. For instance, during IIRH 2010 Conference in Setúbal, Portugal, devoted to *Research in Human Resources* it was interesting to denote that despite literature refer that people are the "core", and what stimulus managers need to produce to engage a knowledge environment the empirical results demonstrate that these policies do not engage personalization, compensation features resume traditional approaches which are not suitable for a knowledge economy, or even that managers actions do not match their discourse. An example was the keynote speech of Francisco Cesário, CEO of PT Contact:

Nós apostámos em transferir parte dos nossos call centers para zonas do país com elevadas taxas de desemprego (interior), pelo que se prova a nossa responsabilidade social (...) (transfer of "production" to areas with high rates of unemployment, as a sign of moral responsibility)

However, when confronted about the true reasons for this movement the answer was:

Razões económicas! Por exemplo, as entidades públicas locais cederam um espaço para permitir a instalação da empresa, assim como efectivamente os salários auferidos pelos colaboradores destas regiões são inferiores aos praticados em Lisboa ou no Porto (..) (economic reasons! Being examples, the local government support, and these workers lower salaries when compared with Lisbon or Oporto)

These arguments clearly demonstrate that beyond rich literature is vital to educate managers to be open-minded and ethical! In fact, this corroborates the numerous informal dialogues undertaken with the editor learners about the perception of faire compensation in knowledge environments. Their responses, representing professional experiences, demonstrate that two additional critical issues seem to arise: the Human Resources policies shortcomings about intellectual property rights (personal versus organizational), as well as the gap amid managers and workers compensation.

Eu rejeito por complete que as experiências pessoais vivenciadas pela minha pessoa na organização sejam propriedade intelectual desta (personal experiences as intellectual organization property- a explicit denial)

É inacreditável a diferença existente entre os valores auferidos pelos colaboradores e a gestão, até porque esta comete erros de palmatória! (gap between managers and workers compensation, as well as knowledge workers have the ability to question about strategic options)

Professional Experiences

While as a Key Account (before embracing lecturing), or acting today as a consultant the author has observed that faire compensation is an extremely complex issue in organizational contexts, namely in small and medium enterprises (SME's). De-

Table 2. Research question 2 results

Pre-tests	Results	Analysis
Top management	"*Justa compensação: o retorno (pessoal e profissional) pela participação individual nos processos de criação, gestão e partilha do conhecimento*"	The importance of knowledge creation, use and sharing
	"*Justa compensação não assenta em princípios meramente economicistas, mas também de reconhecimento e valorização do colaborador*"	The recognition of the financial and non-financial dimensions
	"*Justa compensação: quando alguém recebe algo em troca do seu trabalho ou esforço por ter conseguido um feito com relevância para a organização, sendo partilhado por toda a equipa*"	The identification of the financial and non-financial elements
Middle management	"*Justa compensação pode ser monetária, ou melhores condições no ambiente organizacional*"	The acknowledgment of financial and non-financial realities
	"*Todas as pessoas na organização quando partilham ideias ou colaboram devem ser reconhecidas, ou monetariamente ou através de novos cargos, etc*"	Primacy regarding recognition for those who create, use and share knowledge
	"*Compensação: plano de carreira e promoção de acordo com o desempenho, assim como, prémios monetário*"	The traditional perspective: pure economic
Workers	"*Acho que se deve recompensar de forma justa aqueles que contribuem para a criação, gestão e partilha do conhecimento*"	Again, the significance of knowledge as a process
	"*A justa compensação poderá mostrar-se pela análise, validação e quiçá adaptação e partilha de novas ideias, podendo assim ser um contributo positivo para a empresa*"	The importance of knowledge sharing
	"*Justa compensação pode ser monetária, flexibilidade de horários, aumento da autonomia*"	A interesting bound: enhanced autonomy as a way of fair compensation
Pilot studies	**Results**	**Analysis**
Top management	"*Justa compensação é o reconhecimento a todos os colaboradores que fazem parte da organização*"	The evidence of an organizational transversal process
	"*Justa recompensa surge através de factores monetários e não monetários*"	Economic and non-economic factors
	"*Tudo depende do impacto e das próprias pessoas em causa*"	Personalization as a fact
Middle management	"*Entendo os valores financeiros associados (salário e/ou promoções), e os não financeiros (reconhecimento)*"	The combination of economic and non-economic principles
	"*Compensação pode resumir-se apenas ao reconhecimento verbal do esforço no desenvolvimento do conhecimento. Não tem que se reflectir obrigatoriamente em valores monetários*"	Recognition as a crucial factor
	"*Em termos pessoais uma perfeita compensação é saber qual o meu trabalho e papel organizacional, e através dele respeitarem a minha autonomia e privacidade*"	Autonomy and privacy as basics for faire compensation
Workers	"*O conhecimento que o colaborador possa partilhar e que o vá afectar positivamente ou negativamente na evolução dentro da empresa*"	Knowledge sharing substance
	"*Justa compensação é a partilha de conhecimento sustentada na confiança mútua*"	Sharing knowledge and trust as keys for faire compensation
	"*As nossas organizações ainda não estão adaptadas à realidade de que as empresas são as pessoas e não o contrário, isto é, o mérito deve trazer mais valias, apesar do objecto de trabalho ser raramente recompensado seja por estímulo oral ou por valores compensatórios (financeiros ou outros)*"	The claim that Human Resources policies are inadequate

Table 3. Professional experiences as regards to question 2

Professional experience	Context	Results	Analysis
Meeting	Discussion about innovation in rewarding workers	"*Os colaboradores não necessitam de incentivos adicionais, pois já auferem o salário (...) Além disso, autonomia significa que não podemos controlar o seu trabalho*"	Ignoring literature recommendations
Conference about organizational innovation	Human Resources Manager speech	"*Nós temos uma verdadeira política de recursos humanos, pois valorizamos o conhecimento dos nossos colaboradores (...). Um exemplo foi a atribuição de um prémio de produtividade de 400€ a um colaborador por ter criado um produto financeiro totalmente novo que vai ser introduzido nos mercados financeiros*"	The quandary of fair compensation

spite this observation a detailed analysis will be underlined in subsection discussion; so, about of empirical evidences at a professional level is the author intention to highlight two essential quotations: the first occurred during a meeting with a CEO of a medium learning organization; the second happened in a conference organized by a major financial institution on the topic organizational innovation. Nevertheless, it is vital to detail the context of each quotation, as well as to understand the content of these quotations (observe Table 3). Once again, translation was not executed in order to avoid the lost of insightful connotations.

Discussion

More people feel that are treated fairly, more reasons will have to identify with that group. This assumption is also recognized in organizational environments, because empirical data demonstrate that workers are less worried their absolute income (Adams, 1963). In fact, Cohen (2008) highlights that Rawls social requires benefits and burdens distribution by individuals, as well as inequalities concerning incentive payments are indeed fair. The reason for his claim relies on the following argument: workers with higher levels of productivity will benefit the organization, and as consequence all organizational members will benefit from that situation. Even so, a CEO salary when compared to the remaining organizational members is a social dilemma. For instance, Söderström *et al.* (2003) have demonstrated tremendous gaps between CEOs and other professions; Piketty & Saez (2006) study acknowledges that CEO salaries between 1980-1998 raised 9 per cent average and workers just 3,7; and, the major problem is the historical data of unethical and fraudulent behaviours as regards to corporate performance for CEOs personal gain (Meyer, 2003). The knowledge economy has enhanced this dilemma because knowledge workers possess enough competencies, skills and knowledge to question managers' strategic decisions as well as their consequences. In addition, it is common to observe that knowledge workers academic and professional background is higher than the CEO, namely in small medium companies, which enhances this dilemma. Thus, the author disregards Nichols & Subramaniam (2001) claim that CEO compensation is a matter of personal judgment.

On the other hand, procedural fairness is related to the process of distributive fairness and can be summarized through:

- participation- reflects the opportunity of knowledge workers express their knowledge, which bounded to a tangible and intangible reward as regards to knowledge sharing will promote a truthful sharing environment (Cabrera, Collins & Salgado, 2006). This is consistent with the recognition that sharing activities improves and

sustains knowledge professionals (Wasko & Faraj, 2005), as well as if knowledge workers feel that their knowledge is "snatched" tend to become self-protective and secretive;

- neutrality- a precondition to achieve it the conviction that rules do not allow personal advantages to enter their decision-making. Fehr & Rochenbach (2003) also demonstrate that sanctions that serve the punisher's self-interests disable cooperative behaviour, whereas sanctions perceived as pro-socially;
- and dignity/respect/autonomy- empirical evidences highlight that knowledge workers treated with dignity and respect enhance their levels of sharing behaviour and altruism (Moorman, Niehoff & Organ, 1993). Furthermore, autonomy encompasses for managers the following actions: acknowledge the knowledge worker understanding, afford it significant information in a non-manipulative way, offering decision making, and encouraging proactivity (Baard, Deci & Ryan, 2004), because a supportive management style to autonomy is crucial to promote knowledge sharing (Vansteenkiste *et al.*, 2004).

FUTURE RESEARCH DIRECTION

The Surrealist Assumption

According to the Merriam-Webster Dictionary (2010), surrealism resumes the principles, ideals, or generating fantastic or inconsistent imagery or effects in art, literature, film, or theater through deviant juxtapositions and blends. As such, it reproduces quite well the proposals to be introduced by the author for future research.

Dali Surrealism

Dali through is *Paranoia Critical Method* assumed a way to observe reality in order to reflect double images in the same composition (Salvador Dali Art Gallery, 2010). Moreover, his artwork is not merely used in artistic creation, but equally in scientific work because surrealist theory of automatism was transformed in a method. For Ruffa (2005), by linking surrealist actions and scientific research Dali demonstrates that we systemically have partial or total lack of understanding regarding a subject, meaning that reflection upon existing models is required. As a result, "Dalí draws our attention to the fact that there is no ontological difference between the scientific and artistic spheres, and nor is one superior to the other in terms of their approach to reality" (Ruffa, 2005, pp. 12).

The Metaphorical Assumption

After a careful research with reference to Salvador Dali paintings, the author has decided to illustrate *The Ship* (1943). In his painting, Dali inspires us to question ourselves instead of being slaves ("tied up to the strings of life"), as well as to promote change ("go by the wind"). The wind is seen as the life flow which people may dare (Coelho, 2009). In fact, the aim of these proposals is to acknowledge the need to challenge the established principles with reference to knowledge workers without ignoring compensation systems literature (e.g. Scott *et al.*, 2007) despite the several critics that will arise.

Therefore some proposals that organizations should entail are:

- personalize the compensation systems- as Cohen (2008) demonstrates it is possible to sustain equity and fairness;
- creative rewarding systems- personalization will promote creative rewarding systems. From the author professional experience, typically too many constraints are

imposed in designing novel ways of acknowledging the topic. For some ideas the author suggests the work of Zairi, Jarrar & Aspinwall (2010), or Petroni & Colacino (2008);

- protect tacit and explicit knowledge- is common that organizational tacit and explicit knowledge is not entirely protected. Explicit knowledge encompasses a simple resolution; however, organizational tacit knowledge is bounded to workers personal knowledge which resumes the trade-off between self-interest and versus knowledge sharing (Wang, 2004). A potential solution is to "draw a moral flexible rule" that acknowledges personal experiences as non-organizational property. Through this assumption knowledge workers will feel treated with fairness and dignity leading to a truly knowledge sharing environment;
- acknowledge intellectual property rights- as previously referred Human Resources policies do not address this issue. Define a Solomonic decision, meaning to acknowledge workers intellectual property rights as for instance, offer a percentage over the market outcome of the product or service for a period of time which can be diminished if the worker leaves the organization. Bearing in mind the second example of professional experiences, the financial institution ought to reward the worker with a percentage of the market result during a year!;
- create a knowledge sharing environment- despite the existing backgrounds and competences of knowledge workers, it is vital to be aware of the existing relationships in knowledge sharing amid "those who know" and the "know-notes" (Wang & Noe, 2010);
- assume that knowledge workers values maybe contradictory to organizational values- organizational culture is "a spherical concept (metaphorical symbolism for perfect and constant), and therefore does not reproduces the existing challenges that knowledge management enables" (Costa, Prior & Rogerson, 2010, pp. 84). Although, to recognize values diversity and knowledge workers autonomy will allow to enhance knowledge sharing (Berg, 2010), and ultimately a growing identification with the organization ethical values;
- actions versus discourse ethics- managers primary responsibilities inherent in the organizational ontology through discursive ethics resumes two assumptions: normative claims in order to be valid require a cognitive meaning and can be treated *like* claims to truth; the justification of norms involves a real discourse be carried out and thus cannot occur in a strictly monological form, i.e., in the form of a hypothetical process of argumentation occurring in the individual mind (Rhen, 2002).

As a final remark, the author reveals the following thought for managers: do not question the financial value of increasing compensations if knowledge workers demonstrate higher levels of productivity, because it would be a sign of a competitive organization as well as additional profits. Besides, the economic approach skews any changing attitude as regards to non-monetary compensation, which is sometimes far more important than the monetary one.

CONCLUSION

Changing traditional compensation systems enable several theoretical constraints namely "psychological and cultural", however neglecting that possibility induces to a lack of organizational retention concerning knowledge workers. Knowledge workers have distinctive characteristics that require a novel approach to its rewarding as the

empirical results clearly demonstrate, which top management continues to ignore. A potential justification for today's organizational reality might be the novelty of the topic, but clearly depicts the *status quo* of knowledge society and managers lack of moral reasoning. In fact, despite the introduction of ethics in business the truth is that managers still ignore it, or use it as a marketing tool (similar to corporate social responsibility) which will endanger organizational survival. The assumption for this resumes the lack of recognition about justice in knowledge creation and sharing, fair protection and retribution, fair compensation, and the recognition of human dignity and autonomy. As a final remark, the author argues that the conceptual framework also enables a positive and feasible response to the research questions; yet, is urgent to enhance the number of empirical studies and novel approaches to the topic.

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KEY TERMS AND DEFINITIONS

Compensation: Something given or received as a counterpart for actions taken. Compensation systems in organizational systems assume two major dimensions: monetary and non-monetary.

Equity Theory: The perception of fairness in allocating resources within social and professional realities.

Fairness: Inexistence of favouritism or bias, impartiality, or equity.

Human Resources Policies: Formal rules and guiding principles that organizations need to encompass for hiring, training, evaluating, and rewarding its organizational members.

Knowledge Workers: Everyone who works that needs to create, manage and share knowledge.

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Chapter 67
The Relationship between the Fulfillment of the IT Professional's Psychological Contract and their Organizational Citizenship and Innovative Work Behaviors

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ABSTRACT

Little is known about the relationship between of the level of fulfillment of the IT professional's psychological contract and their innovative work and organizational citizenship behaviors. Using psychological contract and social information processing theories, this study proposes to answer the research question: What is the relationship between the level of fulfillment of the IT professionals' psychological contract and their organizational citizenship and innovative work behaviors? Survey data were collected from 209 IT professionals using group-administered paper and on-line surveys. Results show positive relationships with the level of fulfillment of the IT professional's psychological contract and their innovative work behavior, as well as four of their organizational citizenship behaviors, specifically loyalty, advocacy participation, obedience, and functional participation. Extending the body of knowledge, the dimensional approach of the psychological contract was used resulting in the scope, focus, and tangibility dimensions being the most significant predictors of the organizational behaviors.

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INTRODUCTION

Management continues to view information technology (IT) professionals as human capital, and use this resource to maximize organizational effectiveness, enhance performance, and maximize organizational goals, all while perhaps cutting IT costs (Josefek Jr. & Kauffman, 2003). In coordination with these strategic goals, IT departments are expected to be leaner, yet remain multi-talented and innovative (Koch, 2006). Pring (2003) calls attention to the fact that organizations still need innovation and value delivered from their IT professionals, even when organizations are focusing on cost management issues, such as IT service providers. And while organizational effectiveness is affected by the productivity and performance of employees, there are other work behaviors beyond the dependable role performance that are also sought after by management. Two such extra-role behaviors are innovative work and organizational citizenship.

Research and practitioner literature stress the importance of innovation and organizational citizenship in IT professionals. While an IT professional's job may have an implicit degree of creativity and innovation required, organizations may have difficulty monitoring creativity and innovation objectively. Koch (2006) states that IT departments continue to need IT professionals who have not only in-depth technology knowledge, but can also create new products and capabilities. Innovative work may also be an acknowledged element to the job, as evidenced by one IT professional who was quoted saying, "…it's all about solving problems of the business…and there's always something new to learn" (Murphy, 2005). According to CIO Magazine, even when organizations are faced with cost cutting mandates, chief information officers (CIO) are still charged with emphasizing innovation and creating competitive advantage (Varon, 2005). In fact, 65 percent of the CIOs surveyed believe that "bringing ideas for IT-enabled business innovation to the table is a significant or dominant aspect of their roles" (Varon, 2005).

Organizational citizenship continues to be seen as a vital component to organizational effectiveness. Podsakoff, Whiting, Podsakoff, and Blume (2009) found organizational citizenship behaviors (OCB) is related to a variety of organizational-level outcomes including productivity, efficiency, reduced costs, customer satisfaction, and turnover. In Ang and Slaughter's (2001) research specific to IT professionals, contract workers exhibit lower extra-role (citizenship) behaviors than permanent systems developers, and supervisors evaluate a contract workers loyalty and obedience lower than permanent systems developers. Moore and Love (2005) find differences by job category, in that levels of organizational citizenship behaviors are lower in the IT employees than the employees from work areas other than IT.

The current IT job market complicates this situation as organizations consider management strategies to keep their IT professionals engaged, productive, appreciated, and on the job, or lose them to another company (McGee, 2005; Motti, 2006). The psychological contract, the employee-employer relationship with respect to perceived obligations to each, has been theorized to unite the employee with their organization and regulate their behaviors (Robinson, Kraatz, & Rousseau, 1994). One online poll found that 69 percent of the IT professionals surveyed were looking for a new employment position, and the number one reason given was that they did not like the current employers' management or culture (McGee, 2005). Research shows that when the employee's psychological contract is breached or violated, it can lower job satisfaction (Robinson & Rousseau, 1994), organizational commitment (Coyle-Shapiro & Kessler, 2002; Suazo, Turnley, & Mai-Dalton, 2005), and organizational citizenship behaviors (Coyle-Shapiro, 2002; Robinson, 1996; Robinson & Morrison, 1995), and increase intentions to quit (Suazo, 2009).

Psychological contract research has been conducted with professions from a wide variety of industries, e.g., government employees (Coyle-Shapiro, 2002), professional workers from the banking and hospital industries (Van Dyne & Ang, 1998), service employees (Suazo, 2009), and professional employees from aerospace, electronics, accounting firms (Porter, Pearce, Tripoli, & Lewis, 1998), all of which improve the generalizability of the research. Yet, there has been little empirical research sampling IT professionals, and until Martinez in 2004, no direct research of their psychological contract. And while some IT research supports differences between IT and non-IT professionals' attitudes and behaviors (Cougar, Zawacki, & Oppermann, 1979; Moore & Love, 2005), which justifies studying IT professionals, there is also research questioning those differences (Wynekoop & Walz, 1998). Current research offers no distinctions for the IT profession, and with the present volatility of the IT job market and high expectations of innovation and performance by management, this study empirically examines the relationship between the perceptions of the IT professionals' level of fulfillment of their psychological contract and their innovative work behavior and organizational citizenship behaviors.

In the sections that follow, we will present the theoretical framework and relevant literature to the study. We will discuss the research model and hypotheses. We then test our theoretical model using cross-sectional data and present the results. We conclude with a discussion of the implications of the findings for practice and research.

LITERATURE REVIEW

The study offers two complementary theoretical perspectives together in examining the IT professional's perceptions of the employer-employee relationship and resulting organizational behaviors. Researchers have drawn on Rousseau's (1989) psychological contract theory to help explain differences in employee attitudes and behaviors in the work place (Coyle-Shapiro, 2002; Janssen, 2000; Sels, Janssens, & Van Den Brande, 2004). The psychological contract perspective has also been applied to identify perceptions of IT outsourcing success (Koh, Ang, & Straub, 2004).

Salancik and Pfeffer's (1978) social information processing theory explains that employees receive social cues from not only their own behaviors, but also their employer's behaviors. These social cues can modify their beliefs of perceived obligations owed to and from their employers. Herriot and Pemberton (1997) parallel this view by proposing that development of the psychological contract is a social process, because beliefs of the contract originate from each party through direct or indirect communication.

This study uses both theories to examine the IT professionals' perceptions regarding their employers' fulfillment of those obligations within the realm of the psychological contract and the subsequent effects to their organizational behaviors – organizational citizenship and innovative work. Specifically, this study proposes to answer the question: What is the relationship between the level of fulfillment of the IT professionals' psychological contract and their organizational citizenship and innovative work behaviors?

Fulfillment of Psychological Contract

Rousseau (1989) defines the psychological contract as "an employee's beliefs regarding the terms and conditions of a reciprocal exchange agreement between that focal person and another party" (pg. 123). While the psychological contract is normally perceived as unwritten, it has "the power of self-fulfilling prophecies: they can create the future" (Rousseau, 1995, pg. 9). The employee's perceptions form the psychological contract, which in turn becomes a reciprocal obligation. Hence, the employee believes certain obligations, such as job security and good pay, are owed to

the employer after, for instance, an employee's loyalty or hard work (Rousseau, 1990). Consequently, the employee's psychological contract is the essence of the perceived relationship formed between the employee and employer, yet because the terms are subjective, the actual parties to this relationship may not necessarily agree to its terms (Rousseau, 1989).

The degree of fulfillment, change, breach or violation perceived within the context of the psychological contract refers to the instance where the employer may fail to live up to some aspect of their obligations, and the employee, in turn, believes less is owed to their employer (Robinson & Morrison, 1995; Robinson & Rousseau, 1994; Rousseau & Tijoriwala, 1998). Most research empirically measures the psychological contract or the fulfillment of the psychological contract using the evaluation or content approach, which examines the specific aspects or tangible terms of the perceived employer-employee relationship, e.g., employer's obligations of high pay and career development (Robinson, 1996; Rousseau, 1990; Van Dyne & Ang, 1998).

This study uses the dimensional approach, which characterizes distinctive properties and offers a more extensive understanding of the employee's psychological contract. It also offers an improved assessment in trying to understand the employee-employer relationship in today's dynamic employment environment. The diversity of employment arrangements within the IT industry warrants a more diverse understanding of today's IT professionals' employment situation (Agarwal, De, & Ferratt, 2001; Ang & Slaughter, 2001; Ferratt, Enns, & Prasad, 2001). Investigating the dimensions of the employment relationship might better fit the organizational and employment context of IT professionals (McLean Parks, Kidder, & Gallagher, 1998). This study adopted six dimensions of the psychological contract: stability, scope, tangibility, time frame, focus, and volition.

The stability dimension of the psychological contract refers to the extent the contract is constant or static opposed to dynamic and evolving as perceptions of obligations and entitlements framed within the psychological contract evolve in response to changing needs (McLean Parks et al., 1998). An IT professional whose organizational tenure or employment arrangement is short-term may have difficulty establishing trusting relationships, which enables a more flexible and malleable psychological contract, which is more common when job length is long-term.

Scope refers to the extent of the boundary between an IT professional's employment relationship and other portions of one's life, e.g., the amount an individual's work responsibilities spill over into their personal life (McLean Parks et al., 1998). The scope of the psychological contract can vary from very narrow to very broad.

Tangibility refers to the explicitness of the psychological contract with respect to the employee's degree of understanding to the defining boundaries, terms and expectations of the employment relationship, most important being that the specific terms of the contract are visible and are not ambiguous to third parties (McLean Parks et al., 1998). McLean Parks et al. (1998) proposes that the more specific and observable the terms of the employment contract and job description, the less likely the employee will go beyond the minimum requirements of the job.

Time frame dimension of the psychological contract has end points representing a close-ended, specific contract at one end and an open-ended, indefinite contract at the other end (Rousseau & Wade-Benzoni, 1994). McLean Parks et al. (1998) contends that an open-ended contract may be viewed as a long-term employment relationship; whereas, a close-ended contract may be characteristic of a short-term employment relationship. IT professional's time frame dimension may be affected if working in an organization with high turnover or outsourcing issues, versus if working in an organization with minimal turnover, as evidenced in EE Times (2005).

Focus of the psychological contract refers to the relative emphasis on economic versus socio-emotional concerns on one continuum with extreme end points for the two. For instance, a psychological contract geared toward material and monetary rewards at one end and truthfulness, sharing, respect, development opportunities, etc., at the other end is typical of a economic versus socio-emotional continuum (McLean Parks et al., 1998). Rousseau (1989) states that the longer employment relationships continue, there will be recurring exchanges of contributions, which in turn will strengthen the employee's perceptions of the relationship and fall more on the socio-emotional continuum.

Volition of the psychological contract is "the degree to which employees believe they had a choice in the selection of the nature of the employment relationship…" (McLean Parks et al., 1998, pg. 720). Volition also refers to alternatives one may or may not have with respect to jobs, because of their level of expertise, or specialized talents or skills (McLean Parks et al., 1998). Therefore, IT professionals may believe they have a higher level of volition when their skill set is unique or in demand.

When the organization fails to respond accordingly to their obligations as perceived by the employee, employees may construe the contradiction as some extent of non-fulfillment of their psychological contract. Even though this incongruence is a subjective experience, with any perceived non-fulfillment, employees may change their beliefs about what they subsequently owe their employer (Robinson et al., 1994; Rousseau, 1989). The effects of the non-fulfillment of the IT professional's psychological contract using the dimensional approach on their organizational citizenship behaviors and innovative work behavior has not been assessed in this context. Organizational citizenship and innovative work behaviors are described next.

Organizational Citizenship Behaviors

Smith, Organ, and Near (1983) defines OCB as the extra-role, discretionary actions that help others in the organization perform their jobs or show support for and conscientiousness toward the organization. Organ (1988) identifies five OCB dimensions: altruism, conscientiousness, civic virtue, courtesy, and sportsmanship, which have been used to investigate the relationship with trust and satisfaction (Rioux & Penner, 2001) and to identify an employee's motives toward OCB (Brief & Motowidlo, 1986). Many researchers have offered other perspectives to OCB (e.g., Borman, Penner, Allen, & Motowidlo, 2001; Brief & Motowidlo, 1986; Van Dyne & LePine, 1998), as well as recognized that it's logical to identify variables that might increase those behaviors in organizational settings (Podsaskoff, Whiting, Podsakoff, & Blume, 2009).

Van Dyne and Ang (1998) proposes that organizational citizenship can be regarded as a behavioral gauge of the employee's perceptions and subsequent responses to their relationship with their employer. The relevancy of these perceptions is important when IT professionals are placed in a work environment in which their job performance is partially judged by the amount of OCB performed. For example, Yen, Li, and Niehoff (2008) found that IT implementation teams exhibiting higher levels of OCB, resulted in more effective project management and information system success. It is instances such as these that citizenship behaviors continue to remain a vital component of the IT professional's performance and are essential for proper organizational practices (Moore & Love, 2005).

This study examines a set of organizational citizenship behaviors that have been used in prior research: helping, loyalty, advocacy participation, functional participation, and obedience (Ang & Slaughter, 2001; Coyle-Shapiro, 2002; Van Dyne & Ang, 1998), but not all within the context of IT professionals, yet these citizenship behaviors

fit within the conceptual realm of behaviors that might be expected of IT professionals.

Helping refers to discretionary actions that have some assisting effect and are directed at a specific individual or group and the task performed has some organizational relevance (Coyle-Shapiro, 2002; Smith et al., 1983; Van Dyne & Ang, 1998).

Graham (1991, pg. 255) and Van Dyne et al. (1994, pg. 767) define loyalty and obedience as follows: Loyalty refers to identifying with the organization and having allegiance to the organization, going beyond the "parochial interests of individuals, work groups, and departments." Typical behaviors include "defending the organization against threats, contributing to its good reputation, and cooperating with others to serve the interests of the whole." Obedience refers to accepting the "rules and regulations governing organization structure, job descriptions, and personnel policies." This would include such actions as having "respect for rules and instructions, punctuality in attendance and task completion, and stewardship of organizational resources."

Advocacy participation refers to "behaviors that are targeted at other members of the organization and reflect a willingness to be controversial" and "maintaining high standards, challenging others, and making suggestions for change (Van Dyne et al., 1994, pg. 780). This behavior might be an important component in project management team relationships.

Functional participation refers to behaviors that have a personal focus, yet still contribute to organizational effectiveness, such as "performing additional work activities, self-development and volunteering for special assignments" (Van Dyne et al., 1994, pg. 780).

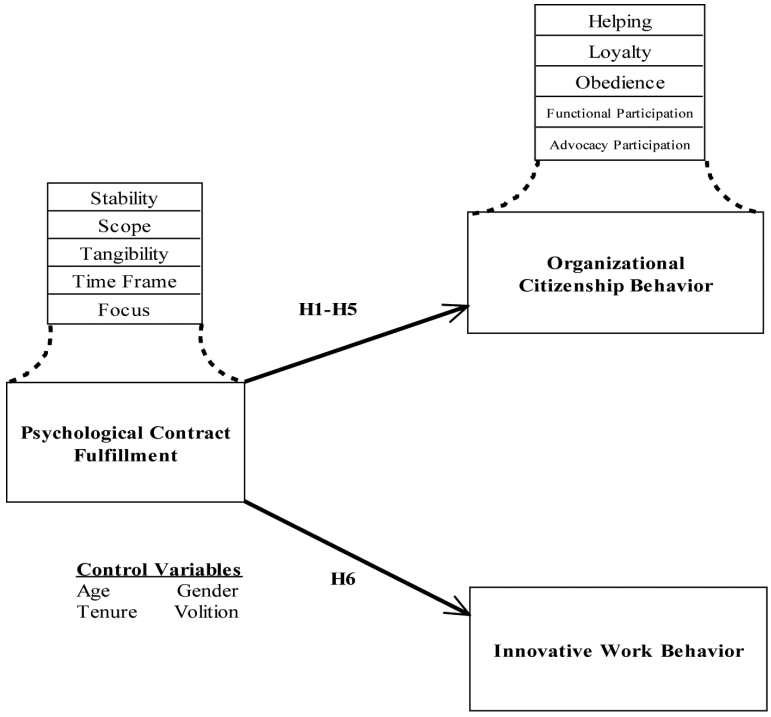
Innovative Work Behaviors

The concept of innovation is defined a multitude of ways (Kanter, 1983; West & Farr, 1990b; Zaltman, Duncan, & Holbek, 1973). Using West and Farr's (2000) definition, Janssen (2000) finds the level to which workers respond innovatively to their job is determined by their perceptions of fairness on the job. In a different study, the employee's perceived obligation to innovate, job autonomy, and pay have a direct effect on their innovative work behavior (Ramamoorthy, Flood, Slattery, & Sardessai, 2005). In the same realm as innovative work, empirical evidence indicates that perceptions of an employee's work environment and creativity climate directly affects the creativity of projects (Amabile, Conti, Coon, Lazenby, & Herron, 1996). Clinton, Hardgrave, and Armstrong (2005) finds the interaction of IT professionals and their environment most important when examining the person-job cognitive style fit on innovative performance. Supporting anecdotal evidence found in the popular press (Koch, 2006; Murphy, 2005), this study examines innovative work behavior, which are planned actions that hope to accomplish some beneficial result, as defined by Janssen (2000).

RESEARCH MODEL AND HYPOTHESES

The psychological contract and social information processing theories are adapted to predict two organizational behaviors of IT professionals, organizational citizenship and innovative work. Using the dimensional approach to the psychological contract, the IT professional's perceptions of their employer's fulfillment of their obligations are investigated as predictors of their organizational behaviors. The research model for this study is shown in Figure 1. From left to right, the level of fulfillment of the psychological contract using five dimensions (stability, scope, tangibility, time frame, and focus) are proposed to affect each of the IT professional's five organizational citizenship behaviors (helping, loyalty, obedience, functional participation, and advocacy participation) and innovative work behavior. The model depicts four control variables: volition (a dimension of

Figure 1. Research model with hypotheses



the psychological contract), and age, gender, and tenure, which are discussed later in the paper.

The key assertion in the study is that higher levels of fulfillment of the IT professional's psychological contract will positively affect the relationship with their organizational citizenship behaviors and innovative work behavior. Studies using the content or evaluative approach have found psychological contract violations related to lower extra-role behaviors (Robinson & Morrison, 1995), lower performance and civic virtue behavior, (Robinson, 1996), lower OCB (Coyle-Shapiro, 2002), as well as lower trust and job satisfaction. Robinson and Morrison (1995) found employees less likely to perform civic-minded behaviors when they felt their employer had not fulfilled their obligations to the perceived contract.

Even though citizenship behaviors are viewed as a collective act by Organ (1988), researchers often consider OCB as a multi-dimensional construct and look at the significance of each dimension under study (Coyle-Shapiro, 2002), or investigate selective dimensions of OCB (Ang & Slaughter, 2001; Robinson & Morrison, 1995; Van Dyne & Ang, 1998). As such, it is proposed that higher perceptions of their employer's fulfillment of their obligations (within the IT professional's psychological contract) will be positively related to higher levels of each of the dimensions of OCB under study: helping, loyalty, obedience, functional participation, and advocacy participation. The five hypotheses below reflect this distinction:

Hypothesis 1: Higher perceptions of fulfillment of their employers' obligations of the psychological contract will be positively related to higher levels of the IT professionals' organizational citizenship behavior dimension - helping.

Hypothesis 2: Higher perceptions of fulfillment of their employers' obligations of the psychological contract will be positively related

to higher levels of the IT professionals' organizational citizenship behavior dimension - loyalty.

Hypothesis 3: Higher perceptions of fulfillment of their employers' obligations of the psychological contract will be positively related to higher levels of the IT professionals' organizational citizenship behavior dimension - obedience.

Hypothesis 4: Higher perceptions of fulfillment of their employers' obligations of the psychological contract will be positively related to higher levels of the IT professionals' organizational citizenship behavior dimension – functional participation.

Hypothesis 5: Higher perceptions of fulfillment of their employers' obligations of the psychological contract will be positively related to higher levels of the IT professionals' organizational citizenship behavior dimension – advocacy participation.

Innovative work behaviors, as well as citizenship behaviors, have been thought of as extra-role behaviors that are not obligatory, are outside the normal job description requirements, and are not clearly distinguished within the formal reward system (Katz & Kahn, 1978; Organ, 1988). In Janssen's (2004) investigation of fairness perceptions in non-management employees' relationship between job demands and innovative work behavior, he finds the level to which the employees respond innovatively to their job is determined by their perceptions of fairness on the job. Thus, it is proposed that one's perceptions of the level of fulfillment of their employer's obligations will be positively related to one's innovative work behavior. Accordingly, the following research hypothesis is proposed:

Hypothesis 6: Higher perceptions of fulfillment of their employers' obligations of the psychological contract will be positively related to higher levels of the IT professionals' innovative work behavior.

METHODOLOGY

Procedure and Sample

Data were collected from a convenience sample of working IT professionals located throughout the United States. The questionnaire was administered through two means: an on-line survey and a group-administered paper survey. Participation was strictly voluntary. The respondents were obtained from two sources: alumni from the management information systems program and graduate students in management information systems program evening classes of a major southeastern university.

For the on-line survey, a letter of invitation to participate was mailed to the intended respondents. A postcard was mailed about three weeks after the first mailing as a follow-up reminder to those who had not yet responded.

Three hundred twenty-four responded to the survey. Of that number, 251 completed the on-line survey, 36 completed the group administered survey, and 37 responded to the on-line survey, but did not complete the questionnaire. The overall response rate was 9.7% with 287 responding out of 2,950 potential respondents. Possible factors influencing the response rate was the length of the questionnaire and the controls established within the on-line survey, in that those responding to the on-line survey had to answer a minimum number of questions to successfully submit the questionnaire. Basic demographic information was asked for in the event the respondent could not or chose not to complete the survey. This enabled verification that those who did not participate were not so different from those who chose to participate. T-tests conducted found no significant differences between those who responded to the survey and

those who chose not to respond; therefore, potential non-response bias was negligible.

Only those respondents who were permanent employed IT professionals were used in this study, providing 209 usable questionnaires. With two sources of data, group administered (n = 18) and on-line survey (n = 191), and the initial and second mailings inviting those to participate in the on-line survey, method bias was also assessed. Again, t-tests were conducted, and no significant differences in any of the demographics collected at $\alpha = .01$.

Measures

To stay consistent with prior research, all scales in the measurement instrument, except focus and volition, were adopted from existing instruments with proven reliabilities. In an effort to have consistent end choice points throughout the measurement instrument, any scales not having choice end points of 1-6 were changed to choice end points of 1-6, which forces a non-neutral choice on behalf of the respondents (Spector, 1992).

The items measuring psychological contract fulfillment, OCBs, and innovative work behavior are presented in Tables 2, 3, and 4. Psychological contract fulfillment dimension scales for stability, scope, tangibility, and timeframe were adapted from Sels and his colleagues (2004). Specifically, respondents were asked to indicate "the extent to which you believe the organization has fulfilled this obligation to…"

Measurement items for the focus and volition dimension were developed for this study. Using the domain definition from McLean Parks et al. (1998), five items were developed to measure and operationalize the focus dimension as it relates to the fulfillment of the psychological contract. Volition was measured as a single item. Respondents were asked, "Which employment arrangement would you prefer to work?" This response was compared to their current employment arrangement, which they provided, and this provided an indication as to whether their current arrangement was voluntary (Morrow, McElroy, & Elliott, 1994; Stamper & Van Dyne, 2001). Following McLean Parks et al.'s (1998) conceptualization of volition, volition is also hypothesized to be a control variable in the research model.

The OCB dimensions helping, loyalty, advocacy participation, functional participation, and obedience were measured using items adapted from Coyle-Shapiro (2002). Innovative work behavior was measured using the eight-item scale developed by Janssen (2000), which assesses Kanter's (1994) three stages to innovation: idea generation, idea promotion, and idea realization.

Researchers find that certain demographic characteristics tend to correlate with outcome behaviors. Forms of OCB may be a function of tenure and thus, tenure may be a moderator between antecedents and OCB (Organ and Ryan 1995). Organ and Ryan (1995) also argue that gender might be a predictor of OCB, considering the beliefs that females may perform more aspects of OCB, e.g., altruism and courtesy factors. In their study investigating OCB in restaurant employees, Stamper and Van Dyne (2001) find age, gender, and organizational tenure related to their work status. Accordingly, age, gender, tenure in the employment arrangement, and volition assessed and statistically controlled in this study,

DATA ANALYSIS

All data analysis was accomplished using SPSS. Pearson correlations were used in the analysis of correlations between the constructs. Analyses of the factor structures were examined using informal confirmatory factor analysis with Promax rotation and extracting the number of factor theorized in the literature. Promax rotation method was used due to moderate correlations among the factor items, which are shown in the Appendix.

Sample Characteristics

The IT professionals responding to this study reflect a representative sampling comparable to the IT workforce as described by ITAA's (2005). The respondents held a wide variety of IT job titles and were in all of the Information Technology Association of America's (ITAA) career field clusters except one (technical writing). The study sample was well educated with 85% having at minimum a bachelor's degree. Approximately 45% had attended formal education within the past five years. The demographic data (see Table 1) supports ITAA's 2005 report that "The IT labor force is a highly skilled, highly educated population" (pg. 6). The study sample and ITAA IT workforce were also comparable in median age, percentage over 45 years of age, and gender. Median age for the sample was 37 years, 25% were over 45 years of age, and 35% were female. Eighty-eight percent of the IT professionals were in their preferred employment arrangement, while 10.2 percent preferred another arrangement. Median tenure in their employment arrangement was five years.

Reliability and Validity of Constructs

Content validity of the measurement instrument was established mainly through the adoption of existing instruments and use of recommended concepts found in the literature. With the development of new measurement items for the focus dimension of the psychological contract, particular attention was taken during pre-testing with domain experts and pilot-testing of the instrument. All reliabilities were above Nunnally and Bernstein's (1994) recommended acceptable level of at least.70 with one exception. The reliability for OCB obedience was $\alpha = .61$, which closely follows the $\alpha = .63$ reliability in Coyle-Shapiro's (2002) study. Means, standard deviations, and inter-correlations of the study variables are shown in the Appendix, as well as the study variables' internal reliabilities (Cronbach's alpha) at the diagonal.

Construct and discriminant validity were assessed through informal confirmatory factor analysis and found to be satisfactory. Five factors extracted for fulfillment of the psychological contract explained 75.5% of the variance; five factors extracted for OCB explained 72.9% of the variance; and the one factor for IWB explained 62% of the variance. An evaluation of convergent validity was possible for two study variables, OCB advocacy participation and innovative work behavior. The measurement items in each variable relate to sharing ideas, making improvements, suggestions, etc., and the two study variables were found to be correlated at $\alpha = .703$. Tables 2, 3, and 4 present the measurement items used in the questionnaire for each factor and the factor loadings from the pattern matrix for fulfillment of the psychological contract, OCB and IWB.

Results

The items retained for each construct were summed and averaged creating the variables used in the analysis. Separate regression analyses were per-

Table 1. Demographic profile of respondents

(n = 209)	Mean	Median	Range
Age	38 years	37 years	22 – 64 years
Employment tenure	5 ½ years	5 years	Less than a year – 25 years
Gender	Female: 73 (35%), Male: 136 (65%)		
IT Field	Database Development 16%, Programming & Software Engineering 34%, Technical Support 18%, Enterprise Systems & Analysis 16%, Network Design & Administration 10%, Other 6%		

Table 2. Measurement items with factor loadings for fulfillment of the psychological contract

Measurement Items	Factor Loadings
Time Frame	
Provide me with job security	**.876**
Make a commitment to me for a long time	**.906**
Won't immediately release me if things are going badly	**.834**
Offer me another job if my current job would disappear	**.770**
Do everything in their power to keep me on the job	**.713**
Scope	
Appreciate me for what I do and who I am	**.882**
Consider not only the end result, but also my personal effort	**.855**
Treat me as a person, not as a number	**.824**
Allow me to be myself within this firm	**.865**
Focus	
Notify me of any available financial rewards	**.680**
Establish a respectful and trusting relationship	**.664**
Provide development opportunities	**.839**
Provide any and all materials necessary to do the job	**.970**
Be truthful even when it may harm the relationship	**.487**
Tangibility	
Specifically describe the performance appraisal criteria used in this firm	**.770**
Unambiguously describe my obligations within this firm	**.925**
Unambiguously describe my rights within this firm	**.674**
Stability	
Stick to agreements despite changing circumstances	**.783**
Consider written or oral agreements as permanently valid	**.996**

Table 3. Measurement items with factor loadings for OCB

Measurement Items	Factor Loadings
Advocacy Participation	
I make creative work-related suggestions to co-workers	**.872**
I make innovative suggestions to improve the functioning of the department	**.844**
I share ideas for new projects or improvements widely	**.776**
I encourage others to speak up at organizational meetings	**.843**
Loyalty	
I tell outsiders that this organization is a good place to work.	**.942**
I defend the organization when other employees criticize it	**.822**
I represent the organization favorably to outsiders	**.899**
Functional Participation	
I work beyond what is expected	**.852**
I exceed formal requirements of the job	**.914**
I go the 'extra mile' for the organization	**.837**
Helping	
I help others who have heavy workloads	**.905**
I help others who have been absent	**.918**
I go out of my way to help colleagues with job-related problems	**.707**
Obedience	
I neglect aspects of job responsibilities	**.846**
Regardless of circumstance, I produce the highest quality of work	**.535**
I follow work rules and instructions with extreme care	**.742**

formed with each of the organizational citizenship and innovative work behaviors as the dependent variables and the five dimensions of fulfillment of the psychological contract, as the independent variables. To control for other factors potentially confounding the relationship between the level of fulfillment of the psychological contract and the organizational behaviors, age, gender, tenure in the employment arrangement, and volition were included in the regression equations. All variables were entered into the regression simultaneously.

As Table 5 shows, perceived higher levels of fulfillment of the psychological contract dimensions were positively related to four dimensions

Table 4. Measurement items with factor loadings for IWB

Measurement Items	Factor Loadings
I create new ideas for difficult issues	**.767**
I search out new technologies, processes, working methods, techniques, and/or product ideas	**.703**
I generate original solutions for problems	**.734**
I mobilize support for innovative ideas	**.801**
I make organizational members enthusiastic for innovative ideas	**.759**
I transform innovative ideas into useful applications	**.771**
I introduce ideas into the work environment in a systematic way	**.698**

Table 5. Regression analysis results explaining variance in organizational behaviors

Dependent Variable	*R*	R^2	R^2_{Adj}	*F*
OCB Loyalty	.76	.57	.55	28.01***
OCB Advocacy Participation	.44	.19	.16	5.09***
Innovative Work Behavior	.43	.18	.15	4.74***
OCB Obedience	.34	.12	.07	2.73**
OCB Functional Participation	.30	.09	.05	2.12*

*p <.05, ** p <.01, ***p <.001

of citizenship behavior – loyalty and advocacy participation (p <.001), obedience (p <.01), and functional participation (p <.05), providing support for Hypotheses 2-5. Hypothesis 1 was not supported by the data; no relationship was found between perceived levels of fulfillment of the psychological contract dimensions and OCB helping. Perceived higher levels of fulfillment of the psychological contract dimensions were also positively related to innovative work behavior at p <.001, providing support for Hypothesis 6.

Table 6 highlights significant predictor variable regression coefficients of all regression equations, except for OCB helping, which was not significant.

DISCUSSION

Innovative work and citizenship are two qualities deemed vital to an IT professional's conduct. In today's world, businesses are constantly changing to adapt to competitive pressures, and they depend on their IT talent to help facilitate that process through their creativity and innovation. Whether the job is to beat the competition or just keep up, innovation remains the goal (Kanter, 2006; Varon, 2005). Citizenship behaviors, such as loyalty,

Table 6. Regression equation using significant predictor variables to explain variance in scores for organizational behaviors

	Loyalty	Advocacy Part	Innovative Work Behavior	Obedience	Functional Part
Predictor Variable[a]	*β*	*β*	*β*	*β*	*β*
PC Scope	.49***	.22*	.23*		
PC Focus	.31***				
Age	.13*				
PC Tangibility		.35***	.25*	.22*	
PC Volition			.17*		
Gender				-.28***	-.15*

*p <.05, **p <.01, ***p <.001, [a]Predictor variables – PC Stability, PC Time Frame and Tenure were not significant in any regression equation, hence omitted from table list.

advocacy participation, obedience, functional participation, and innovative work behavior on the part of IT professionals are still important to overall organizational success, even when the job is less clear (Moore & Love, 2005).

Organizational Citizenship Behavior

The individuals' organizational citizenship behaviors can be a gauge of their responses to their relationship with their employer (Van Dyne & Ang, 1998). IT professionals, who perceive the relationship with their employer is not what it should be, may retreat from their level of involvement within the job or project or withdraw from active participation, or even start to become complacent in their work. Yet, Yen et al. (2008) found that cooperative and helping behavior has a significant impact on information system success.

Applying psychological contract and social information processing theories, the results of this study provide empirical evidence to indicate that increased levels of fulfillment of the IT professionals' psychological contract are positively related the IT professionals' increased performance of organizational behaviors.

This study has examined in greater depth than prior research the importance the IT professional's perception that the psychological contract between the employee and employer has been fulfilled and the potential impact this has on organizational citizenship behaviors. Even though these behaviors are subtly expected by supervisors, they fall outside the traditional productivity and task performance measures (Ang & Slaughter, 2001). Employees, if they perceive that promises have not been met have the potential to "under perform" in areas that are not directly observable by the manager. The IT professionals' citizenship behavior, especially advocacy participation, is strongly affected by the scope and tangibility dimensions of the psychological contract.

Scope refers to the level that the employer typically fulfills their obligations, such as expressing appreciation of the IT professional's work, taking the IT professional's personal effort into consideration, and their treatment of them. Therefore, the IT professional might speak out more while making creative and innovative suggestions, share ideas, and encourage others to speak up, and thus supporting the organization overall, the more the IT professional felt their employer had fulfilled their obligations to express their appreciation to them. Or the direct opposite is true; the IT professional may fail to speak up, share ideas, or make innovative suggestions, if they feel that their employer has not fulfilled their obligations related to scope.

High levels of fulfillment of the tangibility dimension of the psychological contract, the explicitness to defining the boundaries, terms and expectations of the employment relationship, was also positively related to high levels of advocacy participation. Acquisition for technology companies can be challenging for IT professionals, in that innovation and creativity are still expected, even during changes to the organizational structure (Christensen, 2006). Therefore, the clearer the terms of the employment contract and the employer respecting and upholding those terms, the more willing the IT professional will be to make suggestions and share ideas.

High levels of fulfillment of the scope and focus dimensions of the IT professional's psychological contract were positively related to the IT professional's OCB dimension – loyalty. Therefore, the IT professional's level of loyalty to the organization, can be influenced by the amount the employer expresses appreciation of the IT professional's work, takes the IT professional's personal effort into consideration, and treats them with respect, which relate to the scope dimension. For this study, the IT professionals' focus represents a more socio-emotional concern in their psychological contract. Consequently, the more the IT professional feels that the employer has fulfilled their obligations to provide development opportunities, provide a trusting and respectful employment relationship,

and be truthful, the more the IT professional is willing to be loyal and defend the organization. Age is also found to be a significant predictor of loyalty, in that older IT professionals indicate greater loyalty to the organization than younger IT professionals.

High levels of fulfillment of the tangibility dimension of the psychological contract were positively related to high levels of the OCB dimension – obedience. The tangibility dimension again refers to the explicitness to defining the boundaries, terms and expectations of the employment relationship. Therefore, the clearer the terms of the employment contract and the more the employer respected and upheld those terms, the more inclined the IT professional was to produce quality work, follow rules and not neglect aspects of their job responsibilities.

The study corroborates prior research by Organ and Ryan (1995), in that females exhibited higher levels of organizational citizenship than males. Females indicated higher obedience than males. Gender was the sole significant variable in explaining the OCB dimension – functional participation, which relates to higher levels of working beyond expectations, or exceeding formal job requirements, and going the extra mile.

Innovative Work Behavior

The relationship between employee and employer is tenuous in today's IT labor market. The scope and tangibility dimensions of the psychological contract had the most influential effects in the relationship. Managers making simple gestures, such as expressing appreciation to their IT professionals can improve a situation considerably (Motti, 2006). This study finds that if employers fulfilled their obligations to express appreciation of the IT professional's work, consider their personal effort in the performance of their jobs, improve their treatment of them, and stick to agreements, the IT professional was motivated to perform greater levels of innovative work behavior, such as create new ideas, search out new processes, transform innovative ideas into useful applications, etc. West and Farr (1990a) recognize innovative work behavior can be an intentional act, which can be withheld, as easily as it can be performed. The innovativeness and creativity of IT professionals remains a vital component to the organization, and the ability of the employer to improve perceptions of the employer-employee relationship is found to be a common denominator in the equation.

The IT professional's volition, or their preferences for their permanent employment arrangement, was also found to affect their innovative work behavior. However, it was the IT professional, who preferred an employment arrangement other than their permanent arrangement, who indicated higher levels of innovative work. This suggests that perhaps the IT professionals engage in innovative work as a means to facilitate some other objective.

CONCLUSION

An important contribution of this study is its investigation into the innovative work behavior of IT professionals. While research continues to investigate the motives and cognitions around creative and innovative work behavior (Christensen, 2006; Janssen, 2000; Ramamoorthy et al., 2005), this study finds that some aspect of the IT professional's innovative work behavior may be determined by the level of fulfillment of their psychological contract. Recognizing the importance of how IT professionals perceive their environment, these perceptions can affect their creativity, which is the seed of all innovation (Amabile et al., 1996).

Another important contribution of this study is in the use of the dimensional approach to the psychological contract. This more expressive view of the perceptual nature of the psychological contract explored the underlying dimensions of the

psychological contract, while assessing the level of fulfillment. The dimensional approach enabled examination of the psychological contract and its affect on employee behavior by seeking to understand in greater depth, the motivations behind the IT professional. This is an improved illustration over the content approach of the psychological contract, especially with the increasingly complex employer-employee relationship of those in the IT industry.

A strength of this study is in the research methodology as it relates to the data collection and the sample. The administration of the questionnaire was through two means: an on-line survey and a group-administered paper survey, and the respondents were obtained from two sources: alumni from the management information systems program and graduate students in management information systems program evening classes of a major southeastern university.

This study used cross-sectional data and was strictly based on self-report data and did not look at IT employee evaluations by peers or supervisors. As in all research that involves self-report data, there is the potential for self-report bias (Organ & Ryan, 1995; Spenner, 1990); however, Spector (1987) contends that the typical criticism in using self-report measures involving attitude and perception measures may not be factual. Rioux and Penner (2001) obtained ratings from a number of different sources, e.g., self, peers, and supervisors, in an effort to minimize mono-method bias and found self-ratings of OCB comparable to both peer and supervisor ratings.

Possible factors influencing the low response rate of 9.7% was the length of the questionnaire and the controls established within the on-line survey. Those responding to the on-line survey also had to answer a minimum number of questions to successfully submit the questionnaire.

The psychological contract dimensions first empirically tested by Sels et al. (2004) and then analyzed in this research require additional studies to further validate and improve the scales, particularly stability. The focus scale, which was developed for this study, also requires further validation and improvement. The low adjusted R^2 values of the regression models suggest that there are other factors, such as job demands, perceptions of fairness, or personality factors, that may help to further explain the organizational behaviors of IT professionals (Organ & Ryan, 1995), and should be investigated.

For practitioners, the results indicate that the IT professional's perceptions are very relevant in the employee-employer relationship, as Karl Weick so aptly stated, "believing is seeing" (2001, pg. 195). The strong relationship found between the OCB dimension – loyalty and the IT professional's level of fulfillment of their psychological contract sends an unmistakable message to management for the continued need for clear communication between employer and employee. Shore and Tetrick (1994) contends that if organizations don't understand the employee's psychological contract under which they are operating, some strategic business decisions for cost savings and improvements may result in violations to the employee's psychological contract. And as seen in this study, the IT professional's performance of organizational behaviors, specifically their citizenship behaviors - loyalty, obedience, advocacy participation and most importantly innovative work behavior, are affected by their perceptions of their employer's fulfillment of psychological contract obligations to them.

Management has the ability to improve the employer-employee relationship by focusing on and addressing specific issues found within the dimensions relating to the IT professionals' psychological contract. Management could conceivably ask employees to anonymously rate the company's performance on issues such as being clear about opportunities for advancement, improving trust within the organization, providing development opportunities, and finding ways to show appreciation for work performance Low scores may suggest that the employer look closely

at its practices in certain key areas. Yen, et al. (2008) found that training in cooperation and helping behaviors within project management teams influenced their success and when team members went above and beyond their job descriptions, projects were more successful. Using the dimensions of the psychological contract offers tangible employment relationship topics for management to identify and improve upon; it might be something as simple as investing in training opportunities or looking for tangible ways to show appreciation for a job well done (Motti, 2006).

Future research should extend this study by including IT professionals in relevant employment arrangements other than permanent full-time. Sourcing IT jobs beyond the permanent full-time employee has most likely altered how many human resource and management issues are executed (Ang & Slaughter, 1995), and the variability of employment arrangements for IT professionals or their working conditions is not likely to stabilize with continued offshore outsourcing, downsizing, or healthcare cost shifting (Koprowski, 2005). The dimensional approach to the psychological contract tells a more comprehensive story of the IT professional's understanding of their employer's obligations to them and as to what influences their subsequent behaviors, both organizational citizenship and innovative work. This study demonstrates that this approach might also be appropriate when investigating IT professionals in varied employment arrangements. Saying this however, future research might address how important the psychological contract.

The construct, OCB, has received attention referring to the need of better identifying its dimensions (Van Dyne et al., 1994), because of the blurring of the separation between in-role performance and OCB. Most OCB studies have been subject to non-managerial or non-professional respondents. IT professionals do not likely fall into these categories, and hence with their job descriptions, in-role performance and OCB may be harder to distinguish. Organizational behaviors, OCB and IWB, were the focus in the study. Future research might consider investigating whether organizational behaviors within the OCB and IWB domain are considered in-role or extra-role behaviors by IT professionals. Other research might address what supports or leads to cultural or innovative behaviors within organizations.

With the ever-changing roles of the IT professional, management is challenged to understand how the employee perceives their role and the organization's role in achieving cutting-edge performance and creating competitive advantage in this global workforce. This study does not provide all the answers to understanding what affects their behaviors. However, we believe we have expanded our understanding of how IT professionals perceive their employment relationship and how the extent that the employer has fulfilled their obligations to the IT professional that this affects their subsequent innovative work and organizational citizenship behaviors.

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APPENDIX

Table 7. Means, standard deviations, correlation, internal reliabilities among the study variables[†]

	Mean	SD	Age	Gender	Tenure	Volition	Time Frame	Tangi-bility	Scope	Sta-bility	Focus	OCB Loyal	OCB Obed	OCB AP	OCB Help	OCB FP	IWB
Age	37.62	9.12															
Gender			-.065														
Tenure	5.51	4.28	.408**	-.094													
PC Volition			.014	-.010	-.159*												
PC Time Frame	4.15	1.24	-.212**	-.015	.048	-.169*	**.89**										
PC Tangibility	3.90	1.35	-.110	.068	.082	-.128	.589**	**.86**									
PC Scope	4.29	1.18	-.134	-.006	.058	-.126	.652**	.587**	**.92**								
PC Stability	3.84	1.26	-.230**	-.036	-.146*	-.121	.562**	.558**	.671**	**.80**							
PC Focus	4.08	1.15	-.192**	.065	.017	-.146*	.649**	.692**	.755**	.665**	**.88**						
OCB Loyal	4.39	1.27	-.014	.022	.090	-.137	.546**	.491**	.715**	.501**	.670**	**.87**					
OCB Obed	4.39	.96	-.053	-.242**	-.107	-.015	-.035	.105	.016	.080	.052	.029	**.61**				
OCB AP	4.39	.45	.043	.084	.089	.057	.167*	.344**	.283**	.238**	.223**	.252**	.219**	**.84**			
OCB Help	4.40	.22	-.071	-.108	.025	-.064	.029	.061	.076	.140*	.038	.064	.247**	.301**	**.83**		
OCB FP	4.94	.24	.019	-.126	.030	.043	.162*	.203**	.221**	.131	.202**	.328**	.385**	.488**	.355**	**.84**	
IWB	4.29	.35	-.083	.108	-.001	.113	.166*	.314**	.284**	.289**	.253**	.230**	.198**	.670**	.254**	.443**	**.92**

**p<0.01 (2-tailed) *p<0.05 (2 tailed) †Cronbach's Alpha for the corresponding variable is at the diagonal in bold

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Chapter 68
Ethics and Learning Organizations in the New Economy

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ABSTRACT

In the context of the new economy, business organizations need to learn faster, and to maintain and to improve knowledge, producing creative solutions based on their knowledge, skills, and new technologies to develop a customer responsive culture in a more economic and efficient way.

In order to achieve this, CEOs and Human Resource (HR) policies should potentially contribute to knowledge development by creating authentic learning organizations. The authors propose in this study that learning improvements in organizations are not just a matter of techniques or aptitudes, but also a matter of feelings, attitudes, and, above all, of the moral habits of their members. The authors strongly suggest complementing currently established conceptions of knowledge management and organizational learning through an explicit inclusion of ethics and ethical learning in organizations.

INTRODUCTION

In the context of the New Economy, but especially in a moment of general economic crisis, organizations require the ability to understand what is happening outside their environment in order to create a competitive advantage. And what is probably more important, new business organizations need to learn faster, and to maintain and to improve knowledge, producing creative solutions based on their knowledge, skills and new technologies to

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develop a customer responsive culture in a more economic and efficient way.

In order to achieve this, CEOs and Human Resource (HR) policies should potentially contribute to knowledge development by creating authentic learning organizations. These organizations enable a learning environment for all members to consciously transform organizations and their contexts into situations "where people continually expand their capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning to see the whole together" (Senge, 1990, p. 3).

Moreover, we propose in this study that learning improvements in organizations are not just a matter of techniques or aptitudes but, also, a matter of feelings, attitudes and, above all, of the moral habits of their members. In this chapter, we strongly suggest complementing currently established conceptions of knowledge management and organizational learning through an explicit inclusion of ethics and ethical learning in organizations, to build up ethically healthy organizations where the process of learning is easier than in ethically unhealthy organizations.

Our purpose is to show that organizational ethical healthiness is an essential facilitator of the processes of learning by learning organizations in the context of the New Economy and global crisis.

This chapter is divided into five sections. The first section analyzes organizational learning and the concept of learning organizations. The second describes the explicit need to consider ethics and ethical learning competence among agents in a learning organization context. The third section distinguishes between ethically healthy organizations from ethically unhealthy organizations, as concepts that help to better understand the ethical quality of an organization. The fourth section lays down the argument that the ethical healthiness of the organization is an essential contextual facilitator for learning processes and for constructing learning organizations. Finally, some conclusions and future lines of research are put forward.

1. LEARNING ORGANIZATIONS

For many years, we have been hearing that we live in a "knowledge society" (Toffier, 1990; Bell, 1973; Drucker, 1968). As is widely accepted today, the concept of knowledge is based on two primary elements: information (explicit knowledge) and know-how (tacit knowledge) (Simmonds et al., 2001; Nonaka, 1991).

Information is considered to be the knowledge that can be transmitted without loss of meaning and truth, once the syntactical rules required for interpreting it are known. Thus, knowledge as information implies knowing what something means, and that it can be written down (Grant, 1996; Nonaka, 1994). In this sense, defining knowledge as information whose validity has been established through evidence allows distinguishing it from opinion, speculation, beliefs, or other types of unproven information (Liebeskind, 1996).

On the other hand, know-how, as tacit knowledge, is a much more complex concept than information. It can be defined as the accumulated practical skill or experience through time that allows one to do something efficiently. Therefore it is a personal quality -that involves both cognitive and technical elements- difficult to formalize and to communicate because it is not easy to write down (Grant, 1996; Nonaka, 1994).

Knowledge appears then as the key element to define the learning process (individual and organizational) because it can be understood as the result of transforming information into knowledge (Nonaka, 1994), although other understandings conceive learning as an outcome (Nicolini and Meznar, 1995; Dodgson, 1993).

But, if we understand learning as a process, can we distinguish individual learning from organizational learning? Is it possible to distinguish different types of learning according to the subject of the

learning involved, individual or organizational? According to Weick (1991) "individual learning occurs when people give a different response to the same stimulus" while "organizational learning occurs when groups of people give the same response to different stimuli" (p. 121). Therefore, it seems reasonable to talk about organizational learning as something different from individual learning (Kim, 1993). The question now is if we can associate organizational learning to a well-managed knowledge organization or if having organizational learning is not necessarily the same as managing knowledge correctly. In other words, is organizational learning of an organization the same as being at the head of a learning organization?

According to the literature, learning organizations appeared as a result of the adjustments and pressures modern organizations had to face to remain competitive in the business environment (O'Keeffe, T. 2002). These types of organizations facilitate the learning of their members to be able to continuously transform themselves (Pedler *et al.*, 1997). They accomplish their goals based on a culture of trust that generates free and reliable communication, allowing co-operation between individuals and groups (Argyris, C. 1999), mainly focusing on five features: systems thinking, personal mastery, mental models, shared vision and team learning (Senge, P.M. 1990). All the above mentioned contextualizes Senge's (1990) definitions of Learning Organization quoted by Malhotra (1996) as the organization as "a group of people continually enhancing their capacity to create what they want to create".

Academic literature does not always agree as to the answer to the question of whether the Learning Organization and Organizational Learning are different concepts (McGill et al.,1992) Nevertheless, we understand that Organizational Learning and Learning Organization are distinguishable based on Ang & Joseph's (1996) idea that differentiates process -Organizational Learning- from structure -Learning Organization-. In this sense, and according to Malhotra (1996), a Learning Organization is an "Organization with an ingrained philosophy for anticipating, reacting and responding to change, complexity and uncertainty" (p. 2).

In synthesis, all these authors suggest that the Learning Organization creates the conditions for a constant Learning Organizational Environment. But, what are those conditions, or what should those conditions be?

2. EXPLICIT CONSIDERATION OF ETHICS AND ETHICAL LEARNING

Organizations where knowledge is managed have in common the fact that knowledge (tacit and explicit) is shared between human beings. This premise is not only true for creating and processing knowledge, but also for its management. But, what kind of knowledge should people and organizations acquire? Is it enough with information and know how? Knowledge has different effects and, broadly understood, its concept not only develops theoretical or scientific dimensions (*knowing*) and practical or technical-artistic ones (*knowing how*) but, also, ethical conduct (*knowing how to live*) (Guillén, Fontrodona and Rodriguez, 2007). Therefore, we strongly suggest that humans must learn by acquiring not only knowledge and skills (technical habits), but also moral virtues (ethical habits).

Unfortunately, moral dimension has received scant attention in knowledge management literature, but also in general management. As Sumantra Ghoshal (2005) plainly described, ''many of the worst excesses of recent management practices have their roots in a set of ideas that have emerged from business school academics over the last 30 years'', the question is that "by propagating ideologically inspired amoral theories, business schools have actively freed their students from any sense of moral responsibility" (2005, p. 75).

Morality or ethics has to do with the right and proper completion of a human person with hu-

man excellence (through rational judgement and practical action). The moral dimension demands a kind of moral or ethical learning understood as the acquisition of theoretical moral principles of conduct and of practical moral virtues (Guillén, 2006). And in this sense, ethical knowledge or competence could be described as the possession of certain principles or behavioural norms for achieving good ethics, combined with practical habits for personal improvement. Some of these relevant virtues described in business ethics literature are fairness, responsibility, loyalty, honesty, integrity, humility, tolerance, determination, enthusiasm and courage, among others (Solomon, 1992).

By broadening the object of management to the study of moral human conduct, a new line of research opens up that complements the current findings in social sciences and allows the study of aspects that have not been discussed in previous research. We maintain that an assumed evaluative ethical "asepsis" ends up being extremely limited in understanding human behaviour in organizations. The contribution of ethics complements the study of organizations and the behaviour of its members by addressing it in terms of good or bad in relation to how it affects the improvement of the person or people involved and of society as a whole, but also explaining some requisites that are indispensable to understand organizations as groups of human beings.

In this way, together with the climate of desirable and demandable *competencies* and *skills –technical habits–* for a correct management of knowledge, we consider it important to complement the current scope by also considering *ethical or moral habits*. This allows us to take a deeper look at aspects such as fairness, trust, reciprocity or commitment, essential for explaining learning organizations.

Ethical knowledge is both theoretical and practical, and implies a way of growing in the human sense, of becoming a better human being, or what the ancient Greeks called being "virtuous".

Ethical or moral virtue (human excellence in Greek) is a stable character habit in people that enables the achievement of ethical goodness. The habits of the will are those denominated by the Greek philosopher as moral or ethical virtues. As we have just stated, to act correctly does not only require a sound choice of methods, but also a correct inclination towards the goals. In reference to the acquisition of these habits, Aristotle wrote: "we become just by doing just acts, temperate by doing temperate acts, brave by doing brave acts" (Nicomachean Ethics, II, 1, 1103b). The moral virtues are those operative habits which make human beings behave in a way which contributes to making their personalities flourish.

For example, the virtue of sincerity is the habit required as a result of repeatedly telling the truth. In the same way as occurs in other areas of theoretical and practical learning, such as in sports or in handling vehicles, repeating acts generates habits. In a moral sense, moral habits are generated, and are called virtues when they contribute to enriching the person as a human being. Someone who habitually tells the truth acquires the habit of sincerity, while a person who is normally fair acquires the moral virtue of fairness, and the same thing happens with any number of other virtues such as prudence, strength, hard work, order or patience.

Both, moral virtue and competence are kinds of human knowledge. While competence embodies notions of learned skills and technical efficiency, *virtues* offer perspectives to shape the way we live bounded up in ideas of morality (Macaulay and Lawton 2006). Virtue and competence are distinguishable concepts although they are interrelated because they require one another: "Competencies embody certain virtues, whereas virtues require competence in order to successfully implement them through virtuous actions" (Macaulay and Lawton 2006, p. 702).

Having arrived at this point, the question should be asked: What exactly is the relevance of ethical knowledge and learning, and how does

it affect learning organizations? To be able to answer to this question, we should first consider how the ethical personal level of analysis affects the organizational level.

3. THE ETHICAL HEALTHINESS OF THE ORGANIZATION

In this section, we examine in more detail the role played by the organization in terms of *means* or context, and in terms of a climate capable of enabling or impeding the process of transmission, reception and creation of knowledge on the part of its members. The interesting question to be addressed here lies in analyzing to what extent the ethical quality of the organization affects this process.

If we look at the concept of a "virtuous person," by analogy, we can probably discover elements that could be present in the concept of a "virtuous organization". Collier (1995) described "virtuous organizations" based on the idea that the organization is a "moral person" and that it is meaningful to speak about organizations as "virtuous". She then lists four features of virtuous organizations: appropriate purpose, discernment of purpose in relation with human flourishing, action to fulfil the purpose and qualities to attain goods. The first two characteristics are related to principles and judgement, and the second two have to do with practices.

In a similar way, avoiding the debate of considering organizations as moral individuals, Guillén (2006) describes the ethical quality of an organization by using the clinical analogy and by distinguishing between ethically healthy and unhealthy organizations. This study adopts the use of such terminology.

3.1. Ethically Unhealthy Organizations

An ethically unhealthy organization "is that which contributes, to a lesser or greater extent, to the human *impoverishment* of its members, of the people involved in achieving its mission and those affected by its activity" (Guillén, 2006, p.36). In biological terms, we say that an organism is sick when its members and the functions they perform suffer some kind of pathology or dysfunction. In ethical terms, the "pathology" is equivalent to actions that lack a human quality, without moral competence or virtues such as honesty, sincerity or veracity, to give just a few examples.

If a member of the organization ends up being selfish, bigheaded or a liar as a result of belonging to that organization, we can state that this is the case of an unhealthy organization; an organization that destroys or impoverishes the human quality of the people in the organization and those it serves.

Does the organization I work for allow me to grow in human virtues? Am I better or worse as a person since I began working at that organization? If the answer is no, if instead of being more sincere, more hardworking, more generous or more honest we are the complete opposite, then it is likely that the organization in which we work suffers some kind of ethical illness and in such cases, it might be a good idea to ponder to what extent we are one of the causes of that situation.

The ethical sickness of an organization can be explained by the poor moral quality of its aims or its means, or of the people that make it up (its moral competence). This would be the case of organizations in which the objectives or reward systems might lead to dehumanizing their workers. Generally speaking, any management mechanism an organization uses and the people that manage it have an influence on the behaviour of its members, in the same way as they affect it by giving a good or bad example. When these aims, means or people lead to a deterioration of the moral virtues

of members, then we are dealing with an ethically unhealthy firm.

The ethically unhealthy firm destroys the human element, and thus does the same to human relationships in the deepest sense, as it does with the trust these relationships are based upon. Although it may be efficient in economic terms, this organization is destructive in ethical terms and is doomed to a lack of union, to disintegration.

The same happens to ethically unhealthy firms as it does to organisms under the attack of some type of virus; it tends to spread and propagate to the other cells. This would be the case of negative behaviour or reactions guided by jealousy, envy or suspicion. To deny this fact would be to deny the reality of the ethical condition of human beings, elements that constitute the organization.

Just as we can refer to the ethical sickness of an organization, we can also talk of the opposite; the ethical health of an organization. When ethically positive behaviour is accepted, praised, and promoted within an organization, we have what can be classed as a "healthy" organization in the ethical sense.

3.2. Ethically Healthy Organizations

An ethically healthy organization "is one that contributes, to a greater or lesser extent, to the human enrichment of its members, of the people involved in achieving its mission and those affected by its activity" (Guillén, 2006, p. 37). The ethical health of an organization can be explained by the good moral quality of its aims, of its means or the people that constitute it. An organism is healthy when its members and the functions they carry out are correct. In ethical terms, correctness is equivalent to acting with human quality in line with moral standards.

The ethical health of an organization can be explained by the possibilities it provides to its members for their personal human enrichment, for their growth in virtues, as well as those of the people it serves. All of this can be attained precisely via the development and practices of the work of each of its members.

Some examples might help to further clarify this concept. "In an ethically healthy organization, constructive and not destructive criticism is habitually provided; people are able to work in teams, members are aware that this enriches people as individuals and the organization as a whole, both at an intellectual level and in terms of habits and emotions; collaboration with others is common, members do not try to "trip each other up"; knowledge is shared experience and does not remain with isolated members for selfish reasons or due to a fear of opportunism; people cooperate to work towards the common good of the organization and of society in general, not exclusively for self gain: in short, people attempt to work using their human qualities, thereby contributing to "building" trust and hence building the organization and stable human relationships" (Guillén, 2006, p. 37).

The concept of "ethical health" is a gradual one, i.e. health is understood as the absence of sickness, but this sickness can vary in size. Indeed, and talking in the strictest sense, even in healthy organisms, there are always small imperceptible pathologies. Precisely because it is people that make up organizations, moral defects are always present and can lead to small anomalies, misunderstandings, etc. Therein lays the possibility of making mistakes, of doing wrong. This is a fact of universal experience, all human beings do things wrong in moral terms. It is for this very reason that the concept of ethical health, in the same way as biological health, allows us to apply suitable remedies, to make rectifications after making mistakes. We are thus faced with a concept of moral health that is dynamic, that can improve or worsen, that grows or decreases, that is always gradual, precisely because human beings are free and we are responsible for our own actions, and are capable of recognizing mistakes and of finding the means to change and rectify. In this sense, it is possible to talk of degrees in the ethical

quality of organizations. Perfect health would not exist, but it is possible to have a permanent trend towards that goal.

Following this logic, the healthy organism is not only free of sickness, but its health gets better the more it moves towards a complete state of wellbeing, towards total health. The concept of excellence can thus be used to qualify a permanent search for ethical health. Moral excellence presupposes the existence of ethical health along with a *permanent and complete* effort towards improvement. One can thus define an ethically excellent organization as "one that permanently makes an effort to contribute to the *full* human development of *all* its members, of *all* the people involved in achieving its mission and *all* those affected by its activity" (Guillén, 2006, p. 38).

Evidently, the concepts of ethical *sickness, health* and *excellence* are not exact terms, as they refer to human groups in a permanent state of dynamism. In an excellent organization, there may be, and indeed there is, occasional behaviour of a lower ethical quality. However, we can talk of excellence when this dimension forms a habitual part of the means, aims and behaviour of the people in the organization. When the ethical quality of the behaviour of members of the organization ceases to be a common goal for all, we may still be talking about organizations that are more or less ethically healthy, but we can no longer state that they are excellent.

In the same way that the relationship between health and excellence is a question of degree, in a positive sense, so is the relationship between health and sickness. When we talk of ethical sickness, this emphasizes the existence of more or less stable behaviour that encourages the destruction of the human qualities in people, their debasement, and their lack of union, and in the long-term, if measures are not taken, the *dysfunction* of the organization.

The term ethical health therefore allows us to describe organizations that, in general terms, do not encourage dishonest, unfair, deceitful, damaging behaviour. They are thus organizations that allow or even contribute to human development. To the extent that this contribution becomes a mission and permanent task in the organization, with the stable purpose of the continuous improvement of all those affected by the activity of the organization, we can then talk of a total ethical bill of health, of complete ethical quality or ethical excellence.

Having reached this point, and returning to the question that we proposed in previous section: To what extent can we say that the ethical quality of the organization influences or may influence the process of the transmission, reception and creation of knowledge, the process of learning in organizations?

4. THE ROLE OF ORGANIZATIONAL ETHICAL HEALTHINESS IN ORGANIZATIONAL LEARNING

Learning organizations find themselves in a permanent process of knowledge communication. We suggest that this communication requires members in the organization that are capable of being good transmitters, receivers, and also good message creators. In order to explain the role of organizational ethical healthiness this section firstly focuses on an individual level of knowledge transmission and creation understood as a process of constant dialogue, and then moves on to examine the organizational plane.

4.1. Understanding Learning Processes as a Permanent Dialogue

Particular people acquire knowledge in organizations and this knowledge is communicated, by in large, through dialogue to the other members. Each individual can play different roles or go through different stages of the process of communicating knowledge.

The first stage involves a *knowledge receiver*, understood as the person that receives knowledge

that allows him/her to carry out tasks, but also to develop skills, competencies and habits that he/she can then maintain, which do not necessarily have an impact on the rest of the organization. The analogy here could be that of a "pool" or store of knowledge. Logically, people can be either good or bad pools of knowledge.

A second stage of the process of the communication of knowledge is that which acts as a knowledge transmitter, i.e. the person that transfers acquired knowledge to other members of the organization. Closing the circle would mean a person who is both, a receiver and transmitter of knowledge, the stage where they do not only receive but also impart knowledge either by informing or by training (teaching). Returning once more to the hydraulic analogy, this person would represent an excellent channel for knowledge, as this channel not only receives, but also gives.

But the transmission and reception of knowledge alone (explicit and tacit) are insufficient. Today, it is not enough to have good pools and channels of knowledge. Firms in the New Economy are complex organizations facing complex environments. Their reality does not allow them to make do with faithfully receiving and transmitting what they have learnt. They need *all* their members to vindicate their condition as free people with understanding, free will and feeling for creating value in their tasks via a level of involvement that generates new knowledge, ideas, principles, values, procedures, attitudes, behaviour etc.

Learning organizations in the New Economy require the creation of knowledge and for this reason cannot afford to waste opportunities wherever they may stem from, either from within the organization or outside it. Therefore, firms must not only promote downward learning but also upward and horizontal learning. The organizational structure must promote and absorb learning and/or knowledge creation situations from boss to subordinate, subordinate to boss, among peers and not only within the firm but also outside it.

Firms today must focus their attention on all aspects that are necessary not only for learning, but also for teaching, teaching how to learn and learning how to create knowledge. Within the framework of the communication of knowledge, it is not enough to be good receivers and communicators of messages, it is also essential to be able to create new messages. It is necessary for each member of the organization to be a good "pool", a good "channel" as well as an authentic "source" of knowledge or knowledge creator. The "source" not only gives and receives, but also creates. Learning, creating and teaching are the obligations of the members of an organization that wishes to be called a learning organization.

In response to our initial question on the relevance of moral habits or ethical virtues in knowledge management, an answer is already beginning to surface. In the communication of knowledge in organizations, it is not only knowledge and technical skills that are involved, but also attitudes and moral habits or virtues.

Those that are sceptical about recognizing the place of ethics in business might argue that knowledge management, in so far as it can be parameterized, can also be managed using protocol and measurements that allow for its creation, processing and retention. But, can ethics and ethical knowledge be managed?

If we distinguish between explicit and tacit knowledge, the former is liable to be formalized, and can hence be measured and managed. Conversely, tacit knowledge is not a formalized type of knowledge. On the contrary, at times it is neither understood nor perceived; it is *silent knowledge.* Due to its nature, this type of knowledge can be neither measured nor managed in a controllable way, and the same can be said about tacit ethical knowledge. Nevertheless, tacit knowledge and the most ambiguous and non-delimitable explicit knowledge will only have an effect on the organization in so far as enough conditions of trust exist for these effects to occur and remain over time.

As we go on to suggest, organizational ethical healthiness is essential in learning organizations.

4.2. Organizational Ethical Healthiness: A Contextual Learning Facilitator

In this study, we maintain that; *the better the ethical health of an organization the easier it should be for its members to act as good pools, channels and sources of knowledge*. We are aware that empirical support will be necessary to validate this proposition, but the purpose of this study is to present just such a thesis. We maintain that moral competence, ethical virtues, or their absence as well as the greater or lesser presence of ethical aims and means, have a direct repercussion on the way people work, teach and create knowledge around them. Put differently, theoretical and practical knowledge, the acquisition of intellectual, psycho-affective and technical competencies is inseparable from moral knowledge and indeed has a direct repercussion on the way in which this knowledge develops.

We agree with Zamagni (2010)[1] when he points out that to "make the most of the tacit knowledge of our employees, we have to know how to establish reciprocal relationships with them, because I can force someone to arrive at work at 8 in the morning or to be in the office for 8 hours, but I can't force them to contribute their best ideas, their intellectual capital to the organization. (…) The only way of taking advantage of people's tacit knowledge (….) is through reciprocity" (p.2). In other words, the way of getting the best out of each member of the firm is through the reciprocal, mutual and parallel growth between the firm and its members in an atmosphere of reciprocal moral trust, which is the best way of managing tacit knowledge.

When it is someone's duty to transmit information in an organization, that person will perform the task better from an ethical point of view and hence also from a professional one, in so far as the knowledge acquired will be transmitted with *high fidelity* to the rest of the organization. From the organizational perspective, this attitude or moral competence, of being a right "channel" of knowledge, represents an element of union, a unity in a *win - win* relationship based on a job well done. Furthermore, this moral competence has repercussions for the personal development of the agent and his/her contribution to the development of the organizational fabric.

Being an element of union and unity becomes a behavioural norm or ethical principle of action for whoever wants to carry out their work correctly in the organization. "Behaving intelligently, using information correctly, analyzing it and making sure it reaches the people that have the right to access that information generates trust and builds organizations. Work provides the chance for the development of personal and organizational welfare." (Guillén, 2006).

In addition to the moral virtues of fidelity and unity, members of the organization also require *humility*. Without humility among superiors, subordinates and peers, it is not possible to have a climate that is capable of recognizing limitations and of learning from those that can teach. The firm understood in this sense must be capable of detecting the generators and builders of knowledge regardless of their hierarchical level. When the intermediate managers are capable of recognizing their limitations and learn from those that can teach them, be they superiors or subordinates, they are in a condition to become generators or builders of trust, the course along which tacit knowledge truly flows.

Another essential moral competence for knowledge creation is *prudence* or practical wisdom for determining the degree to which it is possible to cooperate in the development of knowledge. The nature of the virtue of prudence allows organizations to discover which ethical principles are applicable in each particular case and to what extent it is necessary to evaluate the

degree of commitment of the organizations with its members, and vice versa.

Together with the virtues of humility and prudence, and in line with a concept in the field of knowledge management understood as communication, a good transmitter of knowledge requires another moral competence, that of having a conversational nature. In this sense, *dialogue* is a key component that demands reciprocity and the willingness to listen. Dialogue enables the establishment of the dual teaching-learning flow in both directions and senses: horizontal – from left to right and right to left- and vertical –up-down and bottom-up–.

Regardless of whether or not the firm is looking to manage that *knowing how to live*, going further than *knowing* and the *know-how* of its members, ethical health is an essential condition for the transmission and generation of both explicit and tacit knowledge. Without trust on an ethical plane, it is extremely difficult to get out of the plane of obligation, whilst conversely, when we can trust that the organization in which we work has aims that are in harmony with our wellbeing and that of society, we are dealing with the most suitable breeding ground for a fluid communication of knowledge, so that all the members of the organization can truly be pools, channels and sources of knowledge. It is for this reason that learning organizations require permanent communication and articulation via continuous dialogue between the organization's members: people.

5. CONCLUSION

The New Economy and current worldwide economic crisis demands that firms should be capable of reinventing themselves if necessary. Today's problems do not only demand internal free and reliable communication, but a higher level of cooperation and trust between individuals and firms. In this study, we propose that organizational ethical healthiness constitutes an essential facilitator for building authentic learning organizations. Today, technical learning is essential but it should be complemented with the ethical one.

State of the art equipment and technology are no longer a key differentiating element as the cost of acquiring the latest technology is within the reach of practically anyone. In any case, both information and technology can be bought. The same thing cannot be said, however, for aspects such as innovation or knowledge creation, and even less so in the case of behavioural dimensions such as personal involvement or initiative resulting from a high level of commitment on the part of workers towards the organization.

Current organizational reality implies making a major leap towards placing their value added in those elements that are inherent to each firm and are non-transferable. If we understand the organization as a group of people arranged in such a way as to achieve an objective or aim, are these people, their actions, relationships, contributions, originality and singularity not the DNA of each firm?

Despite the fact that it may seem obvious to highlight the importance of people in the organization, there is no doubt that 'people' concentrate and represent knowledge and organizational knowledge. Both of these aspects are manifested in human relationships and are built up in atmospheres of trust, respect, desire, commitment etc. It is precisely for this reason that within such a context, it appears logical to assume that businesses firmly committed to ethics, in addition to knowledge management and lifelong learning, can easier develop to their full potential.

Ethical virtues of the members of the organization, such as humility or loyalty, are essential for a learning organizations to attain their goals, but also other virtues such as the audacity to conquer new ideas, goals and high standards; the courage to avoid difficulties; the constancy to overcome failures in the learning process and the benevolence, trustworthiness and reliability to share ideas.

In order to be able to build ethically healthy organizations, and in order to achieve ethical excellence, HR policies are required that consider this third type of knowledge, knowing how to live. However, having an interest in achieving stable, good behaviour among the members of an organization is insufficient. The ethical quality of organizational behaviour does not solely depend upon human resource policies. Top management must ensure that not only behaviour, but also the organization's aims and means are really designed to contribute to the common good, to the ethical welfare of the members of the organization and the people it serves. This constitutes a truly ethically healthy organization, and we propose that this is an essential facilitator of learning processes.

There is no question that the proposals made here call for future research. Empirical verification of the theoretical propositions made here is necessary. Furthermore, much deeper studies should be carried out to better understand unexplored fields such as the relationship between ethical and technical learning in organizations, its influence on other organizational outputs such as organizational trust and organizational commitment, or its relationship with economic results.

Logically, some practical implications follow from the proposals made here. Top management should be the first to set an example in terms of the moral quality of their behaviour, intentions and the means they use to facilitate learning in their organizations. Nonetheless, this does not reduce in the slightest the personal responsibility of each member of the organization in making it a place where everyone reaches personal fulfilment through the exercise of professional work.

Professionally, technical learning cannot be separated from ethical learning, precisely because we are free, responsible human beings. The final outcome of work in organizations combines the external or explicit (measurable) results with internal or tacit ones, such as the capacity to generate and construct trust between agents. The most suitable organizational climate for lifelong learning requires trust in its technical and affective dimension, but above all in an ethical one. It is a fact that humans learn whilst carrying out their work, and in that learning the most technical aspects live alongside the most human ones. We either become enriched by our work or debased by it. This is a personal decision, but one which the management of the firm can do much to influence.

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KEY TERMS AND DEFINITIONS

Business Ethics: Form of applied ethics to the business environment.

Learning Organizations: Organization that facilitates the learning of its members and, therefore, continuously transforms itself.

Organizational Learning: Area of knowledge that studies models and theories in relation to the way an organization learns and adapts.

ENDNOTE

[1] Extract from the speech made by Stefano Zamagni at the I Symposium "Society, Economy and Values" held at the campus of the IESE and organized by the University of Navarra. Taken from: Lucas, A., 2010: 'Humanismo y reciprocidad: El regreso al mundo vital', *Aceprensa*, 26 May, 2010.

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Chapter 69
The Importance of Psychological Contracts in Human Resource Management within the New Global Economy

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ABSTRACT

Human resources are considered the company's most valuable resource. For that reason, organizations require a Human Resource Management (HRM) that provides the adequate work force within the new global economy. The psychological contract includes solid agreements between company and its employees, beyond the written contract, specifying their contributions, expectations, beliefs, promises, and obligations between both parties. Their management requires the definition of the concept of psychological contract, the analysis of its main characteristics and contents; and the identification of its stages of development. Electronic Human Resource Management (e-HRM) introduces a way of implementing HRM strategies through Web-based tools, improving the psychological contract management. Information phase, Intranet, and internal electronic mail have an important role in socialization stage. The consolidation of psychological contract (maintenance phase) is favoured by Intranet, business-to-employees, internal electronic mail, database, videoconference, and groupware. Finally, in breach phase, intranet, electronic mail, database, videoconference, and groupware are important E-HRM.

1. INTRODUCTION

In the global economy, human resources are considered to be the most important asset of an organization, but very few organizations are able to fully harness its potential. Human resources are also considered the most important component of a corporation's competitive advantage in global markets. As human resources are considered the company's most valuable resource, it is necessary to improve their management.

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Human Resource Management (HRM) refers to all of the dedicated activities that an organization uses to affect the behaviours of all the people who work for it (Jackson & Schuler, 2003). HRM is defined as "the policies, practices and systems that influence employees' behaviour, attitudes and performance" (De Cieri and Kramar, 2005). Ideally, these comprise "activities undertaken to attract, develop, and maintain an effective workforce within an organization" (Daft 2000), who ensure the effective functioning and survival of the organization and its members. Organizations need to hire the right numbers of people, with the right qualifications, for the right jobs, in the right locations. Line managers' expectations are to attract and retain excellent employees from the workforce pool. The impact of HRM policies and practices on firm performance is widely accepted and become an important topic in the fields of HRM, industrial relations, and industrial and organizational psychology (Kleiner, 1990; Boudreau, 1991; Jones & Wright, 1992). For these reasons, organizations try to optimize their HRM.

2. MAIN PURPOSE

The classical employment relationship, open-ended as to both its task content and its duration, was tying stable rates of pay to indefinite duration jobs. Employers offered job security and internal career opportunity with little risk of exposure to their workers (Kluytmans and Ott, 1999; Rousseau & Schalk, 2000), because workers did not leave, and certainly not to the competitor (Kluytmans and Ott, 1999). Employees were obedient and disciplined when carrying out their function and when requesting reallocation; and provided maximum performance at present function (Kluytmans y Ott, 1999).

In return, employees expected the reward of loyalty through continuation of the labour relationships and job security (Hiltrop, 1995; Kluytmans and Ott, 1999), irrespective of economic circumstances; the control of career by employer (Kluytmans and Ott, 1999) and payment of a guaranteed wage (Garud & Shapira, 1997; Rousseau and Shperling, 2003).

In the new global economy, increasing international competition, deregulation and globalization of markets have demanded greater flexibility and productivity of organizations. Firms have made the organizational structure change from a hierarchical to a flat form, accompanied by rapid reduction of the permanent core workforce, supplemented by a larger group of temporary contract and contingent employees, which has become a common employment staffing practice in today's modern organizations (Byrne, 1993; Allred *et al.*, 1996; Nicholson, 1996). New forms of labour contract has therefore emerged, such as fixed-term contracts, temporary contracts, etc (atypical contract). They are more short-term contracts and provide fewer career development activities (Pieters, 2009). Companies introduce new strategies, methods and techniques to attract and retain talented workers (Hiltrop, 1995, 1999; Ermel and Bohl, 1997; Rousseau and Shperling, 2003). Large companies had a core group of professional employees who were dependable, who would work hard and who would sacrifice the present for the future (Hiltrop, 1995).

For *organization*, new contractual forms provide greater flexibility and a good deal of enforceability (Marsden, 2004; Silla *et al.*, 2005). Instead of career paths and job security, a new kind of security, called "employability security" is established (Hiltrop, 1995; Schein, 1996). This is the promise that the employee's skills will be enhanced, and access to other tasks and assignments will be facilitated. Moreover, a new pay system is applied, based on flexibility bands to encourage the members to develop new skills (Hiltrop, 1995; Kinnie *et al.*, 1999; Silla *et al.*, 2005).

On the other hand, new contractual forms are getting *employees* to broaden their skills, by organizational learning and training programs, and identify the development of additional skills

as a prerequisite for advancement (Schuler and Jackson, 1987). Workers receive higher salaries linked to performance and skills, rewards linked to performance, absorbing risk and exposure to market volatility (Rousseau and Shperling, 2003; Silla *et al.*, 2005). They consequently assume more responsibilities, and take risks (Schuler and Jackson, 1987). Workers may also manage the organizational intangible resources (knowledge, culture and business reputation, etc.).

This important change in employment relationship has generated a radical change in the relationship established between employer and employee, which must be adequately managed. Today's organizations need, among other actions, (a) to reach solid agreements with their employees, beyond the written contract, specifying the contributions and inducement that each party will receive from the other; (b) careful consideration of expectations in order to overcome ambiguity with their employees (Sims, 1994); and (c) examining and exploring the changing employment relationship. This new approach affects the employees, because the new psychological contract assumes that employees are not automatically loyal to their company as a whole, but that, as professionals, they will be moved by a new kind of loyalty to their own disciplines and skills. It also assumes that people will care more about their own development and that their skills are highly transferable between companies and industries (Hiltrop, 1995).

For those reasons, the psychological contract has reached a great importance nowadays. It is necessary to define the concept of psychological contract, analyze its main characteristics, contents, typologies; and identify its stages of development.

Electronic Human Resource Management (e-HRM) has both a negative and positive impact on employment relationship. Certain jobs are becoming obsolete on the one hand, and new job opportunities are created. IT tools improves information management, sharing information and knowledge, communication and coordination among different organizational members. Thus, these tools facilitate HRM, organizational memory, business management and a corporations' ability to compete in the global economy. These utilities have some important effects in psychological contract management.

As a strong importance of the psychological contract has been reported in the literature, the aim of this study is to examine the role of psychological contract in the actual HRM, and identify the facilitating role of e-HRM on its adequate management. This chapter has been divided into four parts. The first part deals with psychological contract term, analyzing its different subjects, conceptualizations, contents and typologies. Next, the state of psychological contract is examined, considering three different phases. Third, e-HRM and their positive influence on psychological contract are studied. As a conclusion, section 5 presents a discussion on the results of the study, and suggests fields in which further study would be fruitful.

3. DEVELOPMENT: PSYCHOLOGICAL CONTRACT

In reality, a written contract which is explicitly agreed between employee and employer may not exist. When a worker is asked "Is that (task, obligation or benefit) specified in your contract? The reply is more often that it is not. This situation suggest that employees rarely have detailed knowledge about what is included in their contract of employment, or they don't remember what was agreed at the outset of employment. In 2000, Cooke *et al.* demonstrated work and employment-related agreements are often made on an *ad-hoc* and on-going basis between the employer and the employee as and when it becomes necessary to do so.

Under these circumstances, a new concept has emerged: the "psychological contract", which refers to the relationship between employee and employer in terms of the unwritten expec-

tations (Rousseau, 1989), beliefs, obligations, promises, and perceived perceptions that exist, they are not in a formal written contract, but in implicit expectations, often covertly held and infrequently discussed (D'Annunzio-Green and Francis, 2005), which determine the employment relationship. This broad conceptual term is increasingly used as a framework to study the employment relationship. This concept also has various meanings and interpretations among different subjects and constituencies. It is important, therefore, to mention that the conceptual model of psychological contract that is emerging from the literature review requires us to analyze its subjects, main characteristics, content, state and the e-HRM tools' influence on it.

3.1. Written Contract and Psychological Contract: Main Differences

The labour and capital relation includes written contract relation and unwritten psychological contract relation. Gradually, the psychological contract becomes the core content of HRM (Guest, 2004), in detriment to written contract. The psychological contract emphasizes that apart from formal contents regulated by the written contract, there are hidden, unwritten and largely unspoken sets of congruent expectations (Herath and Kishore, 2007), beliefs, perceptions, promise and obligations in the mutual relation between the organization and employees, which (a) mediates the unwritten employment bargain between the individual employee and the organizational agent to satisfy stakeholder requirements (Bathmaker, 1999), and (b) constitutes the important factors to decide employees' attitudes and behaviours (Rousseau, 1995).

The written contract is generally understood and usually includes four key factors: worktime required and available knowledge, skills and psychosocial abilities, and a wage-effort bargain (Huiskamp, 1995). However, the psychological contract fills the perceptual gaps in the employment relationship and shapes day-to-day employee behaviour in ways that cannot necessarily be discerned from a written contract (O'Donnell and Shields, 2002). Hence, employees weigh their obligations, expectations and norms towards the organization against the obligations, expectations and norms of the organization towards them, because they are not created by only an explicit agreement, and adjust their behaviour on the basis of critical outcomes. Although psychological contract is an unwritten contract it also has a central role in work behaviour by better specifying the dynamics of the employment relationship, and can be a powerful determinant of workplace behaviour and attitudes (van de Ven, 2004).

In this sense, Ring and Van de Ven (1994) saw this "informal and psychological contract increasingly compensating or substituting formal contractual safeguards as reliance on trust among parties that increases over time".

3.2. Development of the Concept of Psychological Contract

A considerable amount of definitions has been published on psychological contract. The development of this concept can be divided into two parts. The first part deals with the work of early theorists from 1930 to 1980, which is known as the so called "classical approach" to psychological contract. The second part deals with the "modern approach" to psychological contract, and begins with the publication of Rousseau's work in 1989.

The *classical approach*, arguably, the idea of psychological contract appeared in Bernard (1938), continuing with the seminal work of Argyris (1960), Levinson et al. (1962) and Schein (1965) (Robinson, 1996; Morrison and Robinson, 1997; Zhao *et al.*, 2007).

Bernard (1938) revealed the psychological relations between employees and employers developed as result of an explicit process of co-operative exchanges between them, which

covered employee's implicit expectations of both material and non-material rewards (March and Simon, 1958).

In connection to the previous theories of Bernard (1938) and March and Simon (1958), Argyris (1960) defined the psychological contract as "the expectations of employer and employee which operate over and above the formal contract of employment". He introduced two different aspects. First, he only considered the material or transactional inducement and ignored nonmaterial or relational aspect of inducement (introduced by Barnard, 1938). Second, his approach was somewhat more close to the relationship between groups of employees and their supervisors, rather than a two-way relationship between an individual employee and supervisor (Taylor and Tekleab, 2004).

Shortly after Argyris (1960), Levinson *et al.* (1962) focused on employee-organization relationship as a dynamic contracting process involving an individual employee and organization.

Then, Schein (1965) focused on the need to recognize that the contents of psychological contract between employee and employer could incorporate not only material and economic dimensions but also non-material benefits that would satisfy both parties (Taylor and Tekleab, 2004).

In summary, the concept focused on mutual and reciprocal exchange relations between employee and employer (Argyris, 1960, Schein, 1965). In this step, more exploratory and less empirical research on the concept of psychological contract was done.

The beginning of *Modern Approach to Psychological Contract* was Rousseau's (1989) article titled "Psychological and implied contracts in organizations" (Rousseau, 1989). Rousseau (1989) defined this term as "an individual's beliefs in mutual obligations that a person and another party such as an Employer have¨, (either a firm or another person). This belief is predicted in the perception that a promise has been made (e.g. of employment or career opportunities) and a consideration offered in exchange for it (e.g. accepting a position, foregoing other job offers), binding the parties to some set of reciprocal obligations". This proposal introduced the cognitive-perceptual or individual's mental model to psychological contract, describing it as cognitive-perceptual process or mental model (Rousseau & McLean Parks, 1993; Rousseau, 1995; Rousseau & Tijoriwala, 1998; Rousseau and Schalk, 2000). Hence, the psychological contract represents a cognitive model existing at the individual level rather than an exchange model incorporating different parties.

Beside the significant contribution of Rousseau and her colleagues, some critics challenged the cognitive-perceptual framework of psychological contract of an individual's mental model of relationship with his or her organization and viewed it as a narrower approach to psychological contract that focuses only on an individual employee but doesn't cover the organizational side (Morrison & Robinson, 1997; Guest, 1998; Coyle- Shapiro & Kessler, 2000).

However, some researchers emphasized the need to include both parties in psychological contract (employer and employee) (Tekleab & Taylor, 2003; Guest 2004). Moreover, many authors agree that the psychological contract is based on expectations (Argyris, 1960), perceived promises (Conway & Briner, 2005), beliefs (Morrison & Robinson, 1997) or obligations (Rousseau, 1990).

Despite these ideas, scholars have reached a consensus about the nature of the psychological contract.

The Modern Approach of Psychological Contract is dominated by more empirical studies and less exploratory studies.

3.3. Subject of Psychological Contract

Traditionally, psychological contract is held by employees alone (Shore & Tetrick, 1994; Morrison & Robinson, 1997). However, the inclusion of the employer's perspective is already a reality. In this sense, Guest (1998) argues that neglecting

the employer's perspective may be misrepresenting the core of the psychological contract, and the reciprocal obligations between two parties. In this study, the employment relationship is considered as the exchange process between two parties. For both reasons, employee and employer should be considered as *subjects* of the psychological contract.

Usually, "organizations become party to the psychological contracts as principals who directly express their own terms or through agents who represent them" (Rousseau, 1995). However, they can not "feel" a psychological contract with employees and respond accordingly (Rousseau, 1989). As Rousseau (1995) and Morrison and Robinson (1997) acknowledge, the organization is comprised of multiple agents with whom the psychological contract is made, but the authors do not consider these as proxies for the organization as there may be differences in what each agent is offering or expecting. Indeed, the individual may have concurrent psychological contracts: one that is 'personal' with an organizational agent and one that is 'impersonal' with the organization. The discretionary actions of organizational agents are viewed as actions of organization by the workers (Rousseau, 1989) and may contribute to employees' perceptions of procedural fairness (Moorman *et al.,* 1998).

Hence, we set out to examine the characteristics, content and state of the psychological contract from the employer and employee perspective.

3.4. Main Characteristics of Psychological Contract

The psychological contract is the unwritten *implicit contract* (Argyris, 1960; Schein, 1965; Rousseau, 1989). Its content extends beyond the written contract and determines the bilateral and mutual relationship as a crucial factor in understanding the behaviour of both employee and employer in psychological contract in the work place (March and Simon, 1958; Schein, 1965). It forms in the minds of both parties and its content is highly *personal* for them. Consequently, the creation of a psychological contract may result from implicit means relying on an individual's interpretation of actions and events within an organization (Coyle-Shapiro and Kessler, 2000).

Proper development of psychological contract requires a *social process* (Herriot and Pemberton, 1997), because the employment relationship is founded on social exchange[1]. The psychological contract includes an exchange of terms and conditions of the agreement, *reciprocal* (Rousseau, 1989; Morrison y Robinson, 1997; Tabernero *et al.*, 2005) and *balance* between both parties. Consequently, it contains reciprocal exchange agreement and needs to be well-balanced, to survive at the time.

The psychological contract is thus *subjective* (Schein, 1965; Robinson and Rousseau, 1994; Rousseau, 1995), because its content is open to interpretation. It comprises subjective beliefs regarding an exchange agreement between an individual and, in organizations, typically the employing firm and its agents (Rousseau, 1995). Employees and organizational agents may hold different views on the content of the psychological contract and the degree to which each party has fulfilled the mutual obligations of exchange (Coyle-Shapiro and Kessler, 2000). Psychological contract is consequently open to misunderstandings (Schein, 1965; Robinson and Rousseau, 1994).

All the previous characteristics justifying each subject possess a unique psychological contract based upon his/her own understanding of the reciprocal obligations in the employment relationship between employee and employer (Turnley and Feldman, 1999). As a result, psychological contract can reach an unlimited number of formats.

Thus, the psychological contract is *dynamic* (Rousseau, 1989; Thomas and Anderson, 1998; Reyes and Martinez, 2007), which means it changes over time during the employment relationship (Anderson and Shalk, 1998), as do the organization and the individual. The psychological

contract develops within a dynamic environment in which the individual is often interacting with multiple organizational agents who may each be sending a variety of messages, both verbal and non-verbal (Shore and Tetrick, 1994). The organizations operate in a similar environment, changing their organizational basis (structure, strategy, and culture), and their needs and goals. Subsequently, both reasons justify the changing relationships between constituent or configured parts.

Furthermore, the psychological contract is itself a *flexible* and still evolving concept (Guest, 2004), requiring it to undergo continual revision.

A psychological contract must constantly be *renegotiated and revaluated* (Rousseau & Parks, 1993; Conway & Briner, 2005), to be capable of adapting to the changing conditions. This is a fact that differentiates it from the formal contracts. Therefore, the nature of the perceived content could change.

Finally, the psychological contract is *obligatory* as expectations of perceived obligations must be fulfilled in order to prevent a breaching of the psychological contract which might result in adverse consequences.

3.5. Content of Psychological Contract

The content of the psychological contract includes different combinations of terms like perceptions, expectations, beliefs, promises and obligations (Kotter, 1973; Schein, 1978; Rousseau, 1989; Herriot and Pemberton, 1995). Schein (1965) highlighted the need to recognize that the contents of psychological contract between employee and employer could incorporate not only material and economic dimensions but also non-material benefits that satisfy both the parties (Taylor and Tekleab, 2004). This content can be analyzed from the worker's and employer's perspective.

The psychological contract is the *perception* of both parties of their relationship and the things they offer each other in this relationship (Herriot and Pemberton, 1995). Later, Herriot and Pemberton (1997) define this term as "the *perception* of both parties to the employment relationship, organization and individual, of the reciprocal promises and obligations implied in that relationship". Slightly adapting a previous definition by Herriot and Pemberton (1997), Guest and Conway (2002) define the psychological contract as "the *perceptions* of both parties to the employment relationship, organizational and individual, of the reciprocal obligations implied in that relationship".

Levinson *et al.* (1962) develop the psychological contract as "a series of mutual *expectations* of which the parties to the relationship may not themselves be dimly aware but which nonetheless govern their relationship to each other". Building upon this work, McLean Parks *et al.* (1998) states that a psychological contract is the idiosyncratic set of reciprocal *expectations* held by employees concerning their obligations (i.e., what they will do for the employer) and their entitlements (i.e., what they expect to receive in return).

Rousseau (1989) defines the psychological contract as "an individual's *beliefs* regarding the terms of conditions of a reciprocal exchange agreement between the focal person and another party". This definition is apparently focused exclusively on the employee perspective. However, researchers tend to downplay the aspect of mutuality and introduce the employer perspective (organizational agent).

Turnley *et al.* (2003) stated that "specific, psychological contracts are comprised of the *obligations* that employees believe their organization owes them and the *obligations* the employees believe they owe their organization in return".

Building upon these previous works and conceptual background, the content of the psychological contract includes perceptions, expectations, beliefs, promises, and obligations (Anderson and Schalk, 1998). The core of it concerns the exchange of promises and commitments (Guest & Conway, 2002) and mutual obligations and expectations.

After this brief analysis, we can summarized that the psychological contract consists of a set of perceptions, expectations, beliefs and obligations, based on explicit or implicit promises exchanged, which should cover the viewpoints of both parties (employer and employee) to the employment relationship. Psychological contract only exists within the context of an exchange relationship, mutuality is an underlying feature of it. In addition, psychological contract is implicit and subjective because its content is open to interpretation. It is "obligatory" since its content must be fulfilled in order to avoid contract "breaching". Furthermore, the psychological contract is dynamic due to mutual bargaining and negotiation mechanisms (Conway & Briner, 2005). Finally, the psychological contract is of a highly personal, idiosyncratic and self-constructed nature (Rousseau, 1989) and, consequently, the psychological contract of each individual is unique, and can reach an unlimited number of formats.

The content of psychological contract is adjusting and changing along with an organizations' development in different periods and employees' extending apperception of psychological contract.

3.5.1. Main Content of Psychological Contract

The content of the psychological contract includes perceived terms or "clauses" of the employment relationship. However, both subjects currently have no consensus on what psychological contracts contain or what the psychological contract is or what it actually encompasses. Hence, Anderson and Schalk (1998) contended that most employees are able to describe the content of their contract, and every worker has one. On the contrary, the employer has a general psychological contract with all employees of the same professional level, with some specifications to each worker.

Psychological contract has varied in recent years due to economic, social and existing business changes, and organizational flexibility required in terms of temporal relations, downsizing or part-time labour, imposed by the current financial crisis (Kluytmans and Ott, 1999). Traditionally, loyalty, commitment and confidence of employees are rewarded with job security, promotion, training and professional development, and protection against any problems. Currently, employers require workers with high commitment to business objectives, shared responsibility of success, quality performance, flexibility, judgement, strategic skills and continuous improvement. Employer in turn provides employability, learning capacity, flexibility, a performance-based compensation, greater participation and involvement, wide tolerance of change (challenging work) and a job but not a professional career (Csoka, 1995; Silla *et al.*, 2005).

Many previous works indicate distinct content and dimensions of employee's and employer's psychological contract (Rousseau, 1990; Herriot *et al.*, 1997; Hutton and Cummins, 1997; Guest and Conway, 1999, 2002; De Vos *et al.*, 2003; Jannsens *et al.*, 2003; Cable, 2008). A thorough preliminary investigation of existing research, the most important employee and employer psychological obligations are included in Table 1.

For employee obligations, Table 2 shows several variables of the psychological contract content, based upon previous work. They are related to the main term of contract, loyalty, flexibility, other employee factors' and organizational support.

For employer obligations, Table 3 exhibits the different variables of the psychological contract content. They should be grouped in extrinsic and intrinsic rewards, employer obligations' to employee, arrangement, and employee obligation's.

The heterogeneous nature of the employee obligations and employer obligations warrant specific mention. Psychological contract differ across a number of factors, including employment level and personal culture of both parties. For this reason, the present research contributes to improve this situation, exhibiting the list of the psycho-

Table 1. Summary of employee and employer psychological obligations

EMPLOYEE OBLIGATIONS		EMPLOYER OBLIGATIONS	
Loyalty	An employee's perceived socio-emotional link and attachment toward their employing organization (for example, not accepting every job offer that comes along, working for the organization for at least several years).	Offering possibilities for development and/or promotion within the organization (such as possibilities for development, chances of promotion).	Career development
Flexibility	Willingness to be flexible in carrying out the work that needs to be done (for example, working overtime, taking work home).	Offering challenging, interesting job content (such as work in which employees can use their capacities, challenging tasks).	Job content
Ethical conduct	Willingness to conduct oneself ethically towards the organization (for example, not making confidential information public, dealing honestly with resources and budgets).	Offering respect and understanding for the personal situation of the employee (for example, flexibility in working hours, understanding of personal circumstances).	Work-private life balance
Honesty	The belief that one's partner stands by its word, fulfils promised role obligations, and is sincere.	Offering appropriate compensation (such as remuneration commensurate with the work, conditions of employment that have favourable tax consequences).	Financial compensation
Fairness	The perception by the individual that a particular activity in which they are a participant is conducted fairly by the organization.	Organization is characterized by high levels of distributive, procedural, and interactional justice.	Fairness
Trust	The mutual expectation that the other party will not behave opportunistically in future transactions of the employment relationship.		Trust
Availability	Willingness to keep one's availability status at an acceptable level (for example, taking training courses that become available, keeping up with trade literature).	systematic activities to develop and improve employees' skills, knowledge and behaviours to enable them to perform job-related duties, accomplish specific tasks and meet the quality requirements of HR for the future.	Training
Employability	The development of professional skills in general (such as e.g. language competence), but also to the acquisition of interpersonal skills, such as learning to cope with change.	Offering a pleasant and cooperative working environment (such as good communication among co-workers, good cooperation within the group).	Social environment
Job involvement	The extent to which people are psychologically attached to their jobs and the degree of importance that work holds in their life.	The perception that the job is more or less secure, whether or not there is objective evidence to support this.	Job security
Job satisfaction	The affective feelings toward the job. The extent to which employees gain enjoyment from their efforts at the workplace.	The belief that other people are generally well meaning and capable of positive interactions.	Humanity
Extra role Behaviour	The discretionary actions of workers that go beyond their existing role expectations and are not mandated by the organization.	The perceptions of justice and equality by individuals in an organization.	Organizational Justice
Personal congruence	The process of creating a balance between authentic cultural makeup and the organization.	Consistency between organizational values and actions.	Perceived consistency

Table 2. Employee obligations in the psychological contract

	Rousseau (1990)	Herriot, Manning and Kidd (1997)	Hutton and Cummins (1997)	Guest and Conway (1999)	De Vos, Buyens and Schalk (2003)	Jannenes, Sels and Van den Brande (2003)	Cable (2008)
Employee Obligations							
MAIN TERM OF CONTRACT		Work	Getting the Job Done				
				Delivery of the Deal			Intention to Quit
Employee Obligations for Organization							
LOYALTY	Loyalty						
FLEXIBILITY		Flexibility		Flexibility	Flexibility		
	Willing to Accept Transfers		Flexible Citizenship			Open Attitude	
OTHER EMPLOYEE'S FACTORS		Honesty		Fairness Trust	Ethical Behaviour		
					Employability		
	Extra Role Behaviours				Extra Role Behaviours		
						Respect for Authority	
		Self-Presentation					
	Property						
	Overtime Minimum Stay	Labelled Hours					
						Personal Investment	Work Involvement
							Job Involvement
							Job Satisfaction
ORGANIZATIONAL SUPPORT							Perceived Organizational Support

Table 3. Employer obligations in the psychological contract

	Rousseau (1990)	Herriot, Manning & Kidd (1997)	Hutton and Cummins (1997)	Guest and Conway (2002)	De Vos, Buyens & Schalk (2003)	Jannenes, Sels & Van den Brande (2003)	Cable (2008)
Employer Obligations							
EXTRINSIC AND INTRINSIC REWARDS	Development			Development Opportunities	Career Development		Career Plateau
	Advancement			Promotion			
	Support		Support				
	High Pay	Pay		Fair Payment	Financial Rewards		
		Benefits Recognition		Benefits Package			
EMPLOYER OBLIGATIONS' TO EMPLOYEE				Feedback on Performance			Job - Task Performance
	Training	Training		Training			
	Job Security	Job Security		Reasonable Job Security		Long Term Involvement	
		Fairness	Respect And Fair Practice	Fair Treatment			
		Needs					
		Consult					
		Discretion					
		Humanity				Personal Treatment	
		Environment		Working Environment	Social Atmosphere		
		Justice		Not to Make Unreasonable Demands of Employees		Equal Treatment	
					Work-Life Balance		
ARRANGEMENT				Interesting Work	Job Content	Carefuless Regarding Arrangement	
							Person-Organization Fit
EMPLOYEE OBLIGATION'S							Organizational Citizen Behaviour

logical contract contents' of the most representative research, considering different countries.

Understanding the content of psychological contract is key to understand the factors which lie behind employee turnover.

3.6. State of Psychological Contract

Compared to the traditional approach of Rousseau and colleagues, Guest (1998) advocates develop theoretical models and research that would allow researchers to go beyond mere description of the content of the psychological contract to an evaluation of its state, introducing consequently the concept of state of the psychological contract.

The dynamism and flexibility of psychological contract explains the existence of several states of its development. The state of the psychological contract refers to "whether the promises and obligations have been fulfilled, whether they are fair, and their implications for trust" (Guest & Conway, 2002). It involves a broader evaluation of the employment relationship, shaped by the content of the psychological contract, but going beyond them.

For Guest and colleagues, evaluation of the state of the psychological contract should represent a qualitative leap in research on the psychological contract, rendering it more explanatory and less descriptive, and making possible the prediction of diverse variables related to attitudes, behaviour and employees' health (Gracia *et al.*, 2007)..

The main phases of psychological contract development are: the process of the psychological contract formation, the development or maintenance, and breaking the psychological contract. A more detailed study is needed to accurately characterize each phase.

1st Phase: The Process of Psychological Contract Formation

Many of the psychological contract contents are explicitly or implicitly addressed during the recruitment and selection phases (Sutton and Griffin, 2004). The recruitment and selection are social processes with important informational qualities for both potential employers and employees. These stages have influence on the development of appropriate expectations and inform the early development of individuals' psychological contract with the organization (Herriot, 1984; 1989). Employers also make implicit and explicit promises during *recruitment stage* which obligate them to give certain things to their workers in exchange for their employees' contributions to the organization. Consequently, many terms of a psychological contract are established during recruitment (Rousseau & Greller, 1994; Shore & Tetrick, 1994).

In the *hiring stage*, the potential employee receives and analyzes an introductory letter spelling out conditions of employment. If both parties agree to the formal aspects of employment relationship (working hours, salary, type of contract, benefits and mutual obligations) (Dunahee and Wangler, 1974), the written contract is signed and established. However, new workers have a limited and incomplete knowledge in terms of arrangement that have been voluntarily involved. People "fill in the blanks" along the way, and they sometimes do so inconsistently (Rousseau, 1995). Therefore, a psychological contract is also created in this stage, beginning the formalization of its content.

When an employee is hired, the human resources department starts his/her *socialization stage*. Socialization is characterized by a process through which newcomers could receive a detailed job description and/or an employee handbook. Hence, employees start to understand, interpret, and respond to their new environment. At this moment, most newcomers have only limited or incomplete information about the terms of their employment relationship (Rousseau, 2001) and, consequently, the psychological contract contents. For that reason, organization facilitates all the learning that took place prior to a person's first day on the job. Worker receives instruction about the

correct execution of the job, and the organizational culture and strategy. This motivates newcomers to actively interpret their initial experiences as a basis for predicting future events and for changing their expectations, thereby making their psychological contract schema more complete. Nevertheless, this training is not sufficient to establish the definitive content of psychological contract. This in turn should help them to reduce uncertainty and make their experiences in their new work setting more predictable (Shore & Tetrick, 1994). Thus, the perceptions of promises are adapted based upon newcomers' interpretations of their experiences in the work setting (Rousseau, 2001).

During organizational socialization the psychological contract rapidly develops and becomes more stable. Empirical research demonstrates newcomers change their perceptions of what their employer had promised them based on their perceptions of the employer inducements actually received (De Vos *et al.*, 2003). They also change their perceptions of what they had promised their employer, based on their perceptions of what they actually contributed to their employer (De Vos *et al.*, 2003). Consequently, newcomers use their experiences and knowledge within the work environment as feedback about their initial expectations and they are flexible in adapting their initial expectations based upon this feedback. In the same line, newcomers adapt their promise based upon their interpretations of the employer's actions in the work setting (De Vos *et al.*, 2003). The main conclusion of the foregoing analysis is that the mutuality also operates during the stage of psychological contract formation and that it explains changes in newcomers' psychological contract perceptions (De Vos *et al.*, 2003).

It is important to note that in recruitment, selection and hiring stage, the contract is still an incomplete mindset (Topa and Palací, 2005), for employee and the employer (organizational agent). After the training and socialization stage, the content of the worker's psychological contract changes to introduce his/her feedback (Thomas and Anderson, 1998; Topa *et al.*, 2002) as well as the employer. This adaptation is a result of gradual adjustment and mutuality, which it is more significant in employee psychological contract. Consequently, workers are more flexible in changing their perceptions of their own promises than in changing their perceptions of their employer's promises.

Finally, it is important to note that small and medium-sized companies (SMEs) can build the psychological contract in a different way, as SMEs make less use of formalized recruitment practices, provide less training to their employee, and are less likely to use formal performance based compensation systems (Carison *et al.*, 2006).

2nd Phase: Maintenance of Psychological Contracts

The development of the employment relationship involves a series of ongoing interactions that help to gradually reduce the uncertainty, generating and consolidating the contents of the psychological contract. The dynamism and mutuality of the psychological contract is confirmed in this stage, where the employees' and employers' perceptions, beliefs, expectations, obligations and promises are continuously changing, revaluating and renegotiating. However, our knowledge on the way in which psychological contracts develops, and on the conditions that initiate and influence changes in the psychological contract is still limited.

The constant change of the contract provides increased opportunities for misunderstandings and therefore causing contract breach (Robinson, 1996). The content of the psychological contract are subject to internal and external changes (Rousseau, 1995). The internal changes have their origin in both subjects. The internal changes generated by employee stems from his/her evolution during the employment relationship with the company (employment status, training, wage, work-life balance and promotion for other colleagues). The internal changes generated by the employer

are due to economic, productive, organizational and strategic changes. Both kinds of changes can modify the contents of the psychological contract.

When one party changes the content of psychological contract, a mutual feedback process is activated; which involves a continuous revaluation, renegotiation and implementation of newly required obligations to achieve the recent beliefs and expectations set.

Promoting employability is part of a new psychological contract between employer and employee, whereby both are responsible for maintaining the employment situation (Kluytmans and Ott, 1999).

This phase of the psychological contract depends on a balance between employee's and employer's obligations, and the congruence of both subjects' action. Consequently, it depends on the fulfilment of the arrangement. In this sense, Shore and Barksdale (1998) identified four types of psychological contract, on the basis of two dimensions: employee and employer obligations, and the level of obligations. The types of psychological contract are mutual high obligations, mutual low obligations, employer over-obligation and employee under obligations. In the first two situations, the psychological contract is balanced and both parties have high or low obligations, respectively. In this case, the psychological contract is frequently stable. The other types of contracts are not balanced and their breach has a stronger probability to happen, generating the following step.

The effects of the maintenance stage of psychological contract must be analyzed from two perspectives, the employee and the employer. The fundamental premise is that a fulfilled and healthy psychological contract will result in positive individual behaviour, and be associated with positive outcomes for the organization.

The maintenance of a psychological contract by the employee helps his/her professional development, the reduction of social distance between him/her and the organization, and reaches higher performance (Topa and Palací, 2004). Consequently, the worker has more opportunities for promotion, training and improved wage conditions (Topa and Palací, 2004).

For the employer, if employees maintain a satisfied psychological contract, they are more profitable in the performance of tasks, they work more efficient and with higher quality, yield and efficiency; and consequently, the company achieves greater productivity and performance (Topa and Palací, 2004).

The age of the subjects of the psychological is determinant in this phase. Some authors have suggested that employee age affects the breach of psychological contracts differently, and therefore its maintenance phase. Older workers usually provide more stable psychological contracts (Rousseau, 2001), and react to possible breaches of the psychological contract from younger ones.

3rd Phase: Breach of Psychological Contracts

Breach is a "subjective experience, referring to one's perception that another has failed to fulfil adequately the promised obligations of the psychological contract" (Robinson, 1996). Robinson and Morrison (2000) distinguished breach from violation of psychological contract. Breach of psychological contract is a cognitive evaluation of what is received compared to what was promised. Violation would better describe the emotional and affective state that may follow this cognitive evaluation. Breach is less serious and a cognitive appraisal of the event, while violation is more serious and initiating behaviour, attitude, or emotional response beyond the cognitive appraisal. Breach or violation of psychological contract was found to be related to a lot of negative work attitudes and organizational consequences (see below).

However, it is important to note that there are two intermediate stages in the process of breaking the psychological contract. The first, *reneging*, occurs when one party knowingly fails to meet an

obligation or recognize the existence of an obligation between two parties, but refuse to comply. The second, *incongruence* which can result when an employee has perceptions of a given promise that differs from those held by the organizational agent or agents responsible for fulfilling that promise (Morrison and Robinson, 1997). Incongruence is when a promise is established or it can develop as time elapses and perceptions of promises decay or become distorted in memory. Thus, incongruence relates to a gap in the shared understanding between an employee and the organizational agent (e.g., the employer has a different understanding of the promised outcome), as to whether an obligation exists. These different perceptions result because the terms of a psychological contract are inherently perceptual.

This situation comes from three interrelated areas: (a) workers and organizational agents take part in employment relationship with different cognitive schemata, (b) obligation incongruence and (c) insufficient communication (Morrison and Robinson 1997). The direct results of the incongruence are the lack of trust between the parties, reducing performance and prosocial behaviour, and in contrast, intend to stay in business. This is the most common situation in business area (Turnley and Feldman, 2000) and may progress to the next stage, depending on the interpretation of the damaged party and how the other party responds to these circumstances, trying to respect their commitments and therefore, correcting the failure or not.

The intensification of the two previous intermediate stages generates the psychological contract breach as evidence of non-fulfilment arrangement. Seven reasons justify their existence: (a) the "delay" or sense of procrastination on behalf of the party in providing the obligations, (b) the "magnitude of discrepancy" or degree of lack of obligation that the party feels he or she should be receiving, (c) "type/form", where one party's obligations represent different qualifying standards from those expected by the other party; (d) the "inequity" or comparative analysis between what the participants are getting and what others of the same level in the same job type and/or organizational level are receiving; (e) the "reciprocal imbalance" refers to the sense of imbalance between what one party is receiving compared to what it is giving back to the other (adapted from Cassar and Briner, 2005); (f) the absence of "organizational responsibilities" for fairness and consistency; and (g) the incongruence between organizational culture and individual values.

Morrison and Robinson (1997) argued that the cognitive perception of a breach in a psychological contract will not necessarily result in the intense emotional reaction associated with the term psychological contract violation. These authors observe that explanations of the root causes of breach of contract may reduce the intensity of the emotional response.

The results of breach of psychological contract in behaviours, described by Rousseau (1995), are (a) the exit (termination of the relationship), (b) the voice (actions to remedy the violation), (c) the loyalty (silence, willingness to endure), and (d) the destruction (neglect, counterproductive behaviours). Herriot and Pemberton (1995) described those same behaviours as: 'get ahead' (voice), 'get safe' (loyalty), 'get even' (destruction), or 'get out' (exit).

The psychological contract breach has influence on some variables. Guest (2004) categorized the outcomes of non-fulfilment between attitudinal consequences and behavioural consequences. Attitudinal consequences are job satisfaction (Robinson & Rousseau, 1994; Gakovic & Tetrick, 2003; Johnson & O'Leary-Kelly, 2003), organizational commitment (Coyle-Shapiro & Kessler, 2000; Johnson & O'Leary-Kelly, 2003), trust in the organization (Robinson & Rousseau, 1994), emotional exhaustion (Gakovic & Tetrick, 2003) and cynicism (Johnson & O'Leary-Kelly, 2003). Behavioural consequences are job performance (Robinson, 1996; Turnley & Feldman, 2000; Johnson & O'Leary-Kelly, 2003), organizational

citizenship behaviour (Robinson, 1996; Coyle-Shapiro & Kessler, 2000; Turnley & Feldman, 2000; Lo & Aryee, 2003), absenteeism (Johnson & O'Leary-Kelly, 2003), turnover intention (Robinson & Rousseau, 1994; Robinson, 1996; Turnley & Feldman, 2000; Lo & Aryee, 2003) and actual turnover (Robinson & Rousseau, 1994; Robinson, 1996).

To reduce these negative effects of psychological contract breach is critical to the management of actual or perceived breaches or violations of the contract.

3.7. E-Human Resource Management: Information Management

Since last decade, technology and Internet development have had a profound effect on the field of HRM, promoting the implementation and application of electronic Human Resource Management (e-HRM). This concept is introduced as "a way of implementing HRM strategies, policies and practices in organizations through the conscious and directed support of and with the full use of web technology" (Rüel *et al.*, 2004). While a variety of definitions of the term e-HRM have been suggested, this paper will use the definition suggested by Strohmeier (2007) who saw it as "the application of information technology for both networking and supporting the interaction of a least two individual or collective actors in their shared performing of HR activities".

According to Strohmeier (2007), Information Technology (IT) has two different implications in e-HRM. First, IT is necessary to connect usually spatially segregated subjects and enable interactions between them irrespective of their working in the same room or on different continents, increasing their connection and integration. Second, IT supports subjects by partially – and sometimes even completely – substituting them in executing HR activities. Consequently, IT are tools for task fulfilment.

Both implications operate in a psychological contract management in several ways: (a) two internal subjects interact in order to perform psychological contract activities (employee and employer), (b) the connection between subjects becomes essential, independent of their location, and (c) the task fulfilment is crucial for both subjects, but especially by the employer. Therefore, e-HRM system provides some benefits, such as decreased transaction times, management of psychological contract content, administer compensation and benefit systems (Strohmeier, 2007). In addition, these systems increase the efficiency of HR processes, reduce administrative costs, give support to training and facilitate the information management between both subjects.

Information management is the management of the processes and systems that create, acquire, organize, store, distribute, and use information (Detlor, 2010). Its goal is to help people and organizations access, process and use information efficiently and effectively. The different state of psychological contract requires using and communicating information, as well as the correct establishment of psychological contract content.

A better study would examine a large group of selected Technology and tools that give support to e-HRM, especially on psychological contract management. Intranet, internal electronic mail, database, videoconference, groupware and business-to-employee are IT that help people carry out personal information management more efficiently and effectively (Jones, 2008). IT tools facilitate personal information management, improving communication, collaboration, knowledge acquisition and management. Now, a new need has arisen, the employees are required to develop and maintain professional networks, where they can exchange knowledge and skills, improving their professional efficiency (Surowiecki, 2004; Cross *et al.*, 2005). IT tools track down and contact co-workers and experts inside and outside the organization, keeping their interests, skills and role profiles updated at all times. Thus,

IT tools assist the establishment of organizational memory, its content can be used as a new source of organizational information by the workers. IT tools have consequently an important role in the professional activity and development of the employee and HRM.

Employees should be able to use IT tools to enhance their communication flow with the organization and its members. As it has been inferred previously, the communication process is a fundamental activity for both workers and organization agents, in the different psychological contract's phases. Consequently, if workers improve their skills and capabilities on managing IT resources, a higher degree or performance and job satisfaction will be achieved, leading to an improvement on their psychological contract.

Internet is not an e-HRM, but it is included in this study by its importance in some phases of psychological contract.

Another important factor to consider in the use of IT tools is the age of the staff (personal). It has been broadly demonstrated that younger people use these technologies more frequently, even in their personal environment. Consequently, the age should have a significant impact on the influence of IT tools in the psychological contract management.

In *formation phase*, e-HRM tools are very important to create the new psychological contract.

In *recruitment* stage, Internet is a relevant information source for any newcomer as information about the company's structure, services, target markets, quality certification or customer services can be made accessible through it. Large companies often include charts, news, social responsibility (policies and reports), organizational results, research and development activity reports, newsletters, customers', suppliers' and shareholders' spaces, and online services. Unfortunately, the abundant available information complicates the information search and the detection of interesting information (Martínez-León *et al.*, 2008). Although this tool is not an e-HRM, its great importance in this stage justifies its inclusion in the study.

In another sense, some companies develop an intelligent Web portal to serve as service providers in recruitment tasks. This portal aims at helping people to find a job. When the potential employees find this e-HRM, they start the formation of the psychological contract.

In the *socialization* stage, Intranet and internal electronic mail are e-HRM which help to configure the initial psychological contract. Intranet includes word processing, spreadsheet applications, database management, data analysis, graphics, and communications. In definition, intranet has a wide range of information about organization in general, and its organizational culture, strategy and HRM in particular, which is very important for the newcomer. Intranet's data visualization software, data collection and its ability to provide real-time feedback, makes it far easier to implement training and development initiatives (Denton, 2007), which are essential for any new organizational member.

Moreover, intranet technology allows sharing information, enhancing the organizational communication in general by supporting collaboration across departmental, functional and regional boundaries (Bernard, 1996; Scacchi & Noll, 1997; McNaughton *et al.*, 1999). This tool also supports organizational learning (Martínez-León *et al.*, 2008) and knowledge management (KM) processes (Scott, 1998; Alavi & Leidner, 1999).

The available functionality on the Intranet depends on the level of IT investment, the use of IT tools, its configuration and contents, its updates and internal control, and previous employees' Intranet experience. This is not a "packaged" technology with fixed attributes, but it is moulded and shaped according to the social forces at play in the organization (Hughes, 1987; Williams & Edge, 1996). The computer networks incorporate more significant, private and extensive information than any webpage. Hence, Intranet usually includes community news, message boards, notices of

upcoming events and HRM policies and systems (Arnold *et al.*, 2003). When the private network is more developed, it has available collections of documents and relevant information about organizational culture, corporate government, production systems, strategic plans, forthcoming marketing campaign, classified advertising, IT emergency, project management procedures and project evaluation, and newsletters.

If the Intranet radically changes its unidirectional role for communication and information channel, and is configured in a bidirectional sense, a new working space is created (Corso *et al.*, 2009). This new working space is characterized by a creative environment, focused on employees, their needs, specific working conditions and interactions with others. There, workers can find what they need to work, to learn, to meet and to interact with others (Corso *et al.*, 2009).

Intranets, in their actual configuration, emphasize internal information, build important links among organizations and their employees and improve the employee's vision of the organization. Intranets therefore allow the worker to consistently adapt his/her psychological contract content to the real and changing organization's situation.

An Intranet can also facilitate an ad hoc workstation at home, where the employee could connect to the company's network via VPN technologies.

These different possible utilities justify why the same technology can manifest completely differently in different organizational settings and have different effects on psychological contract formation.

Another important point about e-HRM in the socialization stage of the psychological contract formation is internal electronic mail. Electronic mail facilitates the exchange of information between individuals or groups by offline messages, which can contain documents, programmes, graphics and texts (Martínez-León *et al.* 2008). It allows the users (both workers and organizational agents) share employment relationship's information, which improves their understanding of psychological contract obligations and contents. Hence, this tool gives support to their employment relationships, improving the psychological contract management. However, it can create new problems, such as notably "information overload" or transmission of misleading messages, creating undesired confusion. These problems could make difficult the establishment of the initial psychological contract, so face-to-face contact is required to get a better result.

Thus, on the basis of above arguments we can assume that e-HRM tools facilitate the formation of psychological contract.

- **Hypothesis 1:** e-HRM tools have a positive effect on psychological contract formation.
  - **Subhypothesis 1a:** e-HRM tools have a positive effect on socialization stage as intermediate stage of psychological contract formation.
  - **Subhypothesis 1b:** Internet has a positive effect on recruitment stage as intermediate stage of psychological contract formation.

In Maintenance Phase, some e-HRM could help to consolidate the content of psychological contract, such as Intranet, business-to-employee, internal electronic mail, database, videoconference and groupware.

Intranet facilitates sharing, searching, exchanging and storing organizational, departmental and professional information in the organization, which can be exploited by both psychological contract subjects. The available information should be used to establish the definitive psychological contract content and, in the future, renegotiates their contents. In addition, if the computer network is highly advanced, new working space change employees' role (Corso *et al.*, 2009), varying the psychological contract. Consequently, Intranet is then already widely used as a managerial tool in the employment relationship during the maintenance phase of psychological contract.

A business-to-employee (B2E) system is part of a corporate Intranet (Huang *et al.*, 2004). This tool is an e-business initiative which if successfully implemented assists organizations in delivering useful services, information, or products to their disperse employees (Turban *et al.*, 2006). B2E provides mobile employees and organizational agent (managers and HR professionals) the freedom to access essential business services and data irrespective of location and technical infrastructure at hand.

Different typologies of B2E might support different aspects of maintenance of psychological contract: (a) Business-to-Employee (B2E) portal assists organizations in delivering useful information and services to their disperse employees/ organizational agent or with high geographical mobility which in turn creates productive employee relationships needed for psychological contract maintenance; (b) Business-to-employee messaging system is similar to an internal electronic mail, and refers a closed-loop message distribution system is disclosed for accepting documents from a variety or sources among two subjects; and (c) business-to-employee cooperation support proposes online interviews as a tool that allows subjects to gather interview information and assess cultural fit. Online interviews cannot replace the traditional face-to-face interviews, but can definitely provide the means to help disperse employees/ organizational agent or with high geographical mobility with interviewing challenges.

The internal electronic mail offers the promise of rapid communication of essential information (Pazzani, 2000), which should facilitate the adequate development of psychological contract. This tool also creates communication and cooperation channels with organizational people. These utilities improve the subject's vision about his/her employment relationship, favouring the concretion of psychological contract content. Nevertheless, communication is asynchronous, which does not allow both subjects to communicate in real time, reducing the capability of negotiation. For this reason, face-to-face contact is required to get a better result.

The databases are deposits of past data, internal information and knowledge, which permits interchanging information and creates knowledge (learning) (Martínez-León *et al.*, 2008). Both internal information and knowledge should be able to use in the concretion of initial psychological contract content. Thus, this tool creates and maintains an organizational shared intelligence and memory (Ruggles, 1998), which should provide important and useful internal information for organizational members. Consequently, this information should be extremely valuable and important in the creation and maintenance of the psychological contract. Therefore, databases reflect current and changing situations, which should improve the psychological contract arrangements and renegotiation activities among both subjects.

Videoconference permits simultaneous dialogue through a virtual interaction among people (De Geus, 1997; Davenport *et al.*, 1998), and the exchange of documents, files and shows. Consequently, the videoconferencing technologies facilitate the frequent exchange of information between remote subjects, their collaboration and the creation of cooperative settings in a fast and flexible way (Martínez-León *et al.*, 2008). Thus, this tool should be able to create, diffuse and negotiate of psychological contract content through their synchronous interaction with remote employees, colleagues and organizational agents, which enable to overcome geographical and time barriers in extended organization. Therefore, videoconference helps to adequately manage the psychological contract.

The groupware encourages efficient and accurate sharing of information and knowledge across organizational boundaries. Groupware is able to hide the identity of the participant, which makes it easier to share information and improve communication in a much more free-flowing manner than databases or intranet allow (Martínez-León *et al.*, 2008). If both subjects of the psychological

contract work in dispersed geographical areas, groupware facilitates the remote communication and transference of useful internal information, making the concretion and renegotiation of psychological contract content easy. Therefore, this tool facilitates the psychological contract management.

Internet is not an e-HRM, but its utilities facilitate the psychological contract maintenance. This technology facilitates the search and exchange of information about customers, suppliers, competitors, target markets and own organization (community manager). Hence, the adequate management of information allows detecting external and organizational changes. These changes can affect the arrangement obligations between the parties. Therefore, actual information allows concreting the definitive psychological contract content and its continue revaluation and renegotiation.

Psychological contract is established at a certain point in time, and it is assumed to be revaluated and renegotiated. The perceptions, expectations, beliefs, promises and obligations of employee and/or organizational agent are able to change; generating misunderstandings. In this situation, all technological tools give an opportunity to get interesting and right information for psychological contract maintenance, and facilitate its exchange and communication; maintaining or facilitating a healthy relationship between two subjects. Hence, IT tools facilitate the necessary revaluation and renegotiation of the psychological contract, getting reciprocal and balanced obligations. Therefore, e-HRM is helpful tools to improve the psychological contract management.

These arguments suggest that:

- **Hypothesis 2:** e-HRM tools have a positive effect on psychological contract maintenance.
    - **Subhypothesis 2a:** Internet has a positive effect on psychological contract maintenance.

In Breach phase, e-HRM helps and improves the psychological contract management, reducing its breaching. These tools diminish the *reneging stage*, because they mitigate the information asymmetry about two parties, disappearance of alienation in favour of a maximum transparency between subjects. e-HRM tools also reduce different incentives for opportunistic behaviour by the contracting parties.

Thus, e-HRM reduces the frequency and intensity of *incongruence stages* between both subjects. Technological tools improve communication, reduce obligation incongruence, and diminish the different perception about contributions and inducements. The main conclusion of the foregoing analysis is that e-HRM generates and provides clear information which solves the main sources of incongruence and conflict. However, these tools do not always reduce the different cognitive schemata of subjects.

In *violation or breach stage*, some e-HRM (intranet, electronic mail, database, videoconference and groupware) could help to solve the differences between both psychological contract subjects'. These tools facilitate the acquisition and exchange of correct information and improve their communication. Consequently, one party can share with the other party any well-grounded non-fulfilment or variations in psychological contract content; reducing the time and negative effect of this situation. However, continuous non-fulfilment of psychological contract obligations from anyone generates many requirements, which could worsen the situation.

Obviously, groupware is the less useful e-HRM in this stage, because it does not always facilitate the direct communication between two parties. Sometimes, groupware is used to anonymously announce any non-fulfilment obligations, which alert all groupware's members about them; giving an opportunity to resolve the controversy. On the other hand, Internet is not an e-HRM, but facilitates acquire external information, which could be useful to avoid breaching the psychological contract.

The previous arguments can be summarized in:

- **Hypothesis 3:** e-HRM tools have a positive effect on psychological contract breach.
  - **Subhypothesis 3a:** e-HRM tools have a positive effect on psychological contract reneging stage.
  - **Subhypothesis 3b:** e-HRM tools have a positive effect on psychological contract incongruence stage.
  - **Subhypothesis 3c:** e-HRM tools have a positive effect on psychological contract breach stage.
  - **Subhypothesis 3d:** e-HRM tools have a positive effect on psychological contract violation stage.
  - **Subhypothesis 3e:** Internet has a positive effect on psychological contract breach.

Therefore, e-HRM tools improve human resources management, with special influence in their psychological contracts, which attract and retain talent in the organization. The breach of psychological contract is minimized, reducing the mentioned losses associated. Hence, HRM might be able to improve the organizational management. Then, the firm creates values and can generate and maintain a competitive advantage.

4. CONCLUSION

The findings of this study contribute substantially to the general view of psychological contract concept and the contribution of e-HRM tools in its adequate management. Recently, a new approach to employment relationship has emerged, where the psychological contract reaches wide importance in organizations as a determinant of the employment relationship. The psychological contract contains a set of perceptions, expectations, beliefs and obligations, based on explicit or implicit promises, exchanged and shared by employee and employer. Its content is reciprocal, subjective, dynamic, and derived from a social process. Hence, the psychological contract is an implicit contract, unique and can reach an unlimited number of formats.

This study also focuses on the different statements of the psychological contract: formation, maintenance and breach. Departing from the psychological contract *formation phase*, all stages and processes to create the psychological contract have been considered. Intranet and internal electronic mail are facilitating tools for the psychological contract formation, during socialization stage. Internet is a useful tool in recruitment stage. In a similar way, the *maintenance* of psychological contract includes some process and can be facilitated by different e-HRM tools (Intranet, business-to-employees, internal electronic mail, databases, videoconference and groupware). Finally, the *breach* of psychological contract has two intermediate stages, and numerous and important consequences. E-HRM tools can apparently reduce the number of incongruence and reneging, and decrease the number and effect of breach or violations of psychological contract. These findings suggest interesting and useful implications for future research and for organizational practice. Three main hypotheses about the role of e-HRM on psychological contract and subhypothesis have been proposed, which should be testing future empirical research carried out in the companies.

Consequently, E-HRM tools can not be viewed as a means of reaching higher levels of productivity and managerial results, without a way of providing basic information to organizational members, which plays a significant role in enhancing employment relationships and, consequently, human resource management.

Some limitations to this study must be noted with respect to future theoretical and empirical research. First, the age of the employees has influence on psychological contract management; whereas older employees have a more stable psychological contract than younger ones. Several

reasons justify this reality. First, older employees have more realistic expectations regarding the compensation. Second, they have fewer options to achieve real employment in other organizations (Hedge *et al.*, 2006). As a result, and thirdly, they better regulate their emotions to possible breaching of the psychological contract (Carstensen *et al.*, 2003). Fourth, in a near withdrawal, older workers strive to positively intensify all their experience to keep their job, because it may be the last one before retirement (Carstensen *et al.*, 1999). Fifth, they focus on more positive aspects of relations with the organization, seen as less affected by negative events (Bal *et al.*, 2008). And finally, these workers should receive higher satisfaction of other factors outside work, such as family, hobbies and community (Clark *et al.*, 1996).

However, younger employees should be able to adapt better than older ones in a rapidly changing environment, renegotiating their psychological contract. Thus, younger employees have higher computer literacy than older ones. The benefits of e-HRM tools in the psychological contract management also intensify the actual tendency to generate greater entry for younger employees relative to older ones. Consequently, when organization uses e-HRM tools, organizations are more reluctant to hire older employees and tend to favour younger ones (Aubert *et al.*, 2006).

Secondly, the size of a firm plays an important role in terms of HRM (Kotey and Sheridan, 2004) and the e-HRM tools investments. In fact, larger organizations have more sophisticated recruitment structures and process than smaller one. Barrett and Mayson's (2007) reveal that growth-oriented firms have more formal HRM practices. On the other hand, large organizations invest a lot in technology adoption and use, developing more e-HRM tools' functionalities and getting better HRM.

Thirdly, the efficient usage of e-HRM tools is closely related to a wider comprehension of information management and contribution to organizational performance. IT tools should be understood as a part of organizational information context and its usefulness is influenced by organizational culture, values and principles concerning strategic information management.

Despite these limitations, to our knowledge this research is the first to systematically examine the influence of IT tools on psychological contract management.

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KEY TERMS AND DEFINITIONS

e-HRM: A way of implementing HRM strategies, policies and practices in organizations through the conscious and directed support of and with the full use of web technology.

Information Technologies: The broad range of technologies involved in information processing and handling, such as recording devices, communication systems, computer Systems (including hardware and software components, and data), and other electronic devices.

Psychological Contract: Includes the implicit and specific terms and conditions of the employment relationship, not regulated nor specified in a formal written contract, which has a central role in work behaviour and determine the relationship between employee and employer (organizational agent).

Psychological Contract Content: Refers to the unwritten expectations, beliefs, obligations, promises, and perceptions that are a powerful determinant of workplace behaviour and attitudes, determining the relationship between employee and employer (organizational agent) and, consequently, the employment relationship.

Psychological Contract State: Refers to a relatively stable base level from which changes in the nature of the employment relationship can be judged.

ENDNOTE

[1] Masterson *et al.* (2000, p. 740) observe, "…an employee is involved in at least two social exchange relationships at work: one with his or her immediate supervisor, and one with his or her organization."

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Chapter 70
Understanding How Incentives Influence Motivation and Retention of Health Workers

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ABSTRACT

A critical factor in addressing the human resources crisis in low and middle income countries (LMIC) is the ability to recruit, motivate, and retain health workers. Failure in this area is one of the main causes of decline in availability of services and quality of care. Various financial and non-financial incentives have been implemented and this chapter will explore available evidence to see whether they have influenced motivation. Additionally, Maslow's hierarchy of needs is used to determine if there is a hierarchy of how incentives are valued. While Maslow's model is a useful tool to classify themes of health worker needs, it would appear that workers are motivated without each level having to be fulfilled in turn. While financial incentives may help with retention, they can cause erosion of professional ethos, do not increase job satisfaction, or act as motivators to perform well. More research needs to be done in order to design more effective human resources strategies.

BACKGROUND AND CURRENT UNDERSTANDING

Efforts to improve access to health services across the world are being constrained by severe shortages of health workers. Without the appropriate number of health workers it is not possible to deliver services effectively and efficiently. The human resources crisis is particularly evident in sub-Saharan Africa, where triple the current number of health workers, or at least 1 million more, are needed if they are to come close to approaching the Millennium Development Goals (MDGs) for health (Chen et al., 2004).

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There are three major factors affecting health workers, namely the AIDS epidemic, the migration of skilled labour (the "brain drain"), and a history of massive underinvestment in human resources. These factors are affecting the low and middle income countries (LMICs) the most and placing additional strains on already fragile health systems (Chen et al., 2004).

The AIDS epidemic is challenging capacity particularly in sub-Saharan Africa where services are being completely overwhelmed with people who need treatment, as well as by reducing the number of health workers, who are themselves dying from the disease. Health workers are directly impacted through increased workloads and increased exposure to the risk of contracting HIV through a work related injury. Morale is further reduced as health workers see increased numbers of their patients dying (Chen et al., 2004).

Health worker migration is not confined to international movement; internal migration is also widespread, with workers moving from rural to urban areas and from public to private practice. Rural areas have been worst hit by migration leaving many rural facilities understaffed, and this is affecting the morale of staff who remain there (Awases, Gbary, Nyoni, & Chatora, 2003). Despite evidence showing the detrimental effect of migration of health workers from LMICs, many high income countries have grown reliant on importing health workers from these countries (Hongoro & Normand, 2006).

Early responses to the shortage of skilled health workers in LMICs have focused mainly on issues of training capacity, but it has become increasingly clear that the more important issues are of incentives, retention, and motivation of those who remain. Until issues that are leading to "de-motivation" of health workers are addressed, high quality care cannot be provided (Agyepong et al., 2004). There is evidence, particularly in Thailand (Wibulpolprasert & Pengpaibon, 2003), of incentives that can retain and motivate health workers. Both financial and other incentives are important in motivating professionals, but such research also shows that the necessary financial incentives may involve very large increases in salaries. This is often not a sustainable option and so alternative incentives must be found and put into place.

It is important to note that the human resources crisis is a worldwide phenomenon and all countries, rich or poor, are affected by imbalances in their health workforce. It is estimated that by 2011 Canada will have a shortage of 78,000 nurses (Gagnon, Ritchie, Lynch, & Dronin, 2006). The shortage is being created by not enough people being attracted to the profession, in addition to the increased care demands created by an aging population. A study of nurse retention found that only 50% had a firm intention to stay in nursing. The main sources of dissatisfaction cited included lack of professional support and recognition, heavy workload, lack of equipment, and poor physical work environment (Gagnon et al., 2006).

While this chapter will focus mainly on the situation in LMICs, as they are affected by the greatest burden of disease, migration, and chronic underinvestment in health care, we will also look at challenges surrounding motivation and retention of health workers in high income countries. It is critical that all countries implement health plans to reflect the heath needs of their population and workforce strategies must be put in place to facilitate this. Furthermore, if issues surrounding motivation and retention were to be addressed in high income countries it may reduce their dependency on recruiting health workers from LMICs. Therefore, it is clear that a better understanding of the critical factors influencing human resources capacity is needed globally in order to deliver equitable, effective health care.

First the literature around motivation, incentives, and retention will be reviewed and it will be important to see how much of this is actually borne out in practice. In particular, the authors ask several questions:

- What incentives are being provided to retain and motivate people?
- What incentives positively affect the retention of staff and their motivation to do their job well?
- Are some incentives more important than others?
- Are incentives addictive and do some compete with others? Furthermore, can incentives that help retention impede motivation?
- Is there a sequencing of health worker needs as seen in Maslow's hierarchy of needs?

The remainder of this chapter seeks to draw together evidence to answer these questions and draw out some policy implications. There has been an explosion in human resources research over the last decade, however while not all the evidence exists in the published literature to definitively provide answers to all these questions, it is worth reviewing the available material. Furthermore, the raising of important questions is still useful, not least in identifying gaps and important areas for further research.

A Review of Current Understanding and Key Concepts

While recent research has had an understandable focus on retaining health workers in LMICs, retention is an issue that affects health workers globally. There is no guarantee that retained health workers will be productive or motivated to provide a high quality of care. Retention does not guarantee productivity and it is debatable whether retention even in rural and remote areas without productivity is better than no retention. Retained staff may simply be stuck for alternatives or apathetic about moving. Governments can hire health workers to improve the health system but governments must also ensure that these workers will act in the best interests of the health system and so make the investment worthwhile. Given such concerns about both the retention *and* productivity of health workers it is worth reviewing some key concepts in the literature and theories about the importance of different types of incentives.

The authors take *retention* to be concerned with maintaining staff in post and not losing them to other organizations or to migration. This is one of the key objectives of managing human resources (Salaman, Storey, & Billsberry, 2005). Management needs to be particularly concerned about poor retention of highly skilled cadres because of the scarcity of such labour and the economic investment needed to develop staff with the right skills. Different dimensions of retention that health system analysts are typically interested in relate to:

- loss from public service,
- loss from rural/underserved areas, and
- loss from the country (emigration).

Motivation is a more debated concept and there are several streams of thought about what motivates people to action (Ramlall, 2004). Nevertheless, it is agreed that motivation can be seen as "as a psychological process that causes the arousal, direction and persistence of voluntary actions" (Mitchell, 1982) (pg.81). This has been adapted to a more practical definition within the health sector, with motivation being defined as "an individual's degree of willingness to exert and maintain effort towards organizational goals" (Franco, Bennett, & Kanfer, 2002, p.1). In this context motivation is job-specific and related to delivering mandated health services. Motivation is paramount to achieving higher productivity within the health sector, but is not sufficient by itself to ensure effective health care provision, as infrastructural conditions and other contextual factors may also have an impact.

A related concept to both retention and motivation is *organisational commitment* which represents an employee's attachment to the organization for which they work. Meyer and Allen (1991)

explore different components of this whereby the employee:

- Wants to belong to the organisation (they like it, desire to work there) – *Affective Commitment*
- Has to belong (through economic necessity, lack of alternatives, or has invested in the job) – *Continuance Commitment*
- Ought to belong (they feel a moral obligation – either through their own set of values or they feel the need to pay back the organisation) - *Normative Commitment.*

In a fascinating article, Meyer and Herscovitch (2001) explore how these different components of commitment impact on behaviour (i.e., in terms of staying in the organisation, doing what is required, and doing more than what is required). Affective commitment is the most important in terms of the probability of employees doing their focal work and going above and beyond their duties. High normative commitment alone leads to a high probability of employees exerting effort on key tasks and a lower probability of exerting effort on extra tasks. High continuance commitment alone suggests employees will, on balance, exert effort on doing what is required but will not exert effort on extra tasks. Consequently, health workers with continuance commitment will be retained, but their motivation is low and health system productivity will also be low.

Two different areas of motivation are often confused: motivation to be in a job and motivation to perform. Retention does not ensure job satisfaction and/or exertion of effort to achieve mandated goals. In this regard, Herzberg (2003) reviewed intrinsic and extrinsic factors which impact on levels of job satisfaction. Intrinsic factors relate to job content, e.g. achievement, recognition for achievement, the work itself, responsibility, growth or advancement. Extrinsic factors relate to features of job context or conditions and include company policy and administration, supervision, interpersonal relationships, working conditions, salary, status, and job security ("job context").

Herzberg maintains that if intrinsic factors are satisfied workers are encouraged to work harder and better. Extrinsic factors, in contrast, are more related to accepting and being retained in the post. In summary, salaries and working conditions are important to retain staff and produce continuance commitment, but alone are insufficient to lead to better staff performance. Recognition and feelings of achievement are more likely to influence staff motivation, effort and, therefore, performance.

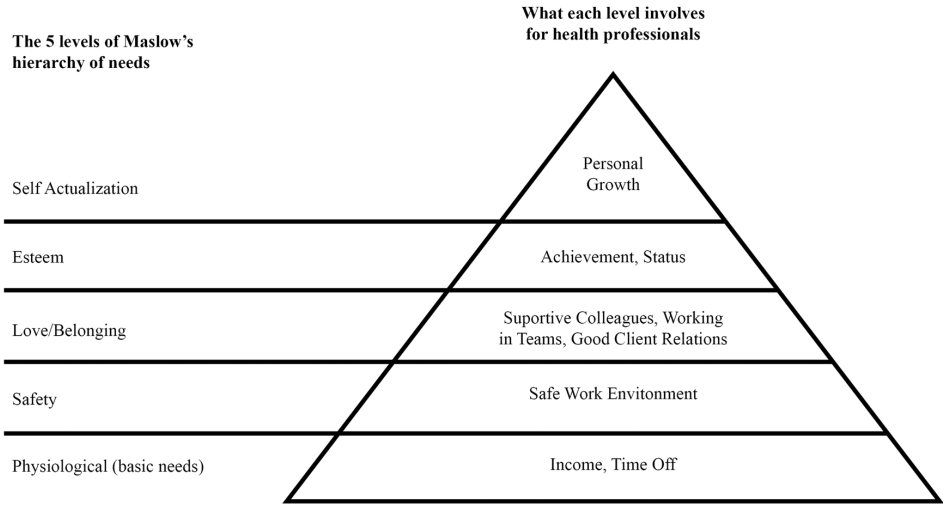
A Hierarchy of Needs?

Maslow (1943) proposed a hierarchy of needs for individuals that has been an extremely influential paradigm for exploring behaviour and motivation. The model has five levels, or sets of needs. Each level must be fulfilled before the individual can progress or turn his/her focus to the next level. There is thus a natural sequence of needs; once needs have been met in the lower level these will no longer be prioritized.

The first level is associated with physiological needs which must be met for the human body to survive and include the need for water, air, and sleep. The highest level is self actualization, where there is a desire for self-fulfilment in order to reach personally set goals. Spear (2006) has translated these needs into a healthcare system setting, where the levels correspond to health worker needs. The lowest level corresponds to basic work needs, such as income and time off, level two is a safe work environment, level three is a supportive working environment, level four relates to achievement and status and the highest level is personal growth. All of these levels are outlined in Figure 1.

Spear (2006) conducted a study in Australia to determine what motivated mental health professionals using Maslow's hierarchy as a framework. It was found that esteem and self actualization were powerful motivators. Additionally, reasons

Figure 1. Maslow's hierarchy of needs and what is included in each level for health professionals



cited by health professionals for wanting to perform well in their work included "sense of achievement", "helping others", "contributing to the community" (esteem values) and "personal development and fulfilment" (self-actualization values).

Measures can be taken to ensure that Maslow's hierarchy of needs can be met in the workplace: basic needs through fair payment and reasonable working hours; security through having a safe and functioning workplace; social belonging through encouraging team work and formation of good relations with patients. Esteem can be fulfilled by providing training opportunities, career development, and celebrating success; and finally self actualization can be met by job variety (for instance, combining clinical work with research or teaching) and the ability to do meaningful work (Spear, 2006). The Maslow model and its adaptation present a means for understanding what health worker needs are irrespective of a developing or developed world context.

EVIDENCE ON INCENTIVES

Motivational indicators (both positive and negative), such as longer working hours, doing a second job (or private practice), lower absenteeism, provision of better quality of care and job satisfaction can be used to try and evaluate whether incentives are improving motivation.

Incentive packages have increasingly been introduced into many countries and there is growing literature on assessing the impact that incentives have had on the ability to recruit, retain, and motivate health workers (Bennett, Gzirishvili, & Kanfer, 2000). Additionally while health reforms are not generally designed with the goal of increasing motivation, the changes in overall organisational relationships and economic incentives which often go along with these reforms frequently do have an impact on motivation (Abzalova, Wickham, Chukmaitov, & Rakhipbekor, 1998).

Studies reviewing incentive packages have reported mixed findings on their impact on motivation. It is often found that where financial incentives have been introduced these have been unequally distributed and that inadequate opportunities for career development and training remain

(Awases et al., 2003). A review of non-financial incentives in East and Southern Africa found that there was widespread evidence that incentives are being used to address training, career development, and social needs (e.g. housing, provision of childcare, staff transport); improved working conditions; development of human resources management (HRM) systems; and workplace HIV programmes. However, there were no clear plans for monitoring and evaluating the incentives to determine the impact on motivation and retention. There is some evidence that training programs have encouraged workers back to the public sector, but information is limited and, as these incentives were in conjunction with financial incentives, it is difficult to attribute any success purely to the non-financial incentives (Dambisya, 2007).

A recent systematic review explored initiatives to promote motivation in LMICs and identified seven major motivational themes (Willis-Shattuck et al., 2008). These are: financial rewards, career development, continuing education, hospital infrastructure, resource availability, hospital management, and recognition/appreciation. It is clear that financial rewards are a core motivational factor; however, they cannot be implemented alone, as career development and management issues are highly influential motivational issues. Furthermore, recognition was found to have a powerful effect on motivation.

Management of health workers is an important determinant in health worker motivation and can significantly affect general satisfaction, organisational commitment, and indeed improve relations between management and other staff members. Health workers need to have a clear job definition that gives guidelines to the worker, as well as guidelines to the supervisor for assessing their performance (Bennett et al., 2000). For this reason supportive supervision, performance appraisal, career development, and transparent promotion have been prioritised in many motivational programmes (Manongi, Marchant, & Bygbjerg, 2006).

While this highlights the importance of financial and non-financial incentives, there is insufficient evidence on the impact that each incentive currently being implemented is actually having on motivation and retention.

The Importance of Financial Incentives

Remuneration has been cited by some analysts as the single most important intervention that can improve motivation (Bennett et al., 2000). If workers are paid a fair salary it means that they will not spend time looking for ways to increase their income either by searching for new jobs with higher salaries or through income generating activities to supplement their salaries such as drug stores, private practice, agriculture, and informal fees as is often the case in LMICs (Dieleman, Viet Cuong, Vu Anh, & Martineau, 2003; Kyaddondo & Whyte, 2003). Certainly virtually all initiatives in LMICs to increase health worker retention and motivation give a prominent place to financial rewards (Willis-Shattuck et al., 2008).

Maynard (2006) classifies incentives as implicit or explicit, both of which have internal and external components. Implicit incentives refer to issues around trust, for instance, with physicians seen internally through their Hippocratic Oath and externally through patient confidence that supports the belief that they are trusted. Explicit incentives revolve around regulation by authorities (internal) and payment (external). In the context of European health systems, Maynard (2006) documents the decreasing reliance on implicit incentives with the increased use of financial incentives to motivate providers.

Nevertheless, it is important to reflect on the precise financial incentives offered. The type of incentives available will affect the behaviour of providers and hence the quality of care received by the patient (McPake & Normand, 2008). In health care there are generally three methods of payment: salary (time rates), fee-for-service

(piece rates), and capitation (being paid for each person on a practitioner's patient list). Fee-for-service is a direct inducement to increase activity. It encourages physicians to see more patients and perform more procedures. Once a fee has been introduced it is difficult to remove it. Capitation and salaries may induce under-treatment and the shifting of tasks (i.e., junior doctors and nurses having to carry out complex tasks) (Maynard, 2006). In their systematic review, Chaix-Couturier, Durnand-Zaleski, Jolly, and Durieux (2000), note that providers paid on a capitation basis for their patients would supply up to 25% fewer prescriptions than those paid on a fee-for-service basis.

Maynard (2006) confirms that the method of payment can affect motivation, with fee-for-service acting as an incentive to increase activity, whereas other payment methods, such as receiving a salary based per unit of time worked or capitation may act as an incentive to decrease activity. Conversely, in Rwanda, capitation payments have created an incentive for health workers to focus on preventative health care and only provide necessary services (PHR*plus*, 2002). This in turn has motivated attention to patient satisfaction and quality of care. Capitation payment has been coupled with a performance-based payment to providers in Egypt, leading to decreased patient waiting time and delivery of preventative care being rewarded (PHR*plus*, 2002).

A more fundamental critique of the "finances first" approach is given by Bowles (2008), in his review of economic experiments. He argues that economic incentives may have unintended but counter-productive effects:

- when they promote selfishness,
- compromise an individual's sense of self-determination and degrade intrinsic motivation,
- or convey a message of distrust and disrespect.

Bowles claims that people act in a certain way so as to be perceived of as a certain type, i.e., a good person or one esteemed by others, and not just to acquire economic goods. Economic incentives may both undermine esteem and create a culture where economic incentives are more important than morals. In addition some may argue that if wages are increased that this will not act as a motivator to perform well, but will only motivate people to seek the next wage increase.

In Le Grand's important article (1997) on human behaviour and social policy he asks whether it is more effective to treat people as "knights" who will work altruistically, or as "knaves" who are solely devoted to self-interest. Certainly he notes a move toward people focusing on self-interest as part of social policy. He notes that by introducing incentive patterns which focus on self-interest these may effectively undermine more community-serving goals (see also Goodin, 1996; Pettit, 1996). In effect a culture of self-interest may follow that changes behaviour and the factors that impact on motivation. Hence financial incentives may well undermine other forms of motivation, and care is needed when using financial incentives, as rewards are often related to activity rather than to indicators of patient satisfaction or quality of care.

It can be argued that increasing pay is only a temporary measure in terms of satisfying the recipient. It may well be that the more providers earn the more they want. Increasing remuneration may wet the appetite for more and that creates a real challenge for policy makers as continual increases are not sustainable. Additionally, salary may be effective in terms of drawing people to facilities, but may not motivate health workers to perform well. Furthermore, salary increases are often not uniformly implemented across all levels of workers and this can lead to discontent

Professional Ethos

Health workers are not just interested in salary and career, but have often gone into the profession because they want to help others and they have an intellectual interest in medical matters. Professional ethos is particularly strong amongst health workers, as their main priority is the well being of their patient and this has a major influence in their motivation to perform their duties (Mathauer & Imhoff, 2006).

It has been found that health workers working in resource-poor areas are often "de-motivated" as they are unable to satisfy their professional conscience because they have not been able to provide the best standard of care (Mathauer & Imhoff, 2006). Often how health workers perceive their relationship with the community affects their job motivation and performance (Ssengooba et al., 2007). Nevertheless, lack of resources does not affect professional ethos and the desire to provide care for people. In countries where there are minimal resources, health workers have stated that they were encouraged by being useful to society and taking care of people (Dieleman, Toonen, Touré, & Martineau, 2006). Additionally in Zimbabwe, nurses working in the public sector were highly motivated to perform well despite increased pressures due to lack of resources and HIV/AIDS (Stilwell, 2001).

It is important to review whether professional ethos changes as incentives become more widespread. Is there evidence of a culture of incentives that ultimately de-motivates health workers and undermines their professional ethos? Experience in China has found that financial incentives have a powerful effect on the behaviour of physicians, leading to an erosion of their professional ethos. Bonuses are tied to revenues and profits so physicians over-prescribe drugs and expensive tests; for example 75% of patients suffering from a common cold were prescribed antibiotics when this was not necessary (Hsiao, 2008). However, in this review of physician behaviour in China there is no information given about the motivational levels of the physicians and it is likely that they have resorted to being driven by profit because they are poorly paid and have not been set appropriate performance targets.

More Evidence of Incentive Conflict: Use of Informal Fees

Informal fees are unreported payments or unregistered illegal payments that are received, either as cash or gifts, in exchange for the provision of a service (or of a faster or better service) that was officially free (Balabanova & McKee, 2002).

There is growing evidence that use of informal fees for health care services are common place in many LMICs (Gaal, Belli, McKee, & Szocska, 2006). In fact, a relationship between inadequate salaries and the opportunities to raise income by charging informal fees has been strongly suggested (Ensor & Witter, 2001; Gaal & McKee, 2005; Lewis, 2007; Muula & Maseko, 2007).

Informal payments are reported to have a negative impact on equity and quality of care (Balabanova, McKee, Pomerleau, & Haerpfer, 2004; Falkingham, 2004; Maestad & Mwisongo, 2007; McPake et al., 1999); however, it has also been suggested that they may contribute to health worker motivation and retention (Ensor & Witter, 2001; Van Lerberghe, Conceica, Van Damme, & Ferrino,2002).

However, the relationship between motivation, retention, and seeking additional income in the form of informal charges may not be straightforward. The use of such a practice can cause rivalries among health workers due to competition, particularly among the lower cadres of workers who do not receive a high share of the payment (Maestad & Mwisongo, 2007). Furthermore there is evidence that this practice can de-motivate health workers more than motivate them through feelings of guilt and general discomfort from charging patients additional fees, especially in rural areas where patients are poor. Given the significance

of motivation and retention issues in human resources for health, a better understanding of the relationship between informal payments and motivation is needed. Consequently the authors explore associations between motivation, retention and informal payments using a case study from Tanzania.

Tanzania: A Case Study

The authors carried out a study in the district of Kibaha, Tanzania to investigate whether informal payments from patients to health workers were being used and, if they were, to determine if they had a motivational effect (Stringhini, Thomas, Bidwell, Mtui, & Mwisongo, 2009). Focus groups were conducted in three facilities and a total of 64 health workers, from different cadres, participated in the discussions. Ethical clearance was obtained to conduct the study.

The study confirmed the use of informal payments and interestingly it was found that these payments were more commonly patient-initiated, rather than provider-led. Informal payments were found to be used in order to obtain better or faster services, for example, by jumping the queue, or in order to access private health services.

It was found that in general, health workers were not satisfied with their jobs. The main source of dissatisfaction was low salary and difficult working conditions and it was felt that salaries were not adjusted according to risk and responsibilities.

Although informal payments provide additional income for health workers, it was found that they do not have an overall positive effect:

"I just want to say that for those who are engaged in informal payments they are not happy of that." (Health Worker, Dispensary of Mwendapole)

Health workers said that informal payments were a type of bribery, making them feel enslaved by their patients and resulting in loss of self-esteem:

"Bribery is a torture to health attendants, because even when you succeed to receive bribery from a person or patient then you will be locked to him for he won't allow you to serve anyone else than him."(Midwife, Tumbi Hospital)

Furthermore, there was a feeling of guilt and discomfort as health workers knew they were involved in a situation that has serious consequences on poor peoples' access to health services.

"On my side bribery is a trouble and a disturbance, and pity to those who are unable to give anything to be treated."(Midwife, Tumbi Hospital)

Informal payments appear to be contributing to an environment of corruption and dishonesty which in turn creates dissatisfaction, discomfort, and de-motivation among health workers. Fear of detection was another major de-motivating factor. All these factors appear to counterbalance the positive effect of receiving the additional income.

"When you receive bribery you become uncomfortable, even if you receive corruption from patient you become afraid, you become insecure in such a way that sometimes when you hear a knock in your office you become afraid or if one talks about bribery you become confused. We don't like this situation, really it's not good." (Midwife, Tumbi Hospital)

Informal payments were not found to be strongly related to retention of health workers. However in this setting there was not a great interest in moving from working in the public sector to the private sector. In fact, the private sector was not always viewed favourably.

"Some hate to be in private sector simply because there is no job security, people are offended, no job satisfaction, tyrannies, and you can even lose the job anytime."(Doctor Specialist, Tumbi Hospital)

In general, money was not found to be the most important factor in the decision to stay in the public sector. First of all, job security was mentioned as extremely important. Additionally, opportunities for further education and training were considered important by certain categories of health worker, such as nurses and midwives. Mid-level providers, namely the clinical officers, reported that due to their "non exportable skills" it meant they were not able to switch to the private sector or to migrate so easily, so they are being retained in their current jobs often because there are no other options.

This study showed that the practice of informal payments contributes to general de-motivation of health workers and negatively affects access to health services and quality of the health system. Policy action which not only provides better financial incentives for individuals, but also tackles an environment in which corruption is endemic is needed. In addition, this study shows that patterns relating incentives, motivation, and retention may depend on the local context. In the particular context examined in this study, financial incentives, when obtained in an illegal and uncomfortable manner, were counterbalanced by non-financial factors and contributed to de-motivating health workers more than motivating them. Moreover, in a context of high unemployment, health workers may respond to non-financial incentives, such as job security, in their decision to stay in the public sector, instead of switching to the private sector for higher salaries.

What Is An Effective Incentive Package?

It is widely agreed that financial incentives alone are not sufficient and any incentive package must include non-financial incentives. There is currently limited information about the effectiveness of incentive packages as there is little rigorous monitoring and evaluation being conducted. Furthermore it is often difficult to attribute outcomes to a specific element of a broad package. However, characteristics for effective incentive schemes have been identified (Weller, 2008) and these are:

- has clear objectives
- is realistic and deliverable
- reflects health worker needs and preferences
- is well designed, strategic and fit for purpose
- is contextually appropriate
- is fair, equitable and transparent
- is measurable
- incorporates financial and non-financial elements.

Success of retention strategies has been documented in Thailand, Uganda, Canada, and the U.K. (Baumann, Yan, Degelder, & Malikov, 2006). Each country has made considerable investments in health with a comprehensive health policy framework and a professional body in place to ensure strategies were being implemented. All strategies focussed on financial and non-financial incentives. Uganda, for instance, from 2001 to 2006 had several policies which included: increased numbers of nurses, upgrading of skills, harmonisation of posts, opportunities for professional development, increased salaries, housing allowances, lunch allowances, and special allowances/incentives for health workers in rural areas (Baumann et al., 2006). Although no data is available for the number of nurses currently retained by these interventions, Uganda has a relatively low number of health workers considering emigration (Awases et al., 2003). Furthermore there is no information about health worker motivation and how this has been affected by the retention strategies. However, it would appear that a similar, multi-faceted approach as used in Uganda could be applied in other settings.

REVISITING MASLOW

It is important to review the evidence and consider whether there is a hierarchy of needs for health workers. Maslow's hierarchy of needs has been used as a model for understanding motivation in business (Benson & Dundis, 2003) and, if this were to be the case for health workers, it would make sense that incentives to improve motivation would target each level in turn, starting at the basic level of fulfilling financial needs and, once this has been achieved, to progress to fulfilling needs of safety, and so on (see Figure 1).

There are arguments for and against the concept of a hierarchy of needs for health workers. It is evident that multiple factors are needed for a health worker to be motivated and clearly financial needs must be met first, particularly for those who work in resource poor settings. Conversely, in high income countries general practitioners are less interested in salaries, but more interested in job quality and opportunities of teaching medical students (Van Ham, Verhoeven, Groenier, Groothoff, & De Haan, 2006), thereby illustrating that they have fulfilled the first level of the hierarchy and are now looking to fulfil levels higher up in the sequence.

Issues of safety are a very real concern for many in LMICs where there are poor and often hazardous working conditions. Willis-Shattuck et al. (2008) note that health workers are working in conditions where simple protective measures, such as gloves, are not available to them. This is contributing to the risk of infection from HIV and other communicable diseases. Conversely in high income countries safety was not perceived to be an issue as work environments tend to be well resourced, thus minimizing the risk of hazardous incidents (Spear, 2006). Again, this shows that once safety needs have been met, it is possible to concentrate on fulfilling higher needs. Furthermore, there is overwhelmingly evidence that belonging and esteem are a major theme and effective human resources management strategies are important to their fulfilment. It could be argued that once financial needs have been met and the worker is in a safe environment it is natural that the next needs which need to be fulfilled are those of belonging and esteem. What this means in terms of motivating health workers through incentives is that an approach would need to be taken to ensure that all needs are being fulfilled sequentially.

However, it can also be argued there are several sets of needs, as outlined in Figure 1, but these do not have to be fulfilled in sequence. A health worker can be motivated while not having satisfied each level in turn. Although financial interests must be met, we have presented evidence that there is a price to pay for using financial incentives and that increasing financial incentives may actually produce de-motivation. They also appear to have an eroding effect on some of the "higher needs" such as esteem and belonging. Furthermore, increasing financial incentives for some cadres or departments and not others may produce de-motivation for those who don't benefit. This is likely to create tension and result in difficulties within the work place environment. Hence, different incentives may not only de-motivate some, i.e., those who don't receive them, but may also produce a general malaise in the workforce.

The power of non-financial incentives used on their own without any financial influence has been demonstrated in Zambia. A study (Furth, 2006), in which one district had a financial incentive and the other had a non-financial incentive in the form of performance awards found that workers in the district with the financial incentive were frustrated and distrustful of the incentive and it had no impact on motivation. However, in the district with the performance awards, that were awarded to teams rather than individuals, workers were motivated and encouraged to do well and felt that they got better support from their supervisors (Furth, 2006). Nevertheless, the interpretation of this may be questioned. It may be claimed that Zambian staff had their basic needs (namely salary) met first and

so were more amenable to higher level pursuits. Nevertheless, given the systemically low levels of salary and remuneration in Zambia and the activation of additional financial rewards in one pilot, this is highly unlikely.

How an incentive is valued will also depend on the profile of the worker, with age, gender, number of dependents, stage of career, and professional background all acting as influential factors (Reid, 2004). There are suggestions that those with families place greater value on income and social factors, such as schools, and young workers place greater value on post-graduate training and career development (Reid, 2004). Additionally people will have their own set of personal values which may influence their decision to work in a rural or urban setting or in private or public practice.

There is limited information regarding how motivational factors are valued by different cadres. A recent study in Malawi (McAuliffe, 2008) has found that mid-level medical cadres are significantly more dissatisfied than nurses. Their main frustration is the lack of continuing education and career progression available to them, whereas nurses were more likely to cite income as the main reason for considering migration. This is consistent with other findings (Willis-Shattuck et al., 2008) which suggest that nurses rank financial rewards higher than other cadres. This is likely to reflect the fact that they are poorly paid and work long hours.

On balance, the required ordering and mix of incentives is more complex than portrayed by Maslow's hierarchy of needs, where a person will not progress from one level of need to the next without having fulfilled that level. Many workers in developing countries are motivated to help their patients despite receiving inadequate financial remuneration.

FUTURE RESEARCH

As it has been shown, there are strategies in place throughout the world to improve motivation and retention. As health professionals are a scarce resource, all countries need to implement plans for effective human resources management, targeting career paths, performance appraisals, clear job descriptions, and ensuring continuous training and education. However, there is still insufficient evidence to reveal the precise interaction between different incentives, context, cadres, and personal needs. Work needs to be done to bridge this gap and thoroughly evaluate the impact of both financial and non-financial incentives in different circumstances. There is limited information as to the extent to which motivational factors are valued differently by different cadres. It would be beneficial to improve understanding of the relative power that each motivational factor has for each cadre. In order to do this, discrete choice experiments (DCE) could be used to evaluate the relative importance of the different factors affecting where health workers choose to work and how productive they will be. In DCEs participants are asked to make a number of choices between packages of attributes, such as salary, work conditions, and career development opportunities, in a hypothetical work environment. While there are only few initiatives in this area at present, the potential is significant to help understand and develop incentive packages to fit each country's health workforce.

CONCLUSION

It is evident that motivational factors are complex and intertwined so that it is not desirable to focus exclusively on one motivational theme at a time, following Maslow's model. Rather, for an effective intervention to improve motivation and retention, it will be necessary to target several themes simultaneously. As health worker needs change,

how incentives are valued will also change and, consequently, interventions to improve motivation must also respond and constantly evolve. This is a key challenge for health system policy makers and human resources managers.

It is essential that health professionals are paid an appropriate wage. Yet financial incentives that may well help with retention do not generally appear to affect motivation and productivity (except when targeted at a specific activity, for instance through a fee-for-service payment). Financial incentives are crucial, but they need to be handled with great care. They can create competition and division, producing not only de-motivation in those cadres who don't receive them, but also tension in the entire workplace through financial competition between winners and losers. They can also promote a culture of personal financial reward over professional ethos. Ethos and esteem are vital motivators for many health professionals and their commitment to help their patients and their communities is often paramount, even in adverse conditions, and for this they should be highly commended. Poorly designed financial packages, that may erode this commitment, may do more harm than good.

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Chapter 71
An Empirical Test of the Information Processing Theory

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ABSTRACT

According to the propositions in the information processing theory, this study tests the relationship between task uncertainty and three organizational design strategies, i.e., creation of lateral relationships, investment in information systems, and creation of self-contained tasks. Data from 125 North American manufacturing firms are used and business environment uncertainty is employed to measure task uncertainty. Sourcing practice and delivery practice measure the creation of lateral relationships, while Information quality measures the investment in information systems. Also, just-in-time production and human resource management measure the creation of self-contained tasks. Regression analysis shows that business environment uncertainty has significant positive influence on sourcing practice, delivery practice, information quality, just-in-time production, and human resource management. While the information processing theory was proposed more than thirty years ago, this study empirically extends the relevance of information processing theory to today's supply chain environment.

INTRODUCTION

Galbraith (1973) proposes the information processing theory (IPT), which argues that the need for information processing increases as the task uncertainty increases. Among the four design strategies the IPT suggests, creation of slack resources and creation of self-contained tasks are used to reduce the need for information processing. Investment in information systems and creation of lateral relations are used to increase the capacity of information processing. Creation of slack resources is not a preferred strategy, because it is usually costly. Therefore, this paper will focus on the relationship between the other three design strategies and task uncertainty.

Creation of lateral relationships can increase information processing capacity. Galbraith (1974)

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mentions several ways to build up lateral relationships, which include direct contact, liaison roles, task forces, and teams. The purpose of the lateral relationship is to move the decision to the level where the information exists. Information does not need to move up to the higher level of the organizational hierarchy for decision-making. Therefore, a good lateral relationship can increase the information processing capacity. As firms have become more globalized in the past two decades, creation of lateral relationships has become more important in today's global supply chain management. Thus, this paper will study the sourcing and delivery practices that enhance the lateral relationships between supply chain partners. Sourcing practice links suppliers with manufacturers and is critical for the lateral relationships between manufacturers and suppliers. Delivery practice connects manufacturers with customers and includes processing inquiries, entering orders, consolidating orders, routing shipments, selecting carriers, transporting products, and so on.

Investment in information systems is used to integrate enterprise-wide information and formalize information. It makes all people share the same information, which can improve standardization and result in less misunderstanding and fewer conflicts. It allows for the processing of information acquired during task performance in a timely fashion. Therefore, having an integrated information system can increase information processing capacity. However, companies are usually not willing to reveal investment dollar amount in research surveys. Thus, this paper will use information quality as a surrogate for the investment in information systems because higher investment in information systems is usually associated with higher information quality. In this study, information quality measures nine aspects: accuracy, availability, timeliness, internal connectivity, external connectivity, completeness, relevance, accessibility, and information update frequency.

Creation of self-contained tasks is a way to organize operations. It is popular in lean manufacturing environments, which usually use just-in-time (JIT) production. One of the JIT production practices is cellular manufacturing, which promotes the creation of self-contained tasks. The advantage of this mechanism is that less information needs to be exchanged across functions, which helps reduce the need for information processing. Another source of information reduction is through a reduced division of labor. Lean manufacturing advocates flexible resources and promotes employee cross-training programs. Therefore, this paper will measure the creation of self-contained tasks with two aspects of lean manufacturing, i.e., JIT production and human resource management. JIT production includes cellular manufacturing, pull system, cycle time reduction, agile manufacturing strategy, and bottleneck removal (Powell, 1995; MacDuffie et al., 1996; Flynn et al., 1999). In lean manufacturing environments, the human resource management practices emphasize employee cross-training and teamwork (Ahmad et al., 2003; Shah & Ward, 2003).

Besides the design strategies, task uncertainty is another key element in Galbraith's IPT. Task uncertainty is directly related to the uncertainty in business environments. Business environment uncertainty refers to the changes in products, technologies, and demand for products in the market (Miller & Friesen, 1983; Dess & Davis, 1984). In today's supply chain environment, the rate of innovation in products and processes has increased significantly. Fine (1998) discusses product clock speed and process clock speed. The faster the clock speeds are, the more uncertainty the business environments and tasks have. In this study, the rate of innovation in products and processes will be used to measure the business environment uncertainty (as a surrogate for task uncertainty).

As the IPT was proposed more than thirty years ago, it is important to reassess whether the relationship between task uncertainty and design strategies suggested by the IPT is still true in to-

day's supply chain environment. Therefore, the focus of this paper is to empirically test whether business environment uncertainty (as a surrogate for task uncertainty) has significant positive impact on the creation of self-contained tasks, investments in information systems, and the creation of lateral relationships. The creation of lateral relationships is measured by sourcing and delivery practices. The creation of self-contained tasks is measured by JIT production and human resource management. Information quality is used as a surrogate for investment in information systems. Hopefully, this study will enhance our understanding of the IPT in today's supply chain environment.

The remainder of this paper reviews literature and proposes the research hypotheses, while presenting the research methodology and measurement scale development. Finally, an analysis of the results are discussed, followed by a conclusion.

LITERATURE REVIEW AND RESEARCH HYPOTHESES

This section reviews the literature in sourcing practice, delivery practice, information quality, JIT production, human resource management, and business environment uncertainty. Based on the literature review, the research hypotheses are proposed.

Business Environment Uncertainty

Task uncertainty in the IPT is directly related to the business environment uncertainty. Higher business environment uncertainty is usually associated with higher task uncertainty. Therefore, this study will use business environment uncertainty as a surrogate for task uncertainty. Pagell and Krause (2004) measure business environment uncertainty from the aspects of products, supply, customers, regulation, and public attitude. Vickery et al. (1999) measure the environmental uncertainty with marketing practices, competitor actions, demand and customer tastes, and production processes. Ho (1996) measures the environmental uncertainty with customers, suppliers, competitors, social-politics, and technology. Ward et al. (1995) measure the environmental concerns with business costs, labor availability, competitive hostility, and dynamism. Ward and Duray (2000) measure the environmental dynamism with the rate of innovation in products and processes. Fine (1998) measures both product clock speed and process clock speed. The clock speeds measure the pace of changes in business environments and have significant impact on operations. In this study, business environment uncertainty is measured by the rate of innovations in product and process.

Business environment has been cited as one of the key antecedents to management practices (Vickery et al., 1999; Dasgupta et al., 1999; Shore, 2001). Shore (2001) uses a case study method and finds that the competitiveness of the business environment does influence the degree of data sharing. Dasgupta et al. (1999) find that companies facing more intense competitive business environment have a higher degree of information technology adoption rate than those facing less competition. Vickery et al. (1999) use a structural equation model to test the impact of environmental uncertainty on organization structures.

Sourcing Practice

Sourcing practice is one of the two aspects this paper measures for the creation of lateral relationships. Sourcing practice is important because manufacturing firms often spend a significant amount of revenue on purchasing raw materials. The sourcing literature has identified several sourcing practices as best practices. First, a designated purchasing team is important (Ellram & Pearson, 1993; Johnson et al., 2002). As Galbraith (1974) mentions, such a designated team is a way to build up lateral relationships. A designated purchasing team can organize firm resources effectively and facilitate the timely completion of

purchasing activities. It serves as a liaison between suppliers and manufacturers.

Second, a long-term supplier-buyer relationship and a reduced supplier base are good sourcing practices. A long-term supplier-buyer relationship plays a critical role in supply chain management (Choi & Hartley, 1996). Hahn et al. (1983) show that the benefits of using long-term contracts outweigh the costs. Another benefit of long-term supplier-buyer relationships is early supplier involvement in the buyer's new product development. Womack et al. (1990) suggest that Toyota's first-tier suppliers' involvement in its new product development reduced the length of the product development cycle. Hartley et al. (1997) also find a significant relationship between suppliers' involvement in product development and overall product development delays, i.e., suppliers' early involvement in the design process can reduce product development delays. Reducing the supplier base can realize economies of scale. It is also less costly to manage a smaller supplier base than a larger supplier base (Treleven, 1987). Meanwhile, it is easier to develop closer lateral relations with a smaller supplier base than a larger supplier base. Overall, a long-term supplier-buyer relationship and a reduced supplier base help foster better lateral relationships between suppliers and manufacturers.

Third, JIT delivery from suppliers is considered a good sourcing practice. JIT delivery requires close interaction between suppliers and buyers. The benefits of JIT delivery include reduced logistics costs, reduced order size, reduced lead-time, improved product quality, etc. (Dong et al., 2001; Hahn et al., 1983; Schonberger & Ansari, 1984).

Fourth, providing suppliers with performance evaluations and feedback is a good sourcing practice. Carr and Pearson (1999) show that supplier evaluation systems have a direct positive impact on buyer-supplier relationships, and an indirect impact on the firm's financial performance. Prahinski and Benton (2004) find that executives at buying firms need to incorporate indirect influence strategy, formality, and feedback into supplier development programs.

When the uncertainty in business environments increases, suppliers and buyers need to have a closer working relationship. A designated purchasing team helps respond to the changes in the business environment faster. Long-term supplier-buyer relationships and reduced supplier bases make it possible to share more information between supply chain partners. JIT delivery can reduce the inventory in supply chains, allowing supply chains to better cope with demand changes from customers. Suppliers' performance evaluation and feedback help not only suppliers but also whole supply chains improve overall performance. Therefore, this study hypothesizes the relationship between business environment uncertainty and sourcing practice as follows:

Hypothesis 1: business environment uncertainty has significant positive impact on sourcing practices.

Delivery Practice

The extant literature and anecdotal evidence show that good delivery practices are crucial for effective supply chain management under uncertain business environments. Johnson and Davis (1998) show that poor ordering processes cost Hewlett Packard a million dollars a day; whereas, the cross-docking technique used by Wal-Mart reduces inventory holding costs and inventory spaces (Stalk et al., 1992). Gurin (2000) describes how an Internet-based delivery process jointly developed by Ford and UPS significantly improves Ford's delivery performance.

Best delivery practices also include JIT delivery and outsourcing of logistics services. Dell computer, which has its suppliers located near its manufacturing facilities, practices JIT delivery. Dell also outsources its logistics to Airborne Express and UPS, which serve as Dell's logistics department. This results in improved product de-

livery performance and higher customer satisfaction. Other best delivery practices include: a single point of contact for all inquiries, instant quoting capabilities to reduce customer confusion, and reduced lead-times (Supply Chain Council, 2000).

The use of different delivery practices is closely related to business environment uncertainty. When the changes in products and processes become more frequent, manufacturers need to have better visibility to the orders in progress. Manufacturers also need the ability to dynamically configure delivery routing as new orders come in. Tracking orders in real time is needed as customer requests might change after the orders are placed. Overall, the need for good delivery practices increases as business environment uncertainty increases. Therefore, this paper hypothesizes the following:

Hypothesis 2: business environment uncertainty has significant positive impact on delivery practices.

Information Quality

In this study, information quality is used as a surrogate for investment in information systems. A number of researchers have described various dimensions of information quality. Tushman and Nadler (1978) define quality information as accurate, timely, and concise data. DeLone and McLean (1992) and Seddon (1997) suggest that information relevance, timeliness, and accuracy are important for an effective information system. McCormack (1998) measures information by accuracy, frequency, and availability. Petersen (1999) measures information quality by currency, accuracy, and completeness. A recent study (Ge & Helfert, 2007) reviews the research in information quality and identifies similar information quality dimensions such as accuracy, relevance, and timeliness. According to the literature review, this study measures information quality from nine aspects: accuracy, availability, timeliness, internal connectivity, external connectivity, completeness, relevance, accessibility, and information update frequency.

Many studies have shown the importance of high information quality. Sum et al. (1995) find that data accuracy has significant influence on operating efficiency and customer service. McGowan (1998) argues that the information system is useful only when the information is high quality. Chopra and Meindl (2001) suggest that information must be accurate, timely, and correct. Information quality is an important measure for an effective information system. Li and Lin (2006) empirically examine the role of information quality and information sharing in supply chain management. Forslund and Jonsson (2007) study the role of forecast information quality on supply chain performance.

The need for a high quality information system increases as business environment uncertainty increases. More information needs to be processed when the rate of innovation in product and process is high. Information accuracy and timeliness become more important when firms rely more on the information to make decisions. Information needs to be updated more frequently as well. Also firms need to have better internal and external connectivity when supply chain partners need to share real-time information and make decisions jointly. Thus, the relationship between business environment uncertainty and information quality is hypothesized as follows:

Hypothesis 3: business environment uncertainty has significant positive impact on information quality.

JIT Production

JIT production promotes self-contained tasks. It includes several practices: cellular manufacturing, pull system, cycle time reduction, agile manufacturing strategy, and bottleneck removal (Powell, 1995; MacDuffie et al., 1996; Flynn et al., 1999). Cellular manufacturing is used to identify

similar products or similar processes and group them together (Wemmerlov & Hyer, 1989). Using cellular manufacturing, tasks can be completed within the cell, which promotes the concept of self-contained tasks. In order for cellular manufacturing to be successful, other JIT production practices are important. Pull systems allow for meeting customer demand in a precise and timely manner (Blackburn, 1991). Reductions in cycle time allow for running smaller batches, which is necessary for cellular manufacturing. Reducing cycle time can also prevent the possibility of producing a large number of undetected quality problems. Agile manufacturing strategy allows production systems to cope with fast demand changes, which is important for today's supply chain management. Bottleneck removal balances resources and maximizes output of production.

JIT production becomes more important as business environment uncertainty increases. Pull systems and agile manufacturing help manufacturers respond to customer demand changes more quickly. Cellular manufacturing and cycle time reduction help reduce lead times, which is usually critical in uncertain business environments. While traditional push systems work well with stable demand, JIT production systems are usually a better choice for more dynamic business environments. Therefore, this study hypothesizes the following:

Hypothesis 4: business environment uncertainty has significant positive impact on JIT production.

Human Resource Management

In lean manufacturing environments, the human resource management practices emphasize employee cross-training and teamwork (Ahmad et al., 2003; Shah & Ward, 2003). Teamwork is important for improving production, because frontline employees working as a team can leverage the experience of all employees and create self-contained work environments. This greatly contributes to process and product improvement. Hayes and Wheelwright (1984) recognize the important impact that workforce participation has on firm performance. Cross-training reduces the division of labor and thus reduces the information processing needs. Schonberger (1990) emphasizes the importance of cross-training and job rotation. Giffi et al. (1990) suggest that employee skills development needs to progress as technology evolves. Both teamwork and workforce capabilities are critical for effective supply chain processes, because firms cannot operate and coordinate with other supply chain members effectively if the firms do not have a capable workforce.

The importance of human resource management increases as business environment uncertainty increases. Firms need more flexible labor resources when customer demand and product mix change more often. The value of cross-training increases as labor resources need to be more flexible. Teamwork also becomes more important when business environment uncertainty increases, because information sharing and collaboration become more critical when tasks become more complex and dynamic. Therefore, the following hypothesis is proposed.

Hypothesis 5: business environment uncertainty has significant positive impact on human resource management.

RESEARCH METHODOLOGY

The Sample

This study uses a survey research method. A total of 745 surveys were mailed. Before the surveys were sent, four academic experts and three industry experts critiqued the research instrument to ensure its relevance and clarity. A total of 134 responses were received from manufacturing industries. Among the 134 responses, 125 are usable responses. The response rate was approximately 18%. The data

analysis is based on the 125 useable responses. The surveyed firms include Xerox Corp., Dow Corning Corp., Owens Corning, Nachi Robotic Systems, Windsor Mold Inc., and Minntech Corp.

The respondents were senior executives, who held titles such as CEO, President, Vice President, Director, and so on. The average number of employees in the respondents' firms was 4,991. Eight companies had more than 10,000 employees. The median annual sales value, as reported by the respondents, was between $100 million and $500 million dollars. Five companies had annual sales exceeding $5 billion. Regarding the manufacturing process, 41% of the companies used a make-to-stock strategy and 28% used a make-to-order strategy.

The missing values were imputed. This study had a missing value rate of 2%. The mean of each item was used to replace the missing data. To minimize the non-response bias, multiple contacts were used to maximize response rate (Dillman, 2000). After the responses were received, the early responses were compared with late responses to determine if there were any statistical differences (Lessler & Kalsbeek, 1992). There were no statistical differences between the early and late responses.

Measurement Scales

The survey questions for each measurement scale are in Table 1. The study has a total of 6 latent variables: business environment uncertainty, sourcing practice, delivery practice, information quality, JIT production, and human resource management. The mean and standard deviation of each survey question are shown in Table 1 as well.

The measurement scale development process supports the validity and reliability of the measurement scales. The content validity of the scales was established by the literature. In addition, both academic and practitioner experts assessed the survey questionnaire content validity before the surveys were conducted. Construct validity ensures that the conceptual constructs are operationalized in the appropriate way. To ensure the construct validity, factor analysis is used. According to Carmines and Zeller (1979), the factor loadings need to be at least 0.3. Only one factor in each construct can have an eigenvalue that is larger than 1 and the variance explained by the first factor in each construct is at least 40%.

Reliability is defined as the extent to which the measures can yield similar results in other replication studies (Carmines & Zeller, 1979; Hair et al., 1998). There are four ways to measure reliability. The retest and alternative form methods require two repeat observations with the same group of people. Since the survey target was senior executives, the limited resources do not allow us to survey the same group of senior executives twice. The third method, split-halves method, has the critical limitation that the reliability results depend on how to subdivide the total set of observations into two groups. The reliability results can be significantly different if the approaches to splitting the observations are different. Therefore, the internal consistency method is used to measure the construct reliability in this study. Internal consistency in this study is measured by Cronbach's alpha. The lower limit of 0.7 is considered acceptable (Nunnally, 1994).

The results of the measurement scale analysis are in Table 2. Table 2 shows that all factor loadings meet the criterion of larger than 0.3 and all constructs satisfy the unidimensionality requirement. For all construct scales except "Delivery Process," only one eigenvalue is larger than 1.00 and the variance explained by the largest eigenvalue is larger than 40%. For the construct "Delivery Process," the second largest eigenvalue is slightly larger than 1.00. The largest eigenvalue explains more than 40% of the variance. The scree test suggests that one factor is the most appropriate for this set of items. Thus, "Delivery Process" is determined to be unidimensional. Table 2 also shows that all scales have Cronbach's alpha values of 0.7 or higher. According to Cronbach's alpha values, it is concluded that all measurement scales are reliable.

Table 1. Survey questions and descriptive statistics

Survey question	Mean	S.D.
Please indicate whether you agree or disagree with the following statements about your business environment [1=strongly disagree, 7=strongly agree]		
Env1. New products account for a high fraction of total revenue	4.04	1.74
Env2. Products and services are innovated frequently	4.64	1.53
Env3. The innovation rate of operating processes is high	3.64	1.55
To what extent have the following sourcing practices been implemented in your company [1 = not implemented, 7 = extensively implemented]		
Source1. Designated procurement teams	4.35	2.05
Source2. Long-term relationships with strategic suppliers	5.51	1.52
Source3. Reduction in the number of suppliers	4.69	1.87
Source4. Just-in-time delivery from suppliers	4.29	1.92
Source5. Frequent measurement of suppliers' performance	4.75	1.83
Source6. Frequent performance feedback to suppliers	4.44	1.94
To what extent have the following delivery practices been practiced in your company [1 = not practiced, 7 = extensively practiced]		
Deliver1. We deliver products to our major customer on a just-in-time basis	4.82	2.07
Deliver2. We have a single point of contact for all order inquiries	5.12	1.82
Deliver3. We have real time visibilities of order tracking	4.41	2.17
Deliver4. We consolidate orders by customers, sources, carriers, and etc	4.59	2.03
Deliver5. We use automatic identification during the delivery process to track order status	3.26	2.19
Assess your firm's information system capability in the following dimensions: [1 = not capable, 7 = highly capable]		
IQ1. Information accuracy	5.62	1.23
IQ2. Information availability	5.36	1.32
IQ3. Real-time information	4.88	1.55
IQ4. Internal connectivity	5.33	1.49
IQ5. External connectivity	4.75	1.60
IQ6. Updating information frequently	5.27	1.22
IQ7. Information completeness	5.24	1.23
IQ8. Information relevance	5.48	1.09
IQ9. Information accessibility	5.02	1.40
To what extent have the following production practices been implemented in your company [1 = not implemented, 7 = extensively implemented]		
JIT1. Pull system	3.97	2.11
JIT2 Cellular manufacturing	3.42	2.25
JIT3. Cycle time reduction	4.40	1.96
JIT4. Agile manufacturing strategy	3.10	2.04
JIT5. Bottleneck/constraint removal	4.02	1.83
HRM1. Self-directed work teams	3.69	1.93
HRM2. We use knowledge, skill, and capabilities as criteria to select employees	5.14	1.60
HRM3. Direct labor technical capabilities are acknowledged	4.67	1.72
HRM4. Employee cross training program	4.76	1.51

Table 2. Results of measurement validation

Scale Name	Variable Name	Factor Loading	Scale Statistics
Sourcing practice	Source1	.54	Cronbach's alpha: 0.77 Largest eigenvalue (variance explained): 2.87 (47.8%) Second largest eigenvalue (variance explained): 0.86 (14.4%)
	Source2	.59	
	Source3	.59	
	Source4	.65	
	Source5	.85	
	Source6	.86	
Delivery practice	Deliver1	.58	Cronbach's alpha: 0.74 Largest eigenvalue (variance explained): 2.45 (48.9%) Second largest eigenvalue (variance explained): 1.04 (20.8%)
	Deliver2	.67	
	Deliver3	.81	
	Deliver4	.74	
	Deliver5	.68	
Information quality	IQ1	.72	Cronbach's alpha: 0.89 Largest eigenvalue (variance explained): 4.99 (55%) Second largest eigenvalue (variance explained): 0.99 (11%)
	IQ2	.82	
	IQ3	.76	
	IQ4	.64	
	IQ5	.56	
	IQ6	.80	
	IQ7	.84	
	IQ8	.70	
	IQ9	.79	
JIT production	JIT1	.57	Cronbach's alpha: 0.82 Largest eigenvalue (variance explained): 2.99 (59.8%) Second largest eigenvalue (variance explained): 0.87 (17.4%)
	JIT2	.79	
	JIT3	.86	
	JIT4	.77	
	JIT5	.84	
Human resource management	HRM1	.68	Cronbach's alpha: 0.77 Largest eigenvalue (variance explained): 2.40 (60.0%) Second largest eigenvalue (variance explained): 0.70 (17.5%)
	HRM2	.78	
	HRM3	.88	
	HRM4	.75	
Business environment uncertainty	Env1	.84	Cronbach's alpha: 0.73 Largest eigenvalue (variance explained): 1.96 (65.2%) Second largest eigenvalue (variance explained): 0.63 (21.0%)
	Env2	.84	
	Env3	.74	

RESULTS AND DISCUSSION

Analysis Results

This study uses five regression models to test the influence of business environment uncertainty on sourcing practice, delivery practice, information quality, JIT production, and human resource management, respectively. First, the average of the measurement items for each factor is calculated. Second, the annual sales variable (as a surrogate for firm size) is entered into the regressions as a control variable. Third, the business environment uncertainty variable is entered into the regressions as an independent variable. Finally, the dependent variables (sourcing practice, delivery practice, information quality, JIT production, and human resource management) are entered into the five regressions respectively. As the control variable annual sales is not significant at the 0.05 level in any of the five regression models, this study reruns the five regression models without the annual sales variable and reports the results in Table 3. Table 3 shows that business environment uncertainty has significant positive influence on all five dependent variables, because all t-values are significant at 0.05 levels. Thus, it is concluded that Hypotheses 1-5 are supported.

Business Environment Uncertainty and the Creation of Lateral Relationships

Table 3 shows that business environment uncertainty has significant positive influence on sourcing practice. The standardized coefficient is 0.284. The R-square is 0.081, which means that 8.1% of the variance in sourcing practice is due to the variance in business environment uncertainty. This finding has several managerial implications. First, executives need to develop a long-term relationship with a reduced supplier base when the business environment uncertainty is high. Close collaboration such as supplier involvement in

Table 3. Linear regression analysis results

Dependent variables	Standardized Coefficient	R^2	t-value	Significance level
Sourcing practice	0.284*	0.081	3.16	0.002
Delivery practice	0.193*	0.037	2.07	0.040
Information quality	0.288*	0.083	3.20	0.002
JIT production	0.329*	0.108	3.60	0.000
Human resource management	0.323*	0.104	3.59	0.000

* p value < 0.05
Independent variable: business environment uncertainty

new product development is important, because that can reduce the new product development lead time and lead to a quicker response to the market. Cousins et al. (2006) suggest that a close relationship between supply chain partners is an important differentiator of high and low performers in today's supply chains. According to Paulraj et al. (2008), long-term relationship orientation can improve inter-organizational communication, which directly affects the lateral relationship in supply chains. Second, suppliers need to develop JIT delivery capability. As products and services are innovated frequently, JIT delivery can reduce the inventory in supply chains and reduce lead times. Third, firms need to provide timely feedback to suppliers so that suppliers can adjust to changing market needs in a timely fashion.

For delivery practice, the regression coefficient is 0.193. The R-square is 0.037. These results suggest that among the five dependent variables, business environment uncertainty has the least impact on delivery practice although it does have significant positive influence on delivery practice. This finding shows that it is important to streamline the delivery process when the rate of product and process innovation is high. For example, having a single point of contact can reduce the lead time of acquiring market demand information. JIT delivery and order tracking allow fast and accurate delivery to customers. As Galbraith (1973) mentions, influence based on knowledge and information is important for the creation of good lateral relationships when uncertainty is high. Real-time visibility and tracking of order status enable supply chain partners to make information-based decisions (Lee, 2008; Ozelkan & Galambosi, 2008).

Business Environment Uncertainty and Investment in Information Systems

The regression coefficient for information quality is 0.288. The R-square is 0.083, which more than doubles the R-square for delivery practice. This suggests that business environment uncertainty is more reliable for predicting information quality than for delivery practice. This finding shows that information quality needs to increase as the business environment uncertainty increases. As the changes in products and processes happen more often, firms need more frequently updated, real-time, and accurate information. This finding confirms the proposition in Galbraith (1973), which suggests that the need for information processing increases as the environmental uncertainty increases. Firms need to increase the investment in information systems when business environment uncertainty increases.

Business Environment Uncertainty and the Creation of Self-Contained Tasks

The regression coefficient for JIT production is 0.329. The R-square is 0.108. Both results suggest

that among the five dependent variables, business environment uncertainty has the largest impact on JIT production. As a component of lean manufacturing, JIT production has been studied in many previous studies (Balakrishnan et al., 2008; Shah & Ward, 2007; Shah & Ward, 2003). For uncertain business environments, JIT production systems work better than traditional push systems. Agile manufacturing strategy enables firms to respond to the changes in business environments quickly. Cycle time reduction, bottleneck/constraint removal, and cellular manufacturing reduce the production lead time, which allows firms to better cope with the changes in products and processes.

The regression coefficient for human resource management is 0.323. The R-square is 0.104. The results suggest that firms need a more flexible and self-directed workforce when business environment uncertainty increases. As a component of lean manufacturing, human resource management has been explored in several extant studies (Ahmad et al., 2003; Shah & Ward, 2003). However, we are not aware of any study that has empirically examined the relationship between business environment uncertainty and human resource management in lean manufacturing settings. Therefore, this study contributes to the literature by providing empirical evidence that business environment uncertainty has significant positive influence on human resource management.

The analysis suggests that the need for self-contained tasks increases as the business environment uncertainty increases. Self-contained tasks help reduce the need for information processing from two perspectives (Galbraith, 1973). First, it reduces the output diversity faced by a single collection of resources. JIT production typically minimizes the information flows across different production groups. Second, self-contained tasks reduce the need for information processing through a reduced division of labor. The human resource management practices such as cross-training help reduce the division of labor.

CONCLUSION AND FUTURE RESEARCH

With the data from 125 North American manufacturing companies, the regression models show that business environment uncertainty has significant positive influence on sourcing practice, delivery practice, information quality, JIT production, and human resource management. This study empirically tests the importance of the creation of lateral relationships, investment in information systems, and the creation of self-contained tasks in today's supply chain management. While the IPT was proposed more than thirty years ago, this study suggests that the concepts proposed in the IPT still hold true in today's businesses. Therefore, this study contributes to the literature by empirically extending the relevance of the IPT to today's supply chain management.

Future research can extend in several directions. First, Galbraith (1973) discusses not only four design strategies but also three organizational structures (i.e., coordination by rules or programs, hierarchy, and coordination by targets or goals). Future studies can test how different design strategies work with the three different organizational structures in today's supply chain environments. Second, future studies can test the relationships proposed by the IPT in service operations environments. Service operations typically have more task uncertainties than manufacturing operations as service operations have shorter lead times and more interactions with customers. Third, future studies can test the IPT in countries with different cultures. Compared to many Asian countries such as China, western countries usually rely more on formal information systems for information sharing and coordination. Asian countries rely more on informal methods such as personal connection to share information. Therefore, the IPT might need to be modified when it is applied to countries with different cultures. Finally, future studies can consider other aspects of business

environmental uncertainty such as social-political components (Ho, 1996).

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Chapter 72
Analysis of Job Responsibilities of Association of Research Libraries (ARL) Human Resource Professionals

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ABSTRACT

The purpose of this chapter was to convey the results of an exploratory survey given to human resource professionals working within the 123 institutional members of the Association of Research Libraries (ARL). The objective was to further define the role of human resource professionals in ARL libraries and reveal the nature and extent of human resource support for faculty and staff at ARL libraries. Respondents were recruited through email and asked to characterize their human resource functions by answering 35 open-ended and closed survey questions via an online proprietary survey tool. The response rate was 30% and provided data for the researchers to examine the experience level and education of human resource professionals, the role these individuals play in the day-to-day library operations, and the extent of interaction with the university human resource department.

INTRODUCTION

The role of human resource management within higher education reflects a vital yet complex function of leadership and management that affects organizational development. An integral area of human resource management within academic organizations is a separate human resources department located within an academic library. Human resource personnel in academic libraries provide counsel and information to library administrators for decision making purposes, aid faculty and staff with human resource issues, and provide training and instruction to all library employees. In addi-

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tion, library human resource personnel maintain contact with and follow regulations set forth by the institutional or university human resource department. The human resource personnel within large research libraries face the challenge "to establish a function that is affirming and highly relevant to the core of the library and to its strategic direction" (Simmons-Wellburn, 2004, p. xii) as well as support development between the library and university.

This paper reflects the results of an exploratory study of human resource professionals working within the 123 institutional members of the Association of Research Libraries (ARL). The researchers sought to gain an understanding of the role of human resource professionals in ARL libraries, gage the level of interaction between library faculty, library staff and human resource professionals, and examine the day-to-day activities of ARL human resource professionals. The objective was to illustrate the breadth of responsibilities of human resource personnel within ARL libraries and more specifically their impact on library faculty.

The researchers employed a variety of closed and open-ended questions via survey to discover more about the human resource challenges in libraries relative to the level of involvement in hiring and recruiting faculty, the number of individuals hired or processed per year, and the extent of their participation in library outreach and in-house training activities. Specific areas in which the researchers delved deeper included, what education or specialized training do the human resource professionals possess; what tasks or practices are performed within a human resource professional's daily job and duties; how the human resource department fits into the library organization as a whole; and the relationship between a libraries' human resource personnel and the institution's or university's overall human resources system.

BACKGROUND

The tasks of academic library human resource personnel are similar to human resource departments at the university level; human resource personnel at many levels are familiar with employment laws, engage in hiring practices, participate in evaluations and performance appraisals, deal with conflict resolutions, offer training and professional development, recruit and train new hires and work with diversity initiatives, among other tasks. Even with the depth of responsibilities held by academic library human resource personnel there is a lack of literature supporting their function and duties.

Library human resource professionals are effective and strategic elements in change management. Library employees in the new millennium are seeking change from hierarchical styles of administration, casual styles of training, unspoken policies, the overuse of stagnant committees, and other attributes that lead to an organization's character. Generally, employees want a clear focus of leadership goals and guidelines. The human resource representative is in a good position to mediate ideas and goals between all levels of administration and staff through assessment and accountability whereby identifying needed process changes and reinforcing behavioral changes (Kreitz, 2008, p. 104).

In his 2008 article, "Human Resource Administration in the Academic Library," Dennis R. Defa emphasizes the sometimes complex human resource challenges found in a university library and recommends that a trained *in-house* (emphasis added) human resources professional would be better suited to handle such responsibilities in the academic library because of their familiarity with university policies. Large research libraries have unique staffing needs that differ from other areas of the university. Not only are there a large mix of positions working together (faculty, staff, students, etc.) and several library departments collaborating on projects (reference, collection development, technical services, etc.) but the

operations and services of academic libraries stay open extended hours including weekends, holidays, and summers. The diverse staffing needs found in libraries coupled with the changing rules associated with federal and state laws, and the interaction between the library and the campus human resources department can present distinct challenges to library human resource professionals.

The human resource professional working in a library plays an active role in the entire process of hiring new employees, assisting with the logistical side of the hiring process as well as guiding the administration to successfully navigate through the sometimes murky legal waters. Oftentimes many individuals are involved in faculty hiring, and each need to be briefed on equal employment opportunity laws and the legal restrictions that govern the types of questions that can be asked of a candidate. The successful library human resource department works closely with both the administration and the faculty to ensure that all guidelines are followed during the hiring process.

Academic libraries are often challenged with attracting and retaining a diverse work force, especially in faculty and administrative ranks. The library human resource professional should play an active role in fostering an environment of diversity and participating in the recruitment of a more diverse work force. Cultural diversity among library employees brings new skills and ideas into a department, which is an essential component of today's academic research library. Diversity initiatives and programs help to establish mutual respect and mutual learning among different individuals working together. "Successful diversity is built from the often small, everyday actions taken by people at all levels of the organization… Changing how people act must [however] be reinforced by changing the organizational policies and procedures that define how people operate" (Kreitz, 2008, p. 103).

Giesecke and McNeil (2005) suggest building an inclusive workplace environment by building trust, treating everyone with respect, and promoting good communication (p. 34). The definition of an inclusive environment is one where differences among staff are recognized as strengths that can be built upon in order to further the goals of the organization (Giesecke and McNeil, 2005, p. 34). Leadership positions set the tone of the environment. Therefore, leaders need to communicate effectively and not leave members of the team out of the communication cycle, leaders need to give credit for other's work and ideas, and leaders need to listen to their staff.

Librarians in leadership often end up in these positions with little supervisory training, therefore they may need support from the administration and human resource professionals. Library faculty in tenure-track positions face unique challenges when they have management responsibilities in addition to research, service, and teaching expectations. Human resource personnel should consider motivational factors that directly tie into librarians' performance and job satisfaction. "Positive motivation not only leads to better performance, but also increases the employee morale, commitment, and emotional identification with the organization" (Mallaiah, 2008, p. 40). Cross-training or job rotation in order to develop employees' skills and potential in new areas may increase employee interaction and develop positive morale among the library employees. Human resources would play a part through motivational planning by developing new avenues where employees would feel valued.

Human resource management can help library supervisors and administrators develop their management styles as well as assist in creating a motivating work climate. Human resource personnel can clearly define what is expected of the employee and if these expectations are included in the job description and performance evaluation. Similarly, basic supplies and resources need to be provided in order for employees to achieve a higher standard of success (Giesecke and McNeil, 2005, p. 40).

The human resources department in research libraries should be structured to lead and develop to the changing employment needs of the individual workers and the tertiary learning institute. The role of human resources in the academic library should be as an initiator and transformational towards change, no longer holding to the traditional role of human resources as a responder to change with fragmented and reactive initiatives. Butterfield summarizes, "HR should plan with local leadership how to address and resolve issues of accountability, engagement, competency development, growth and reward" (p. 34).

The research presented focuses on the general responsibilities of ARL human resource professionals and includes university demographics, information about the libraries' human resource personnel, and job description detail. The specific functions of human resource professionals and their relationship to the library staff and faculty as well as to the university will be discussed.

METHODOLOGY

Survey Instrument

Academic library human resource professionals play an important role in the recruitment, hiring and retention of library faculty. Through the 35 question survey instrument "Analysis of Job Responsibilities of Association of Research Libraries (ARL) Human Resource Professionals" (Appendix A) the researchers sought to better illustrate the current role and responsibilities of these human resource professionals. The researchers chose an online survey to obtain information from a variety of respondents efficiently. The survey questions were organized into three sections, "About the University", "About Libraries' HR Department or HR Personnel", and "Questions for Libraries HR Personnel/Manager". The third section also included two subsections of questions, "What is your job?" and "Professional Development."

The first section, "About the University" asked participants to complete the questions using ARL statistics. The questions related to the number of full and part time students enrolled, the salaries and wage expenditures for the libraries and the number of full time Libraries professional staff, faculty, and support staff. The researchers hoped to gain an understanding of the size of the institution based on the numbers provided.

The second section, "About Libraries' HR Department or HR Personnel" contained one required question, "Does the Library employ either part or full time human resources (HR) professionals?" Questions in this section related to the way human resource matters are handled in the library, including the human resource professionals job classification, to whom the individuals report, the level of interaction between the university human resources department and the libraries human resource contacts, and how library human resource policies are adopted. The researchers hoped to find out more about the level of interaction between the parent or university human resources and the libraries human resources contacts.

Section three, "Questions for Libraries HR Personnel/Manager" and the two subsequent sections were designed to be completed by the Libraries primary human resource professional on staff. Questions in section three related to the number of hours the human resource contact devotes to human resource duties, the number and type of individuals he/she supervises, the salary range for human resource management and staff at the institution, the professional's educational background and other qualifications, and his/her years of service to the human resource profession and to the library. The questions provided a more complete picture of the general responsibilities and qualifications of the main human resource contact.

The two subsections, "What is your job?" and "Professional Development" further investigated the role of the library human resources professional in human resource responsibilities at the institution. The researchers asked the main human

resources contact to describe the role of the libraries' human resource professional(s) and the role of the institutional human resource department, and how many and what type of individuals are hired in the library each year. The researchers asked several questions about the library human resource contact's role in the recruitment and hiring of library faculty. To gage the level of involvement, questions about the human resource professional's role in promoting diversity in the workplace and participating in outreach activities were also included.

The final portion of the survey included questions about the library human resource contact's professional development activities. The questions related to the number and type of conferences and workshops attended, whether the human resource professional has given presentations or published in human resource or library journals, and what professional societies he or she is a member. From the questions in the two subsections, the researchers hoped to gain a better understanding of the library human resource contact's job as it relates to hiring faculty specifically and how active he or she is in the profession.

Participants

The survey subjects were identified by the researchers as human resource contacts working in ARL institutions. To compile the list of contacts the researchers created a list of ARL institutions and visited the libraries' websites to identify the responsible parties. Whenever possible, titles and department names were noted on the list.

The researchers attempted to identify the main human resources contact (i.e., the manager or department head), but when this was not possible, any individual associated with human resource issues was included on the list. When a library website did not include a specific page for human resources, the researchers attempted to find the contact by viewing any job postings and noting the contact names on them. If the website included multiple human resource contacts, all names were noted, but only one e-mail to all contacts was sent to this institution.

The researchers sent 123 personalized e-mails to the ARL contacts. Institutions with multiple human resources contacts only received one e-mail, however, it was addressed to all identified contacts. This was done to make all the human resource contacts at the institution aware of the survey, but to hopefully avoid receiving multiple survey responses from the same institution. The researchers asked respondents to forward the e-mail to the appropriate contact person and/or to inform them of the contact person's name if the recipient was not the right person to complete the survey.

Many of the institutional contacts were not identified by title on the websites, however when title information was available the researchers made note. The individual titles varied, and the following chart shows some of the most commonly used titles for human resource contacts (see Table 1)

Other job titles included: Library Personnel Office Manager, Staff Human Resources Manager, Human Resources generalist, Director of Personnel and Staff Development, and Assistant Dean for Personnel and Planning.

Table 1. Titles for human resource contacts at ARL institutions

Title	Number
Administrative Officer	3
Associate or Assistant University Librarian or Dean	4
Director or Head of (Library) Human Resources	11
Human Resources Consultant or Advisor	3
Human Resources Librarian	3
Human Resources Manager or Officer	12
Human Resources or Personnel Coordinator	12
Human Resources Specialist or Assistant	9
University Librarian or Dean	5

Data Collection

The survey instrument was input into Zoomerang, a proprietary online survey tool. Using a format such as Zoomerang to display the survey questions and collect the results enabled the researchers to choose different types of question formats and gather data for collation and analysis more easily. The software does have some limitations, though. One respondent indicated that the question formatting in the software was confusing when it contained multiple parts.

The researchers provided the survey link (URL) to the human resource contacts via e-mail. All respondents received the same e-mail text asking for their participation and informing them of the survey close date, March 13, 2009. Respondents were given approximately two weeks to complete the survey.

The survey greeting, which respondents viewed after clicking on the Zoomerang link, but before beginning the survey included the statement "This survey has been approved by the Louisiana State University's Institutional Review Board, and any questions regarding subjects' rights or concerns can be directed to Robert C. Mathews, Institutional Review Board, (225) 578-8692, irb@lsu.edu, www.lsu.edu/irb. By submitting the survey, you are providing and documenting your consent." Other permission was not required or sought from the respondents.

When respondents completed the survey the information was recorded in the Zoomerang account. The software also recorded how many views the survey received (187) and the number of partial surveys (12).

Survey Results

A total of 40 individuals completed the survey instrument. The survey questions included closed, open-ended, and a combination of the two types of questions in which respondents were encouraged to provide further information after indicating their response (Appendix B). The researchers collated the data and have provided a breakdown of the question responses according to the order they appear in the survey instrument in this section of the paper.

About the University

The majority of the 40 survey respondents work at institutions with undergraduate and graduate student populations between 10,000 and 25,000. Twenty-six percent of the respondents are employed at universities in which the number of full-time undergraduate and graduate students enrolled ranges between 10,000 and 15,000. Twenty-three percent of the respondents are employed with universities with enrollments of 20,000-25,000 students.

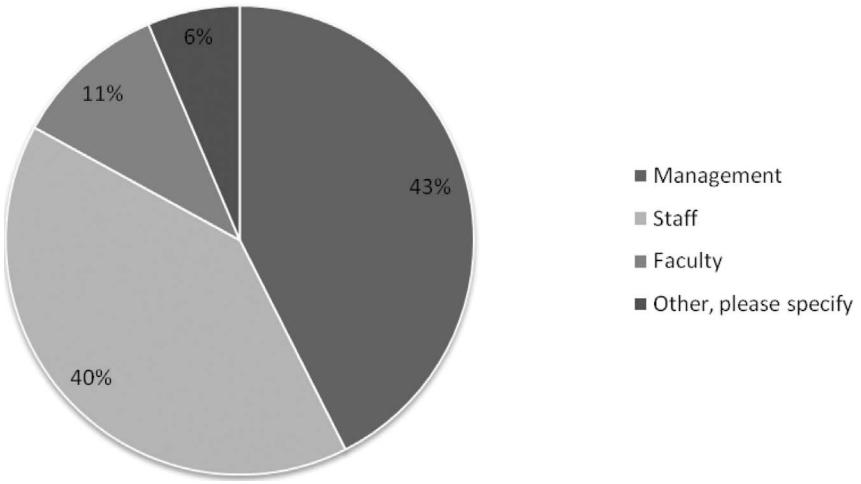
Forty percent of the respondents stated the total salaries and wage expenditures for their library varied between five million and ten million dollars. An additional 24% indicated their expenditures fell between ten million and fifteen million dollars. While 12% reported expenditures of 15 to 20 million.

The number of full time professional staff or faculty working in the respondents' libraries ranged from 30 to 450. The median value of professional staff or faculty working within ARL libraries was 75. The number of support staff employed ranged from 18 at one library to 431 at another. The median value of full time library support staff at all institutions was 107.

About Libraries' HR Department or HR Personnel

Ninety-five percent of the respondents indicated that their library employs either full-time or part-time human resource professional(s). The respondents listed a total of 42 management positions, 23 professional staff positions, and 48 clerical or administrative assistant positions. At a single institution, the largest number of

Figure 1. Question 8: What is the university job classification for libraries' HR professionals?



positions reported were four in management, three in professional staff, and four in clerical or administrative assistant positions. The majority of the human resource positions were classified within the institutions as either management or staff positions with only a few listed as faculty positions. Figure 1 illustrates the breakdown of job classifications of human resource professionals at the responding ARL institutions.

None of the respondents indicated that Libraries human resource professional(s) report solely to a *university* human resources department. Eighty-two percent of the respondents stated that the Libraries human resource personnel report directly to a Dean, Director, or University Librarian. Only five percent of the human resource professionals responding stated that they reported to a combination of the university human resources department and a local administrator within the library. The remaining 15% of respondents who provided further comment to the question indicated that they reported to administrators such as the Associate Dean for Finance and Facilities, Associate Director for Administrative Services, Area Finance/Administrative Officer, Associate University Librarian for Administrative Services, Associate Dean for Finance and Facilities, and the President.

In response to survey question nine about the level of interaction between the University HR Department and the Libraries HR professionals, 80% of respondents indicated moderate to maximum contact. Additional comments indicated that the libraries human resource professionals are communicating regularly and some are maintaining close working relationships with the university or institutional human resources department.

The majority of respondents indicated that their library adopts human resource policies from the university or institutional human resource policies. Twenty-three percent of the respondents indicated that their libraries model policies after university policies, but do adopt some of their own. Finally, 18% stated that the libraries administration created their own human resource policies. Three respondents provided the following comments to the question "Libraries human resource policies are": "Collective bargaining agreements", "Some are adopted and some are modeled", and "Departments have some leeway in interpreting campus [policies]."

Question twelve, "Please provide any additional information about the relationship between the Libraries HR Professionals and the University HR Department", allowed the respondents to provide additional information about the rela-

tionship between the Libraries human resource professional(s) and the university human resource department. Nine individuals provided comments, including the following, "The Libraries have an assigned representative in the University's HR department. We work closely with her" and "HR Professional serves on HR campus-wide committees – Grievance Committee and Sexual Harassment Committee." One respondent stated that they have a decentralized structure in which the libraries has delegated authority to hire academic positions (Librarians), but staff hire approvals must go through the university human resources department.

Questions for Libraries HR Personnel/Manager

More than half, 63%, of the respondents perform human resource duties full time, forty hours per week. Twenty-four percent of the respondents may work full time at the library, but they devote less than 40 hours but more than twenty to human resource responsibilities. This statistic is supported by the number of people surveyed with titles that indicate they have responsibilities other than human resource matters. Only 5% of the respondents devote less than 20 hours a week to human resource duties.

Ninety-five percent of the respondents have some supervisory responsibilities of full time employees, part time employees, or student workers. No respondents indicated that they supervise graduate student workers. Fifty percent of the respondents supervise one or more student workers. Twelve respondents supervise more than three full time employees.

Human resource managers at 85% of the respondents' institutions earn a salary greater than $50,000, while staff handling human resource duties earn between $35,000 and $40,000 at 29% of the institutions represented.

The respondents' educational backgrounds and qualifications range from a Masters in Library and Information Science, Masters in Human Resource Management, undergraduate degree in Human Resource Management, a human resources certification, and a combination of two or more of the aforementioned. Four individuals commented that they have a masters in business administration (MBA). Nearly half of the respondents indicated having education beyond a bachelors degree.

Thirty-two percent of the respondents indicated that they have worked as human resource professionals between 15 and 20 years. Some (30%) of the respondents have more than 20 years of experience in the field. They smallest percentage, three percent, of the respondents indicated that they have been a human resource professional for 1-3 years, and 19% had been in the field for more than five years but less than ten. The respondents indicated working a variety of different time frames at their current ARL libraries. The largest representation (24%) fell in the category of working more than five years, but less than ten years at their present institution. If longevity in a position is a sign of satisfaction, this group does seem to be relatively happy. Over twenty percent of the respondents have been in their current positions for 20 years or more, as illustrated in Figure 2.

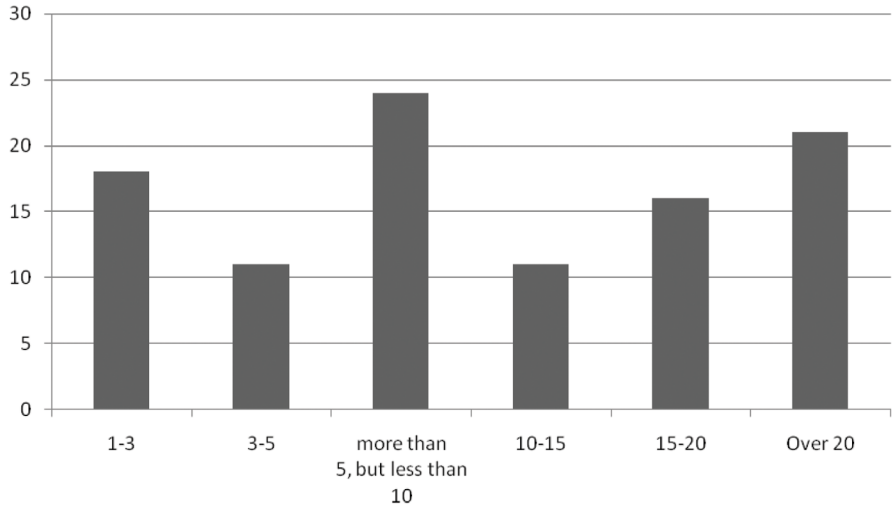
What Is Your Job?

This section of the survey consisted mostly of open-ended questions. The authors have analyzed the results and grouped the different responses into categories, which will be discussed in further detail in this section.

Only five respondents indicated that the hiring for the entire libraries is *not* done through their office. Some of the "no" responses included comments that they hire all faculty but not staff or students. One "no" response indicated that their office only handles student hires, and not faculty or staff. The majority of the respondents, though, handle all hiring in their offices.

When asked about the number of individuals in the categories "Librarians", "Library Associ-

Figure 2. Question 18: I have worked at this ARL library as an HR professional for _ years.



ates / Paraprofessionals", "Administration", and "Graduate Students" the library hires, respondents indicated that on average their library hired two librarians per year, ten library associates or paraprofessionals per year, one administrative position per year, and ten graduate students per year.

The respondents were asked to describe their role versus the university human resources department's role in the hiring process. The majority of the respondents included detailed information about the various duties of each. The respondents indicated that their library human resource department handles the majority of the duties associated with hiring faculty or professional librarians. Several respondents stated that the candidate selection, interview process, reference requests, and job offers originated in the library. A few respondents also listed recruitment efforts as a part of their responsibilities. For those that listed job postings and general paperwork, the majority stated that this was handled through the university or institutional human resource department. Several respondents stated that non-librarian (e.g., staff, paraprofessionals, and classified) employees are hired through the institutional or university human resources department.

The following individual responses provide further detail about the different roles of the library human resource professional(s) and the institutional or university human resource department:

I coordinate all academic hiring or recruitments. Design positions, advertise, post, create web sites, set up phone interviews, set up campus interviews, orient search committees, document search process, Affirmative Action Compliance, contracts and everything else related to hiring faculty.

Library HR does all interviewing and contact. University HR maintains online job posting system and does background checks. University HR does preliminary [sic] screening for applicants who meet/do not meet the minimum requirements.

I place all ads for professional positions nationally. University HR posts all jobs on the university job web site. All applicants must apply through the online university web site for each position. The university [sic] HR recruiter will forward me applicants who meet the minimum requirements for the position. I continue the rest of the recruitment and hiring process.

HR Department posts position, advertise positions, do background checks, if needed contact references, makes job offer to candidate. Library HR selects candidates to interview and makes decision on who to hire.

Question 22, "Please describe your role in the hiring of professional librarians (faculty). For instance, do you serve on search committees; oversee ingest of all applications, etc.?" asked the survey respondents to describe their role specifically in the hiring of professional librarians. In over 70% of the responses it is clear that the library human resource department is solely responsible for the hiring of librarians. Only two respondents indicated clearly that they have no involvement. One respondent stated that the hiring was done through the Dean's Office, however it was not clear whether this office is a part of the library. Sixteen respondents indicated that they serve on the search committees for faculty hires. The majority indicated that they play an active role in the entire hiring process.

The following responses provide further detail about the library human resource professional's role in librarian hiring:

I meet with each search committee when the Dean charges the committee in order to review the search process and answer any questions the members may have. I receive all of the applications. After the search committee makes its recommendation to the Dean and the Dean makes the decision to offer a position to a candidate, I ensure that all necessary paperwork is completed.

I prepare all of the forms, NOV, and place job ads. I meet with committees to provide them with procedural and EEO information. I receive all applications and make them available to the committees. I correspond with applicants. I schedule interviews and meet with candidates.

One of the professional HR librarians serves on the search committee as Affirmative Action Officer, manages all candidate contact and correspondence, provides guidance to committee on policies and procedures.

We meet with all applicants during their interview process. Negotiate offers and extend offers.

Respondents were asked to describe their role in the *recruitment* of librarians or faculty. Most of the responses included information about where job announcements are posted and by whom. Several respondents stated that they met with candidates during the interview process. None of the respondents included information about their library's active efforts to recruit new faculty. It is unclear why the respondents did not provide concrete examples such as recruitment fairs or other recruitment initiatives, although later responses to question 25 about outreach activities indicated that most libraries do not need to recruit because their applicant pools are already quite full. Example responses to question 23, "Please describe your role in professional librarian (faculty) recruitment:" are:

I manage the recruitment processes for all library faculty positions. This involves analysis of job descriptions, coordination of interviews, and placement of job postings. For faculty searches, I assist search committees, place job advertisements [sic], coordinate scheduling and interviewing logistics, and complete paperwork for various University offices and units including Affirmative Action and Academic Affairs. I ensure compliance with federal and University regulations and policies, including Affirmative Action guidelines.

I work with the Dean and the Associate University Librarians on all Job Specifications and review. These specs are reviewed by University HR for classification. All searches are done through me and I support the search committees as they inter-

view. I prepare a hiring proposal and submit [sic] this to University HR for their approval [sic] of the hiring plan. I work with the Budget Manager to apply the appropriate rates to positions within the pay bands of the University.

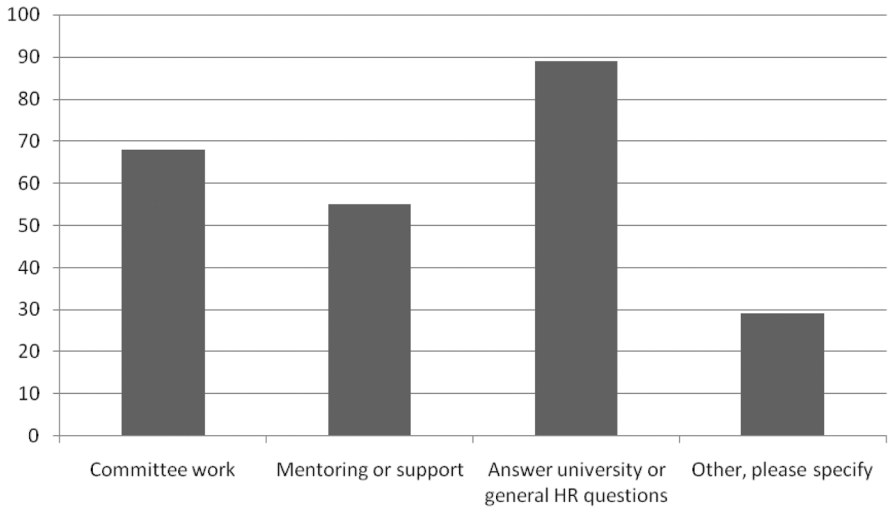
Approximately 40% of the respondents indicated that they do not participate in *university-wide* faculty recruitment strategies or strategies for promoting diversity in the workplace. The respondents who do participate in diversity efforts cited examples such as serving on a diversity task force or serving as an Equal Employment Opportunity representative for the libraries. A few respondents indicated that they participated in campus wide initiatives to promote diversity among faculty and one respondent stated that his/her library would foster two ARL fellows this summer.

The majority of the respondents do not participate in outreach activities to prospective employees. Several of the "no" respondents indicated that their libraries did not need to recruit because the applicant pools were adequate with minimal job advertisement. Respondents who do outreach work cited examples such as the American Libraries Association (ALA) conferences, both annual and midwinter, the Association for College and Research Libraries conference, and job fairs.

Question 26 asked the library human resource professional to indicate how often he or she conducts human resource related sessions and presents materials to the Libraries faculty and staff. Thirty percent indicated conducting sessions once a month or more, while twenty-four percent indicated conducting HR sessions about every six months. Respondents were then queried on what topics they had either given or sponsored in Question 27. Over 30% listed conducting performance evaluations as a topic covered. Other common threads in the responses included sessions on diversity awareness, university policies about leave and attendance, conducting effective meetings, interviewing, sexual harassment prevention, and goal setting.

The final question in this section asked respondents to indicate their interactions with professional librarians (faculty) beyond the hiring process (see Figure 3). Most human resource professionals (89%) interact with professional librarians by answering university or general HR questions, as well as committee work, and mentoring or support. The respondents commented that

Figure 3. Question 28: Beyond the hiring process, what interaction do you have with professional librarians (faculty)? Check all that apply.



they also served as a "general sounding board" for faculty, facilitated reviews, acted as a consultant to the library administration and others, assisted with goal setting and monitoring, and resolved employee relations or conflicts.

Professional Development

Forty-six percent of the survey respondents indicated that they attend three to four human resource related conferences or workshops per year, and thirteen percent do not attend any. The majority of respondents who do attend conferences or workshops do so at their institution or at a state or regional level. More than half, 57% of the respondents stated they do not give professional presentations outside of their perspective libraries regarding human resource related issues. Similarly 92% of Libraries HR professionals have not published in human resource or library journals concerning human resource related issues.

DISCUSSION

Results of the survey present a general view of library human resource professionals' relationships to the institutional or university human resource department, their relationships with library faculty from interview to daily interaction after hire, their supervisory responsibilities and reporting structure, and their level of involvement in professional development activities. Each of the survey sections has the potential to provide more research opportunities, and could be developed beyond the questions found in this instrument.

The survey results indicate that ARL libraries employ their own human resource personnel, usually an individual classified as management working 40 hours a week primarily on human resources duties. Many of the individuals responsible for human resource duties possess a degree higher than a bachelor's degree, and are compensated with salaries greater than $50,000 when in management positions. Overall, this group of respondents have been human resource professionals and have worked at their current ARL institution for a more than 15 years. The researchers sought responses from as many individuals responsible for human resource duties at ARL institutions as possible without delineating between a library dean who handles human resources duties among his or her many responsibilities and an individual classified as clerical or paraprofessional who handles only human resource duties. This lack of differentiation is a limitation to this survey instrument and results could be further honed if more were known about the individuals. In addition, respondents were not required to leave their contact information, so there is a possibility that some institutions may have submitted more than one time.

Respondents indicated that overall they handle all responsibilities associated with the hiring process, especially of faculty or professional librarians. The library human resource professionals are integral to the hiring of faculty including some level of involvement in the recruitment process, involvement during the interview process, orientation, and some training. By and large the respondents indicated that they do not participate in organized recruitment of faculty. Many indicated that their library does not actively recruit because of adequate interview pools, however the researchers did not ask the respondents to specifically indicate why recruitment was not a part of their duties. It is possible that some institutions do not recruit because it is expensive and time consuming.

The human resource professionals provide a great deal of training and support to the library faculty and staff overall. Many respondents cited conducting sessions on performance evaluations. It was not clear from the responses if these sessions were designed for supervisors administering evaluations, employees completing evaluations, or both. Performance evaluation of library faculty specifically is a topic that deserves further research.

The survey responses indicate that overall the library human resource professionals are not very involved in diversity initiatives within their library or at the institutional level. This information may not imply a lack of diversity initiatives at the institution, but could be an indication that there are other offices in addition to the human resources department at a university that handle diversity work. The level of involvement within the library can also vary depending on the size of the library staff.

Overall the respondents did not seem to participate in professional development activities. This may not indicate a lack of interest on the part of these professionals, but could be explained by a lack of institutional support to attend conferences. Very few professionals had published in their field, but this is not surprising since the respondents vary from primarily clerical workers to library deans.

The survey instrument focused on ARL libraries at universities and most of the questions were tailored to this group, which is a limitation to the research findings. In addition, the overall return rate of the survey was around 30% of the total individuals surveyed. Even with the above limitations, the survey data provided information that can be further developed into future research about the role of library human resource professionals.

FURTHER RESEARCH

The research presented in this manuscript should be considered an initial step in future assessment of the effectiveness of human resource functions within the academic library. Further research could be done to evaluate library staff and faculty relationships with the library human resource personnel. Additionally, research about the library human resource professional or department as it relates to employee satisfaction, motivation, and the organizational climate within the library culture would be welcome. Further research could be done in the relationship between library human resource professionals and the university or institutional human resource department also.

Human resource professionals are in a position to effect change within the library's organizational climate. A possible strategy to assess the library's overall climate and how employees interact may be to administer the Myers-Briggs (personality) Type Indicator or another similar test to categorize personalities and temperaments. Voluntary testing of library employees could lead to more effective team building strategies or motivational plans. Library administration and library human resource personnel should engage their faculty and staff in discussions about workplace attitudes and atmosphere.

Since each job within a library is important, human resources should work with administrators to create a positive social environment. However, research into the intricacies of library administration, faculty, staff, and library human resources needs to be developed further. Specifically, researchers should delve into the academic libraries' environmental climate, motivational tactics, employee satisfaction, and performance evaluation.

CONCLUSION

Human resource professionals at ARL institutions share the responsibility with library administration to improve efficiency and productivity of all staff and faculty. In ARL libraries, human resource personnel assist with hiring, training, and evaluation of employees. They maintain paperwork, ensure that legal objectives are met, and follow institutional guidelines. In addition they are often tasked with improving organizational climate in the library and monitoring the general welfare of the employees. A majority of ARL human resource personnel are integrally involved in the hiring process of professional librarians, beyond the level of paperwork processing. They also facilitate performance appraisals and mediate workplace situations.

Human resource personnel in ARL libraries provide multi-faceted service to the library and parent institution for which they operate. They maintain institutional and library policies and regulations as well as keep current with all state and federal laws. The function of ARL human resource professionals, according to this research, is to serve in more traditional roles of human resource management. However, even with more traditional functions, human resource professionals within large research libraries provide necessary organizational operations fundamental to the mission of the library.

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APPENDIX A: SURVEY INSTRUMENT

About the University (Answers Should Be Based on ARL Statistics)

1. Number of undergraduate and graduate students enrolled:
   Total Full time
   Total Part time
2. Total Salaries and Wages Expenditures for Libraries:
3. Number of full time Libraries Professional Staff and Faculty:
4. Number of full time Libraries Support Staff:

About Libraries' HR Department or HR Personnel

5. Does the Library employ either part time or full time human resources (HR) professional(s)?
   Additional Comment
6. If you answered "Yes" to question 5, please list the number of individuals in each HR related position and indicate their work status (part or full time):
   Management
   Professional staff
   Clerical or administrative assistant(s)
   Other, please specify
7. If you answered "No" to question 5, please indicate how HR matters are handled in the library:
8. What is the university job classification for Libraries' HR professionals?
   Management
   Staff
   Faculty
   Other, please specify
9. The Libraries HR Professional(s) report to:
   Dean, Director, or University Librarian
   University Human Resources Department
   A combination of the two
   Other, please specify
10. What is the level of interaction between the University HR Department and the Libraries HR Professionals?
    Minimal – only for information
    Moderate – regular contact with HR personnel
    Maximum – very close working relationship between departments and/or HR personnel is employed by university HR Department.
    Other, please specify
11. Libraries human resource policies are
    Adopted from University HR Department policies
    Different, but modeled after University HR Department policies
    Created by the libraries administration
    Other, please specify

12. Please provide any additional information about the relationship between the Libraries HR Professionals and the University HR Department

Questions for Libraries HR Personnel/Manager

The Following Sections Should Be Completed By the Libraries Primary HR Professional on Staff.

13. Approximately ___ hours of my job are devoted to human resource tasks:
    40 hours (full time)
    Less than 40 hours, but more than 20
    20 hours
    Less than 20 hours
    Other, please specify
14. Are you the primary supervisor for employees, student workers, and/or graduate assistants?
    Yes, number of full time employees:
    Yes, number of part time employees:
    Yes, number of student workers:
    Yes, number of graduate assistants:
    No, I do not supervise.
15. The salary range for _____ at my Library is:
    HR Management:
    Less than $30,000
    $30,000 – $35,000
    $35,000 – $40,000
    $40,000 – $45,000
    $45,000 – $50,000
    Greater than $50,000
    N/A
    HR Staff:
    Less than $30,000
    $30,000 – $35,000
    $35,000 – $40,000
    $40,000 – $45,000
    $45,000 – $50,000
    Greater than $50,000
    N/A
16. Indicate your educational background and other qualifications (please mark all that apply)
    Masters in Library and Information Sciences
    Masters in Human Resource Management
    Undergraduate degree in Human Resource Management
    HR certification or training.
    Other, please specify

17. I have worked as an HR professional for __ years.
    1-3
    3-5
    More than 5, but less than 10
    10-15
    15-20
    Over 20
18. I have worked at this ARL Library as an HR professional for __ years.
    1-3
    3-5
    More than 5, but less than 10
    10-15
    15-20
    Over 20

What Is Your Job?

19. Is the hiring for the entire Libraries conducted through your office? (Space is available for further comments.)
    Yes
    No
20. Please describe your role as the Libraries HR professional and the role of the university HR Department in the hiring process:
21. On average how many people in each category below are hired per year:
    Librarians 1 2 3 4 5 6 7 8 9 10
    Library Associates/Paraprofessionals 1 2 3 4 5 6 7 8 9 10
    Administration 1 2 3 4 5 6 7 8 9 10
    Graduate Students 1 2 3 4 5 6 7 8 9 10
22. Please describe your role in the hiring of professional librarians (faculty). For instance, do you serve on search committees; oversee ingest of all applications, etc.?
23. Please describe your role in professional librarian (faculty) recruitment:
24. As a Libraries HR Professional, do you participate in university-wide Faculty recruitment strategies or strategies for promoting diversity in the workplace? Please specify these activities.
25. Do you participate in outreach activities to prospective employees (attend fairs, conferences)? Please include examples of these activities:
26. How often do you conduct HR related sessions and present materials to the Libraries faculty and staff?
    Frequently: 1 time a month or more
    Often: About every three months
    Less often: About every six months
    Infrequently: Once a year
    Never

27. If you answered a.-d. in Question 26, please list some topics covered in HR sessions you have given or sponsored:
28. Beyond the hiring process, what interaction do you have with professional librarians (faculty)? Check all that apply.
    Committee work
    Mentoring or support
    Answer university or general HR questions
    Other, please specify

Professional Development

29. I attend approximately __ number of HR related conferences and workshops per year
    1-2
    3-4
    None
    Other, please specify
30. If you answered a or b to the above, please specify how many conferences and workshops are
    National or international 1 2 3 4 5 6 N/A
    State or regional 1 2 3 4 5 6 N/A
    At my institution 1 2 3 4 5 6 N/A
    Other, please specify
31. I have given professional presentations outside of my Library about HR related issues. If yes, number of times:
32. I have published in HR or Library journals about HR related issues.
    If yes, number of times:
33. I am a member of the following professional societies:
    American Libraries Association. Name roundtables or sections of which you are a member:
    HR professional organizations. Please list
    Other, please specify:
34. Please provide any additional comments related to this survey.
35. Optional information
    Name:
    ARL Institution:
    Address 1:
    Address 2:
    City/Town:
    State/Province:
    Zip/Postal Code:
    Country:
    Email Address:
    Thank you for your participation in this survey!

APPENDIX B: SURVEY RESULTS

About the University (answers should be based on ARL statistics)

1. Number of undergraduate and graduate students enrolled:
   10,000-15,000: 26%
   15,001-20,000: 12%
   20,001-25,000: 23%
   25,001-30,000: 16%
   30,001- 35,000: 07%
   35,001- 40,000: 07%
   40,001 – 45,000: 02%
   45,001 – higher: 02%
   N/A: 05%
2. Total Salaries and Wages Expenditures for Libraries:
   0 - $5 million: 12%
   $5 - $10 million: 40%
   $10 - $15 million: 24%
   $15 - $20 million: 12%
   $20 - $25 million: 07%
   + $25million: 05%
3. Number of full time Libraries Professional Staff and Faculty:
   Lowest response: 30
   Greatest response: 450
   Median value: 75
4. Number of full time Libraries Support Staff:
   Lowest response: 18
   Greatest response: 431
   Median value: 107

About Libraries' HR Department or HR Personnel

5. Does the Library employ either part time or full time human resources (HR) professional(s)?
   Yes: 96%
   No: 4%
6. If you answered "Yes" to question 5, please list the number of individuals in each HR related position and indicate their work status (part or full time): ***
   In general respondents indicated full time employment.
7. If you answered "No" to question 5, please indicate how HR matters are handled in the library:***
   "Human resource matters are handled by the Associate Dean for Administration"
   "Library Payroll and Personnel Services has a manger [sic] and 2.0 FTE classified staff who deal with payroll and routine personnel recordkeeping."

8. What is the university job classification for Libraries' HR professionals?
   Management: 50%
   Staff: 48%
   Faculty: 12%
   Other, please specify: 10%
   Other comments included: Administrative Professional and Professional Non-Faculty
9. The Libraries HR Professional(s) report to:
   Dean, Director, or University Librarian: 83%
   University Human Resources Department: 0%
   A combination of the two: 05%
   Other, please specify: 14%
   Other comments included: Associate Dean for Finance and Facilities, Associate Director for Administrative Services, Area Finance/Administrative Officer, Associate University Librarian, Administrative Services, Associate Dean for Finance and Facilities, President
10. What is the level of interaction between the University HR Department and the Libraries HR Professionals?
    Minimal – only for information: 17%
    Moderate – regular contact with HR personnel: 52%
    Maximum – very close working relationship between departments and/or HR personnel is employed by university HR Department: 29%
    Other, please specify: 02%
    Other comments included: Not applicable – not a university or college
11. Libraries human resource policies are
    Adopted from University HR Department policies: 71%
    Different, but modeled after University HR Department policies: 21%
    Created by the libraries administration: 19%
    Other, please specify: 07%
12. Please provide any additional information about the relationship between the Libraries HR Professionals and the University HR Department ***
    "the Library is represented on a campus wide HR Liasian [sic] Committee"
    "The Libraries have an assigned representative in the University's HR department. We work closely with her"
    "The relationship varies depending on the nature of the exchange. Benefits information is more or less managed centrally, but Libraries HR supports our faculty and staff. We are very independent on our own recruitment and collaborate closely with our Compensation Dept."

Questions for Libraries HR Personnel/Manager

The Following Sections Should Be Completed By The Libraries Primary HR Professional On Staff.

13. Approximately ___ hours of my job are devoted to human resource tasks:
    40 hours (full time): 59%
    Less than 40 hours, but more than 20: 29%
    20 hours: 0%
    Less than 20 hours: 05%
    Other, please specify: 07%
14. Are you the primary supervisor for employees, student workers, and/or graduate assistants?

Table 2.

	1	2	3	4	5	6	7	8	9
Yes, number of full time employees	36%	21%	21%	4%	7%	0%	0%	0%	0%
Yes, number of part time employees	78%	22%	0%	0%	0%	0%	0%	0%	0%
Yes, number of student workers	50%	33%	17%	0%	0%	0%	0%	0%	0%
Yes, number of graduate assistants	0%	0%	0%	0%	0%	0%	0%	0%	0%
No, I do not supervise	0%	0%	0%	0%	0%	0%	0%	0%	0%

15. The salary range for _____ at my Library is:

Table 3.

	Less than $30,000	$30,000 – $35,000	$35,000 – $40,000	$40,000 – $45,000	$45,000 – $50,000	Greater than $50, 000	N/A
HR Management	0%	0%	0%	6%	6%	85%	3%
HR Staff	11%	20%	29%	20%	11%	6%	3%

16. Indicate your educational background and other qualifications (please mark all that apply)
    Masters in Library and Information Sciences: 23%
    Masters in Human Resource Management: 10%
    Undergraduate degree in Human Resource Management: 21%
    HR certification or training: 33%
    Other, please specify: 54%
    Other comments included: MBA, Experience, MA in Economics, BS in History, BS in Education, PhD in Library and Information Science
17. I have worked as an HR professional for __ years.
    1 – 3: 03%
    3 – 5: 0%
    More than 5, but less than 10: 18%
    10 – 15: 15%
    15 – 20: 33%
    Over 20: 31%
18. I have worked at this ARL Library as an HR professional for __ years.
    1 – 3: 18%
    3 – 5: 10%
    More than 5, but less than 10 22%
    10 – 15: 15%
    15 – 20: 15%
    Over 20: 20%

What Is Your Job?

19. Is the hiring for the entire Libraries conducted through your office? (Space is available for further comments.) ***
    "Yes, Hiring for all faculty, staff, & over 200 students"
    "No, Classified & Student Staff handled by other"
    "Yes, Also hire for all grant funded projects"
20. Please describe your role as the Libraries HR professional and the role of the university HR Department in the hiring process: ***
    "The University HR Department processes paperwork"
    "Selection, Interviewing, References, paperwork, job offers are handles by Libraries HR. The application process is coordinated through the university HR department"
    "The university department refers applications to us. We work closely with supervisors through the rest of the process"

21. On average how many people in each category below are hired per year:

Table 4.

	1	2	3	4	5	6	7	8	9	10
Librarians	3%	27%	24%	8%	19%	3%	3%	5%	0%	8%
Library Associates/ Paraprofessionals	5%	8%	11%	14%	5%	11%	5%	0%	0%	41%
Administration	52%	17%	0%	9%	9%	9%	0%	4%	0%	0%
Graduate Students	8%	8%	0%	19%	19%	4%	4%	0%	0%	38%

22. Please describe your role in the hiring of professional librarians (faculty). For instance, do you serve on search committees; oversee ingest of all applications, etc.? ***
    "Oversee the entire hiring process, however I do not sit on all the search committees"
    "Oversee process, interview logistics, salary negotiations, relocation logistics"
    "I serve ex-officio on all search committees. All applications are directed to me and then shared with the search committee. All interview schedules, travel arrangements are handled in our office"
23. Please describe your role in professional librarian (faculty) recruitment: ***
    "I manage the recruitment processes for all library faculty positions. This involves analysis of job descriptions, coordination of interviews, and placement of job postings. For faculty searches, I assist search committees, place job advertisements, coordinate scheduling and interviewing logistics, and complete paperwork for various University offices and units including Affirmative Action and Academic Affairs. I ensure compliance with federal and University regulations and policies, including Affirmative Action guidelines"
    "Place advertisements in appropriate journals, online listservs"
    "All postings are done through our office and all contact with candidates is by our office"
24. As a Libraries HR Professional, do you participate in university-wide Faculty recruitment strategies or strategies for promoting diversity in the workplace? Please specify these activities. ***
    "No"
    "We work closely with university HR, EEO, and our diversity advisory council in promoting these strategies"
    "I serve on University committees that participate in forming diversity initiatives"
25. Do you participate in outreach activities to prospective employees (attend fairs, conferences)? Please include examples of these activities: ***
    "No – our applicant pool is usually very large just by advertising through our University website"
    "Actively participate in ARL Diversity Initiative conference. We have sponsored and staffed booths at ACRL conference"
    "Yes, I have traveled to other campuses to recruit new faculty"

26. How often do you conduct HR related sessions and present materials to the Libraries faculty and staff?
    Frequently: 1 time a month or more - 29%
    Often: About every three months - 21%
    Less often: About every six months - 24%
    Infrequently: Once a year - 21%
    Never - 05%
27. If you answered a.-d. in Question 26, please list some topics covered in HR sessions you have given or sponsored: ***
    A general summation of the responses include: diversity training, Fair Labor Standards Act, university personnel policies, behavioral styles in the workplace, safety training, FMLA, sexual harassment, new employee orientation, and performance appraisals
28. Beyond the hiring process, what interaction do you have with professional librarians (faculty)? Check all that apply.
    Committee work: 69%
    Mentoring or support: 56%
    Answer university or general HR questions: 90%
    Other, please specify: 28%
    Other comments included: "Facilitate reviews", "Employee relations, FMLA, mediation", "Consultant to Library Administration & all others"

Professional Development

29. I attend approximately __ number of HR related conferences and workshops per year
    1 – 2: 29%
    3 – 4: 47%
    None: 11%
    Other, please specify: 13%
    Other comments included: "I attend monthly HR-related luncheon (SHRM chapter)", "10+", "Monthly meetings of University HR"
30. If you answered a or b to the above, please specify how many conferences and workshops are

Table 5.

	1	2	3	4	5	6	N/A
National or international	33%	14%	5%	0%	0%	0%	48%
State or regional	62%	17%	0%	0%	0%	0%	21%
At my institution	14%	29%	14%	18%	7%	14%	4%
Other, please specify	0%	33%	0%	0%	0%	0%	67%

31. I have given professional presentations outside of my Library about HR related issues
    Yes: 43%
    No: 57%
32. I have published in HR or Library journals about HR related issues.
    Yes: 08%
    No: 92%
33. I am a member of the following professional societies: ***
    "SHRM – Society for Human Resource Management"
    "LLAMA – Library Leadership & Management" (a division of the American Library Association)
    "ACRL – Association of College and Research Libraries"
34. Please provide any additional comments related to this survey.***
    "The demographic numbers I reported on the first screen also include our law, medical and dental libraries that are treated as a separate entity at my university"
    "Survey question responses pertain only to Main Library"
    "The Center is a not for profit academic library consortium and not part of a university or college. Hence, I had to respond not applicable to several of the questions"
35. Optional information

Thank you for your participation in this survey!

*** For complete responses to qualitative questions please contact the authors.

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Chapter 73
Understanding Organizational Culture and Group Dynamics:
Reframing the Normative Orientation of the Role of Information Professionals within Organizations

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ABSTRACT

The field of library and information science will benefit from a greater understanding of the function of individuals in relation to organizational culture and group dynamics, including how individual experiences underlie the culture of an organization. Understanding how these factors can shape successful human resources management will help today's information science and management organizations in their recruitment, development, and retention efforts. It is suggested here that, while MLIS curricula and library organizations have traditionally focused on leadership as a function of management, a reorientation towards development of leadership skills at all levels of the organization will have a positive effect on organizational culture and group dynamics. In development of this concept, this chapter provides an overview of traditional approaches to understanding organizational culture and group dynamics and how these are applied in the information and library science literature and curricula; explores an alternate normative orientation towards the understanding of organizational culture and group dynamics as a function of all individuals in an organization and not just management; identifies ways in which information professionals and organizations can use this knowledge to recruit, develop, and retain employees in the information sciences profession; and explores future research directions in these areas.

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INTRODUCTION

The library and information science profession has a history of addressing organizational culture issues in its graduate curriculum, through the literature, and within organizations themselves. Understanding organizational culture is traditionally focused in the areas of management and leadership, as is evidenced in the literature and in the library and information science curricula. A shift in normative orientation – or the assumption of what ought to be the norm – from managers as experts to individuals as equally responsible for the work environment – will help create an organizational culture that encourages the recruitment and retention of employees who are well-matched to the needs, values, and goals of the organization. It is important to recognize the value for anyone, at any place in the organization to have an understanding of organizational culture. Ultimately, the culture of an organization has an effect on everyone in that organization, regardless of position or level of responsibility. Likewise, each individual has the potential to influence his or her organization. Several approaches exist which libraries should consider to reframe the understanding of organizational culture and group dynamics from a management function to a function of every individual in the organization. The approaches proposed here include *Distributed Leadership, Job Embeddedness, The Bad Apple Concept,* and *Positive Relationships at Work.* While the concepts in this chapter are just some examples of how to apply this different normative orientation, it is hoped that these concepts help merge theory with praxis – or practical application – for use in information organization settings.

BACKGROUND

Organizational Culture and Group Dynamics Defined

Understanding the field of organizational culture requires a background introduction into a broader field of study: organization theory. According to Tompkins (2005), "organization theory is the study of how and why complex organizations behave as they do. Specifically, it is the study of formal structures, internal processes, external constraints, and the ways organizations affect and are effected by their members" (p. 1). This broader field of study has three subsets: the branch of organization theory, the branch of organizational behavior, and the branch of management theory. The organization theory branch uses a macro perspective which looks at the organization itself and its structures. The organization behavior branch of study uses a micro perspective approach and looks at individuals and groups and how they interrelate. Management theory focuses on the subset of management in organizations (Tompkins, 2005). Each of these branches of organization theory provide different insights into how organizations and the individuals within them operate and mutually influence each other. The primary focus of this chapter is on the organizational behavior branch which emphasizes an understanding of how individuals and groups within organizations have an influence on each other and on how organizations function.

In addition to looking at organizational culture, this chapter addresses a closely-related concept: group dynamics. Macgowan (2009) defines group dynamics as "the internal and external forces that affect processes and outcomes in groups" and it consists of four groups: "(1) communication and interaction, (2) interpersonal attraction and cohesion, (3) social integration (power, influence, norms, roles, status), and (4) group development" (Macgowan, 2009). These aspects of group dynamics mutually influence organizational culture. Understanding these relationships helps inform

approaches information organizations can take in adjusting their practices to work most effectively within these cultures.

History of Organizational Culture and Group Dynamics as Areas of Study

Organizational behavior cuts across disciplines using ideas from such fields as the natural sciences, sociology, anthropology, business, economics, psychology, and public administration. In the field of library and information science, much of the study into organizational culture and group dynamics is found in the management literature (Stueart & Moran, 1987; Evans, 1983; Lynch, 1985). This section explores the focus of organizational culture and group dynamics as a management function in information organizations. The next section follows with a proposed different normative orientation towards organizational culture and group dynamics for the effective recruitment and retention of information professionals.

As has been noted, organizations are often analyzed from a management perspective. In the early 1900s, Frederick Taylor used his engineering background in application to organizations (1911). His theory of scientific management sought to shape organizational culture to maximize productivity and efficiency. This approach was adopted in many fields, including libraries and library literature, as is illustrated in Dougherty and Heinritz's *Scientific Management of Library Operations* (1966). In the late 1970s and early 1980s, the study of organizational culture as a subset of the management literature emerged with influences from the fields of anthropology and psychology. Social Psychologist Edgar H. Schein provided a conceptual framework of organizational culture. The three interrelated levels of this framework include artifacts, espoused values, and basic underlying assumptions (Schein, 1992, p. 17). Artifacts are observable organizational structures and processes such as mission statements, organization charts, and meeting membership and conduct. Espoused values include the values of the organization such as annual goals, vision statements, and accepted norms. Basic underlying assumptions incorporate the underlying values in the organization which, while not expressly stated, set the guiding tone for how organizational members take action (Schein, 1992, p. 231). Schein (1992) suggests managers should use this awareness of the elements of the organizational culture framework as a tool for recruiting and retaining employees who have similar values and normative assumptions to the organization (p. 47).

Around the same time as Schein's work, interest in Japanese management techniques emerged in the U.S. management literature. The strength of the Japanese economy grew in tandem with U.S. interest in this phenomenon. William Ouchi's Theory Z compares Japanese organizational culture to American organizational culture. He describes Japanese culture as a clan culture which emphasizes trust and relationship building, while the American organizational culture tends towards bureaucracy with a basis of hierarchy rather than groups (Tompkins, 2005, pp. 369-372). This observation echoed the findings of German economist and sociologist Max Weber from decades earlier. Weber described organizations at the turn of the 20th century as being hierarchical and bound by rules with little regard for the human element (Tompkins, 2005, p. 54). Ouchi's Theory Z illumination of the rule-bound trends in American organizations led to new approaches with organizational culture and group dynamics which recognized the possibilities of addressing the individuals within those organizations, their needs, and their influences on each other and on the organization. The "Solutions and Recommendations" section of this chapter explores some of these other theories and examines how they can be applied in information organizations.

A large body of literature in library and information science focuses on the business application of understanding organizational culture. This approach has overtones of Dougherty and Heinritz's

(1966) applications of scientific management of library organizations mixed with more modern elements of business. Schachter (2005) and Adyoyin (2006) exemplify how understanding and shaping organizational culture in libraries is couched in terms of managerial duties. Adyoyin states: "Library managers live within the corporate culture. They must understand it as a basis for diagnosing and solving problems and for developing new policies or procedures" (2006, p. 1). While this is a valid perspective, the aim of this chapter is to reorient thinking of organizational culture to a study for all individuals in the organization. To truly understand and enact organizational change, there needs to be understanding and buy-in from everyone involved within that organization.

While the literature reflects the study of organizational culture and group dynamics as a function of management, the library and information science graduate curricula demonstrates this orientation, as well. The library and information science graduate programs orient, educate, shape attitudes, and provide a normative orientation for librarians for work in information organizations. Consequently, it is helpful to look at the graduate curricula for elements of organizational culture and the types of courses in which it is addressed. Currently, there are 62 American Library Association (ALA) accredited Master's programs in Library and Information Studies (ALA, 2008a). The most recent requirements for accreditation highlight issues of current importance to the profession:

The most important issues at the time of the revision [of the accreditation requirements] included: diversity, systematic planning, student learning outcomes, definition of the field, interaction with other fields of study and other campus units, distance education, globalization, management, multiple degree programs, values, and ethics. (ALA, 2008b, p. 14)

Organizational culture and group dynamics are not named specifically, but "management" is listed as an important issue. As is seen in the following sample of ALA accredited programs, human resources issues such as organizational culture and group dynamics tend to be included in courses in management, if included at all, in the curriculum. These programs include a diversity of value placed in understanding organizational culture as a key component of librarianship; demonstrate the variety of perspectives of organizational culture as management function versus an organization-wide knowledge asset; and illuminate the viewpoints of organizational culture as the role of external forces in shaping organizations versus internal forces of organizational culture having an effect

Table 1. Library and information science courses with a focus on management in relation to organizational culture

• Administration of Information Agencies: This course focuses on the managerial role in information agencies. The purpose of the class is to highlight the core competencies necessary for information organization management, summarize some of the key theories behind management, and provide an opportunities [sic] for students to experiment with tools for improving managerial effectiveness. (University at Albany, State University of New York, 2009)
• Managing Information Organizations: Applies theories and techniques of management to libraries, information centers, and information enterprise, concentrating on political processes, leadership, communication, human resources, organizational structure, decision making, planning, and control. Also includes elements of project management. (Drexel University, 2009)
• Administration of Libraries: Addresses the general principles of administration and their application to the organization and management of different types of libraries. Core components include general management techniques and administrative procedures, budget preparation, human resources issues, and facilities and resources management. Students will learn how to apply standards for evaluation of libraries and how to develop functional library programs. Provides a forum for the discussion of the roles of different types of libraries in society. Includes a required field experience. (Clarion University of Pennsylvania, 2009)
• Organizational Management: Survey of management issues common to all information environments --understanding organizations, decision making, hiring and personnel, grant writing, and marketing. (University of Iowa, 2009)

upon how we serve our patrons. Many of these programs do not address organizational culture or group dynamics in any of the course description offerings. Of those that do, the majority are part of management or information organizations courses. This brief sampling (Table 1) covers the course descriptions of these programs and does not entail a review of the syllabi for these courses. It is assumed that the course descriptions provide a summary view of the normative orientation of the programs.

These courses, like the literature, reflect a traditional approach to organizational culture in library and information science curricula which emphasizes leadership as a function of management. Newer concepts and approaches to organizational culture issues may be of use in today's fast-paced information organizations, as is examined in the next section.

UNDERSTANDING ORGANIZATIONAL CULTURE AND GROUP DYNAMICS IN RELATION TO RECRUITMENT, DEVELOPMENT, AND RETENTION OF INFORMATION PROFESSIONALS ISSUES, CONTROVERSIES, AND PROBLEMS

As is seen from the review of the literature and the library and information science curricula examples, the focus of organizations and organizational culture is couched in the area of management or in the understanding of the role of information organizations in society. What is lacking in these examples is the value that understanding organizational culture and group dynamics at every level is a key component to effectively participating in organizations regardless of the type of organization or place within it. This is not just a management or an information organization issue, but it is about existence and living daily life in an organization of any sort.

Solutions and Recommendations

As noted earlier, the library and information science profession should consider alternate approaches to organizational culture which explore the role of individuals in organizations. It is useful to understand and appreciate an organization's culture and group dynamics when developing management strategies and techniques. Likewise, it is useful to recognize the value of such knowledge for anyone at any place in the organization. The culture of an organization has an effect on everyone in that organization, regardless of position or level of responsibility. Each individual has the potential to influence his or her organization. Libraries can reframe their understanding of organizational culture and group dynamics from a management function to a function of every individual in the organization. Some approaches proposed here include *Distributed Leadership, Job Embeddedness, The Bad Apple Concept,* and *Positive Relationships at Work.* A shift in normative orientation from managers as experts to an orientation of individuals as equally responsible for the work environment will help create an organizational culture that encourages the recruitment and retention of employees well matched to the needs of the organization and the orientation of the individual. The following examples of how to apply this different normative orientation help merge theory with praxis, or practical application, for use in information organization settings.

Concept of Distributed Leadership

To set the stage for this new normative orientation, it is useful to consider adoption of *Distributed Leadership* as a value. In Distributed Leadership, each individual has the potential to lead from within any point in an organization. West Chester University demonstrates this concept in the following statement:

Distributed Leadership is an attitude rather than a management technique. It means seeing

all members of the faculty and staff as experts in their own right – as uniquely important sources of knowledge, experience, and wisdom. Above all, the approach allows the University's vision for the future to be shared and implemented across the campus.

Under Distributed Leadership, everyone is responsible and accountable for leadership within his or her area. Good ideas come from throughout the University, and many people cooperate in creating change. With ramifications in virtually all areas of campus life, Distributed Leadership is an environment where everyone feels free to develop and share new ideas. A central goal of the approach is for individuals to succeed in a climate of shared purpose, teamwork, and respect – an atmosphere in which we can reach out to help one another and feel free to turn to ask for help. In other words, Distributed Leadership supports and strengthens already outstanding individuals (West Chester University, 2009).

Distributed Leadership informs organizational culture and group dynamics through an approach to investing in all employees' ability to shape the organization and lead from any position. This normative reframing of individuals' roles leads to the potential successful use of the related concepts described next.

Aquinas College in New Zealand serves as an example of a library employing the concept of distributed leadership (Blackwell, 2007). Their approach to distributed leadership seeks to encourage innovation, encourage professional debate and conversation, and demonstrate trust through shared responsibilities, participation in meetings, and professional development opportunities. In this instance, the organizational culture includes expectations that all employees participate fully and that there is a dedication of organizational resources to help individuals success in that regard.

Job Embeddedness Rather Than Job Satisfaction (Or Dissatisfaction)

Shifting the focus of understanding organizational culture to meeting an individual's needs rather than as an isolated function of management is the next step in creating a positive organizational culture. Indeed, Lee, Holtom, and Mitchell observe: "a person's perceptions about alternative job prospects combined with his or her job satisfaction and organizational commitment has represented the dominant approach to understanding voluntary employee turnover." (2006, p. 318). Instead, they suggest considering the approach of job embeddedness when shaping an organizational culture. This approach places responsibilities for that culture in the hands of the employees. The critical features of job embeddedness, according to Lee, Holtom, and Mitchell include: the extent to which the job is similar to, or fits with the other aspects in his or her life, the extent to which the person has links to other people or activities, and what he or she would give up by leaving – the perks, benefits and other aspects of the job they value, such as a safe or pleasant work environment. These dimensions are called fit, links, and sacrifice (2006, p. 319).

To gauge a good fit of employees and an organization, it helps to provide a clear picture of organizational culture up front and to ask employees pre-employment questions through surveys and interview questions which address the fit with this culture (Lee, Holtom, and Mitchell, 2006, p. 322). After hiring new employees, they need an introduction to their new environment. Anderson uses a gardening metaphor to illustrate this type of orientation process. If individuals are expected to play an active role in a successful organization, then they need to be equipped with information about organizational culture but not so much information that it becomes noise. Anderson states, "'Planting them too shallow' means not providing enough information, resources, or support. 'Planting them too deep' means over-

whelming employees with too much information or unrealistic initial expectations" (2006, p. 76). So, to help provide the organization culture context, Anderson suggests providing the employee with information needed to answer these critical questions:

- Who do I need to know? The people and relationships that will be most important to this person's success.
- How do things get done around here? The systems, procedures, and cultural 'rules' this person will need to understand and use.
- What's expected of me? The specifics about the performance for which this person will be held accountable, and how you'll stay in touch about those expectations (2006, p. 76).

To create links to the organization, an organizational culture which actively fosters healthy relationships can be used. For example, Lee, Holtom, and Mitchell (2006) suggest investing in technologies which keep mentors and mentees connected online when face-to-face meetings are not possible (p. 323). This could include permitting the use of instant messenger programs or wiki software to facilitate immediate feedback or knowledge building between individuals. At the author's institution, each library department holds "Getting to Know You" sessions every few years to educate each other about the roles and functions of individuals and the units in which they work. This exercise creates a link for individuals between how all parts of the organization fit together to achieve organizational goals.

A final way Lee, Holtom, and Mitchell (2006) suggest that organizations can control for job embeddedness is to create benefits which would be considered sacrifices if an employee were to leave an organization. While financial rewards are an obvious benefit employers can provide, other, less costly benefits can include an organizational culture which places value in other types of benefits. Examples may include treating employees with the normative orientation of distributed leadership as a positive value. Another example is for employees to have the opportunity to serve on committees or boards which make decisions about the roles and services of the organization. Training offerings and skill-building is another way to invest in employees and to invest in the organization at the same time. Returning to the Aquinas College example, all library employees receive membership into the regional library association to help with networking and professional development opportunities. Travel and professional leave, as is found in many libraries, is another such example of creating embeddedness. Using the distributed leadership model, organizations empower employees to decide or recommend the benefits offered to employees which are of most help and value to them; employees consider losing these benefits a sacrifice upon leaving.

Bad Apple Concept

While much of this chapter has focused on the concept of organizational culture, group dynamics has a very close relationship with organizational culture which can be seen through the research into the "Bad Apple" Concept. In their research, Felps, Mitchell, and Byington (2006) found that one negative group member can have a "powerful, detrimental influence on teammates and groups" (p. 175).

Effective groups "produce as individuals, which depends on having a team that is motivated, capable, and able to learn and change" (Felps, Mitchell, & Byington, 2006, p. 202). They also, as a group, "effectively coordinate and integrate individual action into a coherent whole constituting a group output" (Felps, Mitchell, & Byington, 2006, p. 202). In their research, they found that a negative group member, or "bad apple," can have a detrimental effect on group function. Three areas in which this type of individual can

cause problems in groups include problems with cooperation, conflict, and group outcomes (Felps, Mitchell, & Byington, 2006, p. 204). Problems with cooperation occur when a negative group member undermines trust in the group by spreading gossip or taking credit for others' work, resulting in diminished trust that cooperation is for the benefit of the whole group (Felps, Mitchell, & Byington, 2006, p. 204). Conflict situations differ depending on the type of conflict. If the conflict is about a person, or relational conflict, then this can disrupt group work, can result in retaliation, and can cause the disengagement of group members (Felps, Mitchell, & Byington, 2006, p. 205). In addition, it may be a damper upon the process of task conflict (a positive form of conflict which explores ways in which to do work) or brainstorming and constructive criticism. Ultimately, the bad apple can have a negative impact on group outcomes which result in "poor performance, low viability, and an unhappy team" (Felps, Mitchell, & Byington, 2006, p. 206).

It is suggested here that educating group members about the bad apple concept and making them aware of signs of bad apple behavior can help them mitigate the effects the bad apple can have on the group before the damage to the group dynamic is irreparable. The most important bad apple behaviors of which to be aware include "the withholding of effort, the demonstration of negative affect, and the violation of important interpersonal norms" (Felps, Mitchell, & Byington, 2006, p. 207). Usually, as groups try to address or adjust to these behaviors, defensiveness occurs in individuals across the group because of a lack of control over the situation and a frustration over the time and energy required to navigate around the negative behavior. Felps, Mitchell, and Byington (2006) suggest several implications from their work which help mitigate these behaviors. First, the selection of individuals into the workplace should, ideally, not include those with bad apple orientations. Second, those who already are in the organization should have as little group process work as possible. Third, training for groups helps them become more attuned to handling destructive behavior. This last point should be highlighted as it emphasizes to the importance of empowering the group members in these bad apple situations (Felps, Mitchell, & Byington, 2006, p. 212). Individuals can work together to form coalitions or to establish unacceptable behavior in a group if they feel empowered and educated about the benefits of doing so. Organizations which have trusting groups which engage in productive behaviors rather than defensive and hostile ones will likely find increased job embeddedness and improved recruitment and retention. So, while management has some role in the hiring and training processes, the members of groups have the most control over creating positive group dynamics and in shaping an organizational culture that does not tolerate bad apples spoiling the barrel.

Positive Relationships at Work

Further commentary about organizational culture and group dynamics is couched in the context of positive relationships in the workplace. Kahn (2007) explores this in terms of positive relationships in groups and communities. Kahn (2007) presents a formulation of positive relationships in groups at work:

> People simply act in positive ways towards one another, and are enabled to do so by communal structures, cultures, and processes. These actions create relationships among people that enable them to feel valued and valuable, seen and witnessed, cared for and appreciated, productive and engaged…Members are reasonably authentic, saying what they think and feel and acting in ways that feel real to them. To do good work together (p. 277).

The challenge, Kahn suggests, is figuring out how to create opportunities to make and foster these types of relationships. He suggests four conditions which, when all met, can help achieve positive work relationships. The first condition is

abundance, where people show acts of gratitude, concern, selflessness, and compassion which leads to job embeddedness and positive work engagement (Kahn, 2007, p. 278). The second condition, safety, "evolves from a series of repeated acceptances by group and community members of one another" and leads to trust, intimacy, and authenticity in groups (Kahn, 2007, p. 279). The third condition, boundaries, provides definition to groups and reinforces the second condition of safety. The final condition, positive spirals, is the constant reinforcement of positive acts being met with positive acts resulting in a momentum of positive energy within a group (Kahn, 2007, p. 281). As was found in workplaces which discourage bad apple behavior, positive relationships can increase retention and yield greater job embeddeness for employees.

Organizations can encourage positive relationships to form in a variety of ways including the creation of mentoring opportunities, retreats, and work community events such as parties and lunchtime seminars. They can also reward employees who show the courage to participate positively. Finally, assuming a model of distributed leadership is being used, every leader can help shape a positive work environment. This type of leadership includes recognizing negative spirals and interrupting their cycles, finding areas where positive spirals occur and feeding into those spirals to help them grow, and by being positive examples themselves whenever possible (Kahn, 2007, pp. 283-284). As Dutton and Ragins observe, positive work relationships "are generative in the sense of creating meaning about the self, about others, or about a collective, which in turn cultivates additional resources that make more likely other generative patterns of interaction" (2007, p. 393). If members of organizations are empowered to facilitate positive interactions, the results grow exponentially as positive experiences flow into other aspects of the organization with each related interaction. In the next section, these concepts, along with other related concepts will be explored relative to the library science curricula.

Comparison of Organizational Culture as a Function of Management vs. Organizational Culture in Terms of the Role of the Individual in Library and Information Science Curriculum

In an earlier section, the ALA Accredited graduate programs were examined for aspects of organizational culture and group dynamics in their curricula. While many schools either ignore these concepts or couch them as a function of library management, some examples of these ideas are similar to a distributed leadership normative orientation. These alternate orientations are offered in comparison to the management-oriented curricula reviewed earlier in this chapter:

In Table 2, the two courses under the heading "Library and Information Science Courses with a Focus on Individuals in Relation to Organizational Culture" focus on the role of the individual. The tone of the first course focuses on empowering every information professional with the skills and abilities to become an effective leader, regardless of position within the organization and to help create a healthy organizational culture and group dynamic. The second course under that heading-couches management from any point within an organization. These two courses serve as examples of how Library and Information science programs can reorient their curricula towards empowering individuals to understand their roles as leaders from any point in organizations.

FUTURE RESEARCH DIRECTIONS

What are the future implications for research into understanding the role of organizational culture and group dynamics relative to the recruitment, development, and retention of information professionals? It is suggested here that refram-

Table 2. Library and Information Science Courses: Normative Orientations Compared

Library and Information Science Courses with a Focus on Management in Relation to Organizational Culture	**Library and Information Science Courses with a Focus on Individuals in Relation to Organizational Culture**
• Administration of Information Agencies: This course focuses on the managerial role in information agencies. The purpose of the class is to highlight the core competencies necessary for information organization management, summarize some of the key theories behind management, and provide an opportunities [sic] for students to experiment with tools for improving managerial effectiveness. (University at Albany, State University of New York, 2009) • Managing Information Organizations: Applies theories and techniques of management to libraries, information centers, and information enterprise, concentrating on political processes, leadership, communication, human resources, organizational structure, decision making, planning, and control. Also includes elements of project management. (Drexel University, 2009) • Administration of Libraries: Addresses the general principles of administration and their application to the organization and management of different types of libraries. Core components include general management techniques and administrative procedures, budget preparation, human resources issues, and facilities and resources management. Students will learn how to apply standards for evaluation of libraries and how to develop functional library programs. Provides a forum for the discussion of the roles of different types of libraries in society. Includes a required field experience. (Clarion University of Pennsylvania, 2009) • Organizational Management: Survey of management issues common to all information environments --understanding organizations, decision making, hiring and personnel, grant writing, and marketing. (University of Iowa, 2009)	• Communication for Leadership: Theory, research and practice of interpersonal and group communications for collaborative leadership roles: facilitator, coach, catalyst, and leader. Includes using a variety of media for information transfer among groups; communicating a leadership stance, creating and enrolling others in your vision (advocacy), developing organization support for your vision (systems literacy) and building skills in interpersonal communications, groups dynamics, negotiations, conflict resolution and asserting influence. (Dominican University, 2009) • Management of Libraries and Information Services: Information practice demands knowledge of all aspects of management and service delivery. This course introduces selected theories, principles and techniques of contemporary management science, and organizational behavior and their application to libraries and information services. Students develop skills in planning, organizing, personnel management, financial management, leading, marketing, stakeholder management, and coordinating functions in libraries and information services. Students also have the opportunity to think critically about, and reflect upon, contemporary management practice in information organizations. Information professionals find that no matter whether they choose a career as a single entrepreneur, solo librarian, archivist, or whether they join a large organization, they become managers -- of themselves, of clients or staff, and sometimes of substantial systems and services. Through classroom instruction, workshops on specific management skills, assignments, readings and discussion, and guest lecturers, this course prepares students to assume managerial responsibilities in their work. (University of Michigan, 2009)

ing the normative orientation in library and information science curricula, literature, and in organizations themselves from focusing on these areas as functions of management to functions of any member of an organization is a useful starting point. Empowering individuals to take ownership for organizational culture and group dynamics increases job embeddedness, facilitates "good-apple" behaviors, and encourages positive relationships in the workplace. Furthermore, job embeddedness, the bad apple concept, and positive relationships in the workplace are just some examples of how organizational culture can be understood; the organizational culture and group dynamics literature offers many other potentially applicable approaches which should be considered. Given the generational differences in expectations of roles in the workplace, further research into how distributed leadership might be approached differently depending on generation should be considered. Also, research into the bad-apple concept and into distributed leadership is relatively new and could be more rigorously considered relative to the information and library science profession. Additional distinctions between types of information settings, particularly considerations for public agencies should be considered and would benefit from greater integration of the public administration literature into the library and information science areas of study. While not provided here, case studies into how these concepts might be applied could help shape theory into practical application for use by the information science practitioner.

CONCLUSION

Organizational culture and group dynamics shape the world within which individuals do their work.

As information organizations in the 21st century seek to recruit, develop, and retain employees, it is important for these organizations and the people they hire to be equipped with the knowledge, skills, and abilities to shape this work environment for success. This knowledge, skill, and ability can start with required offerings in the information and library science curricula and should extend into the normative orientation of information professionals within organizations themselves. It is proposed here that this normative orientation take on the approach of distributed leadership to empower information professionals to use an understanding of ideas such as job embeddedness, the bad apple concept, and positive relationships at work to influence organizational culture. Information professionals who are empowered with this information will be better equipped for successful, rewarding careers in healthy workplaces which are prepared to take information organizations forward in the 21st century.

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Chapter 74
"We Don't Have the Key to the Executive Washroom": Women's Perceptions and Experiences of Promotion in Academia

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ABSTRACT

This chapter reports on a pilot study looking at the progression of academic women at one UK University. The chapter focuses on the promotions process and criteria as one important issue emerging from that research. Earlier research has shown that women are less likely to break into institutional networks which allow them to access information not only on formal and objective promotion criteria but also on hidden criteria and the way the 'academic game' is played. One result of this is that some academic women may have an inaccurate view of promotion criteria and processes. At the university studied by the authors, the Human Resources department has sought to make the promotion process more transparent and, officially at least, it no longer depends purely upon research achievements. However, these changes will not necessarily result in easier progression for women academics. The authors' study confirms that there is still a mismatch between what women think the criteria for promotion are, what the formal criteria are and how those criteria actually operate. Reliance on incomplete or inaccurate information about promotion criteria, coupled other factors, such as women's reluctance to promote themselves actively and traditional barriers to promotion such as caring responsibilities, puts women at a disadvantage when they attempt to progress into more senior positions within universities. Reform of promotions procedures needs to look beyond re-writing the substantive criteria for promotion and look to improving understanding of what is involved.

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INTRODUCTION AND BACKGROUND

This chapter is based on the findings of a small scale research study carried out in 2008. The study considered the progression of women in higher education and focused on academic staff at the University of Bradford in the United Kingdom. The research outlined the European and national law relevant to this area before examining the university's own policies in detail. The majority of the study then focused on the lived experience of academics at the University exploring issues around promotion and progression, work life balance, mentoring and perception of policies amongst others through in-depth empirical work comprised of semi-structured interviews with male and female academics employed at the University (n=30). In addition to the interviews, some basic analysis was also made of statistics provided by the university. While the study did not specifically concentrate on the SET (science, engineering, and technology) disciplines, many of our respondents did in fact fall in that category. We interviewed academics in the engineering design and technology department as well as colleagues from life sciences, informatics, psychology and the school of health. Out of a total of 30 respondents, 17 were from SET disciplines while the others came from disciplines such as law, management, social sciences and languages. However, the analysis of our data showed no differences in responses by discipline.

This chapter focuses on one of the key themes emerging from the research: the promotions process in Higher Education. The emphasis is on promotion within and between the Lecturer and Senior Lecturer grades. This is partly because it was those promotions that most of our respondents talked about and also because these decisions are made internally, whereas assessors from other universities are involved with promotions to Reader and Professor. Promotions criteria in Higher Education are supposed to be transparent and clear to those employed in relevant institutions. The Higher Education Role Analysis (HERA) used to define roles within universities in the UK is supposed to allow "employers [] to ensure their pay and grading structures are designed to recognize the value of roles and ensure equal pay for work of equal value" (Educational Competencies Consortium Ltd 2007 (ECC)). A national role analysis was carried out, resulting in the development of national role profiles in UK Higher Education. These can be mapped onto a single national pay spine to ensure fairness and equality across the sector as a whole. The University of Bradford has adopted the single pay spine and the associated role descriptors. However this research casts doubts on the transparency of criteria and role profiles and the extent to which they are made explicit to university staff and/or applied consistently. In addition, as Deem and Morley (2006) note "although this methodology may deliver equal pay for equal work, […] it may also restrict promotion opportunities since these often now depend on moving to a new job rather than upgrading an existing one" (p190).

The move to a single pay spine might also explain why we detected no disciplinary differences within our data. Academics working in SET disciplines are subject to exactly the same promotions criteria as those working in the social sciences and humanities and as such they have very similar views of those criteria and processes. Nonetheless the empirical work presented here takes as its focus those interviews conducted with colleagues in the SET disciplines.

The chapter first considers academics' perceptions of what the promotion process involves and their experiences in planning for and applying for promotion. It then turns to the university administration's own explanation of what the promotions process requires and involves. These are discussed, along with some "hidden" criteria for promotion. We then consider the implications of some significant differences we found between participants' and managers' understanding of the promotions process. We will conclude that it is

unclear whether these differences have their roots in a failure to properly educate women academics about what they need to do in order to achieve promotion or whether the perception of women academics is correct but not accurately reflected in the university's formal criteria. Another factor is that this study was carried out at a time when the university had only just implemented some major changes to the procedures for promotion (including re-naming it as regrading) and this may have impacted on participants' knowledge of the process and criteria. Whichever of these explanations is correct, our findings suggest that attempts to reduce the imbalance between male and female academics at senior levels within the university are unlikely to succeed.

METHODS

The research strategy of this project employed a qualitative socio-legal methodology. It involved the analysis of law and policy from institutional to European level. This analysis was then complemented with in-depth empirical work comprising of semi-structured interviews with male and female academics employed at the University.

Table 1. Respondents by gender

	Male	Female
Number	5	25
Percent	16.7%	83.3%

The empirical work sought to gain in depth knowledge and understanding of women academics in the University of Bradford. Qualitative semi-structured interviews were carried out with male and female academic staff at the University of Bradford at all levels of an academic career (n =30). The interviews covered areas such as

- Background Data
- Career trajectory
- Reasons for choosing to work in academia
- Advantages and Disadvantages of life as an academic
- Future plans
- Perceived barriers to career progression
- Views on promotions criteria and processes
- Public perception of women academics
- Institutional culture

In order to protect the confidentiality of our respondents we are unable to provide a full profile of our sample. However, the details in Table 1 and Table 2 may be of interest.

We did not find any striking differences according to seniority in the answers given and the gender differences were also minimal with male and female respondents identifying similar issues in women's progression.

Analysis of the empirical data was carried out using the software package Nvivo7. Interviews, which mainly took place in the staff's offices and ranged from 45 minutes to 2 hours, were recorded and the recordings were transcribed and entered. The data was split (or coded) thematically as the

Table 2. Respondents by seniority

	Numbers			Percentage		
	Total	Male	Female	Total	Male	Female
Lecturer or below	16	1	15	53.3%	3.3%	50%
Senior Lecturer or equivalent	3		3	10%	0%	10%
Reader/Professor/Senior position	11	4	7	36.7%	13.3%	23.3%

themes arose from the interview data and was then analysed in accordance with those themes.

As a qualitative study this work did not seek to make representative claims or present statistics or statistically significant data. The figures highlighting the lack of senior academic women are well rehearsed elsewhere. Instead this study aimed to understand the experience of academics at the University of Bradford and then situate that experience within the wider literature. It provides a detailed case study which highlights areas for future qualitative and quantitative research.

WOMEN ACADEMICS AT THE UNIVERSITY OF BRADFORD

The Equality Act of 2006 places a general duty on all public authorities in England and Wales, when carrying out their functions, to eliminate discrimination and harassment that is unlawful under the Equal Pay Act 1970 and the Sex Discrimination Act 1975; and to promote equality of opportunity between men and women. The university appears, on paper at least, to take this duty seriously. 'Confronting inequality: Celebrating diversity' is one of The University of Bradford's strap lines. The university's equality policies and schemes reflect a formal commitment to promoting equality. The policies examined as part of this study were found to be comprehensive and well thought out. The main gender equality policy and scheme is well supported by a number of other policies dealing with issues such as harassment and bullying as well as maternity, paternity and adoption leave and flexible working.

However, this does not translate into equal number of male and female academics in senior positions or indeed into a perception of equality within the institution (Deem and Morley 2006). Perhaps unsurprisingly, statistics we were provided with by the University show that the most marked gender differences arise at the more senior level. Out of the 444 members of academic staff below professorial grade 43% (189) are female. At professorial level, however, 76% are male. At Senior Lecturer level the proportion of men is 65%, and at Reader 88%. At Lecturer level however the genders are almost evenly split with men making up 51% of the total. The figures broadly match those of other studies (Forster 2000). Ackers and Oliver (2005) note that "[an] inverse relationship exists between the level of feminisation and seniority as women fail to progress in science careers at an equivalent rate to their male peers" (p3).

In spite of Fisher's proclamation 17 years ago that "[n]o organisation these days can afford to waste valuable brain-power simply because it is wearing a skirt (Fisher, 1992, p. 46) the figures suggests that women are less successful than men in achieving promotion, first to Senior Lecturer level and then to more senior grades (Forster 2000; AUT 2004). The university supplied us with the figures for the promotions round held in 2007. More men (87) applied for promotion than women (59) and men were more likely to be successful. 74% of men who applied were granted a promotion whereas only 66% of women were successful.

The main purpose of this study was, however, not to conduct detailed statistical analysis but rather to gain an insight into the experience of staff at the institution. While it must of course be recognised that there are disciplinary differences even within the SET disciplines and that different factors are likely to affect people differently as they progress through their life course and career trajectory, a number of common themes emerged.

In order to get a picture of the attributes and characteristics that women academics valued in their colleagues and the standards they were measuring themselves against, we asked respondents about their 'ideal' academic. It is clear that there was no single picture of an ideal academic, and different people placed their emphasis on different skills. We also asked respondents about their own decision making around promotion and about their experiences of applying for promotion. We got a strong sense that academics across the university

felt daunted by the complexity of the promotions process; although information is available, our respondents did not find it easy to understand and to navigate. The difficulties were possibly increased because of the recent introduction of new promotions systems and criteria. We also found significant differences in respondents' perception of what the promotions criteria are – these varied not just from school to school but also within schools and departments. We detected an apparent mismatch between what people thought the criteria were, what the criteria actually were and how the criteria then operated on the ground.

The next sections in this chapter will explain in more detail what academics said about promotion in their interviews. We have dealt separately with views about what is needed in order to be promoted, and with what happened when our respondents actually tried to get promoted.

WHAT WOMEN TOLD US ABOUT PROMOTIONS CRITERIA

Researchers have found that lack of information about promotions procedures and criteria are not confined to new academics (Metcalf et al 2005). Our study also found confusion about the criteria for promotion. This confusion was not limited to junior academics but can be found across the seniority spectrum. Many respondents expressed anxiety about what exactly was expected of them. Our respondent Andrea for example commented "*No, I don't [know what I need to become a senior lecturer], I know that's where I want to be, but I don't know what I need to do to be there…"'.*

Many interviewees felt that there was a mismatch between the work the university expected them to carry out and the work that they were actually rewarded for in terms of promotion and progression. So while the university's focus was on teaching, widening participation and student engagement and these activities generally took up a substantial amount of academics' time, the reward and promotions structure was thought to be focused mainly on research activity. This focus on research in itself has been seen in previous studies to put women at a disadvantage (Forster 2000) but most academics still regard research outputs as the most important criteria for promotion. The quotations given below illustrate the point.

Researcher: What do you think it is in your discipline that gets people promoted, what's the key thing that has to be on the CV?

Interviewee: Undoubtedly, papers in peer reviewed, excellent, well-read journals. [Michelle, Lecturer, Female]

What does the institution reward? It rewards researchers who can bring in big research grants. It doesn't particularly reward teachers for good teaching […] because if you want a promotion to senior lecturer then you have to have a research track record [Shannon, Lecturer, Female]

Debate about progression in academia is ongoing particularly in the context of recognising and rewarding teaching and learning (Parker 2008, Young 2006, Collins and Palmer 2007 Gibbs and Habershaw 2002). This debate was not lost on our respondents and some mentioned that promotions criteria were beginning to change or that the emphasis or weighting of them was shifting; some thought towards teaching, some towards managerial skills and others to a more rounded approach:

So at Professorial level I've no doubt that we have to move from a focus on research. Now we have changed […] some of the criteria, we've changed it so it's more about teaching excellence, it's about knowledge transfer, KTs, consultancy, it is wider [Daniel, Senior, Male]

However, even though a shift in emphasis and the availability of different career paths through

academia was recognised at very senior level and welcomed at the lower levels of seniority, it appears that few believed that this shift in emphasis was actually being translated into practice. Three crucial issues emerged. Firstly, managers, most often academics themselves, do not necessarily have up to date and reliable information about how to apply promotions criteria in individual situations and are thus unable to give clear and constructive advice. Secondly, academics who are unsure of what exactly the criteria are and cannot get clear guidance from their managers, are unable to work strategically towards achieving those criteria or may believe they do not meet the criteria when in fact they do. Thirdly, as well as the criteria set down in HERA or those identified at departmental or school level, there are additional hidden criteria which operate in parallel with the formal criteria but which are far less transparent. These issues are explored further below but the quotation below highlights the problem women academics face:

There's a phenomenal repeat message from the females about how they went for promotion and they have the most research and you know, everything else they outperform guy X and guy X got the job and they asked for feedback and none of them got feedback. So I think the criteria might be different or the experience of the criteria might be different between the male academic and female [Nicole, Junior, Female].

What Women Told Us about their Experiences of Preparing for and Applying for Promotion

Researcher: How did you find the criteria?

I think it's still written in gobbledegook, I'm a plain speaker. I just find it really interesting that on the one hand the institution is saying that they want people to apply for a promotion, they advertise that this is going to happen. The information session run by the institution was a week before submission. So those 2 things do not go hand in hand. So they're saying one thing, when they actually mean something totally different. And that's my impression. If you really, really want to support people to do something you don't give them the information a week before, the amount of evidence that they want needs to go in, even down to when you've got to write your list of publications. We use Harvard referencing here, that's not Harvard referencing, so I had to redo it all. [Shannon, Lecturer, Female]

The personnel website of the University of Bradford devotes quite a significant amount of web space to matters related to promotions. Staff can access detailed information about the pay and grading structure, role descriptors and the promotions process and timetable. Nonetheless our respondents did not necessarily feel that they were well informed about the process and the applicable criteria, nor did they feel confident in going through it. There was a common perception that the promotions process was time consuming and involved complex paperwork. A number of our respondents actually felt unable to spare the time from the 'day job' to complete the required paperwork and those who did often found the process stressful. Sarah's comments encapsulate the feedback we received on the process: "*It was hard work, bureaucratic, lots of box ticking"*. [Sarah, Lecturer, Female]

Michelle touches on a further issue which many respondents raised:

I don't want to want to be knocked back; I don't want to put a lot of time into something that I can see is going to be knocked back because I know I haven't got the quality publications recently [Michelle, Lecturer, Female]

She highlighted that she did not want to just 'have a go' at going for promotion but rather

wanted to be sure that she met the criteria and would be successful when she applied. She did not want to go through being rejected or knocked back. Two related points emerge. In the view of some respondents, there was a gendered dimension to reluctance to submit a speculative application, and that men were less concerned about rejection and more comfortable with self-promotion (Bagilhole and Goode 2001). ' *I do think women are less willing to put themselves forward maybe because they're afraid of being hurt, you know'* [Stephanie, Lecturer, Female].

Further, those who were aware of the promotion criteria, for the most part felt it difficult to relate them to the work that they did or were frustrated with the application paperwork because it did not allow them to accurately portray what they felt was important. The criteria, said our respondents, are based on process and form and are *"a very traditional way of looking at it"*. [Elizabeth, Senior Lecturer, Female]. The application form used applied a restrictive view of the promotions criteria and thus did not allow applicants to portray *"a full enough or a round enough description of [themselves] and all the things [they] were doing"*. [Sarah, Lecturer, Female]

THE UNIVERSITY'S FORMAL PROMOTIONS/ REGRADING CRITERIA

The University has two distinct procedures for promotion, one applying to promotions within and between the Lecturer and Senior Lecturer roles and one applying to promotions to Reader and Professor. The focus of this section is on the former.

The University of Bradford has recently overhauled its promotions procedures. All staff have been placed on a single pay spine, over 260 role at the university evaluated, and new role descriptors introduced. This is part of a national initiative for pay modernisation. The new system was used for the first time in 2007. Most of the respondents interviewed for this research had not yet applied for promotion under the new system, but some had and others commented on it more generally. Given that one of the themes we detected in our interviews was lack of awareness of promotions procedures, the fact that many respondents failed to comment on the new process was instructive in itself.

The new procedure is initiated when the academic and their manager agree, at an annual Performance Review meeting, that the academic's "role" has undergone significant development, i.e., the academic has taken on additional responsibilities or developed new skills. (Regrading is not concerned with *potential* to perform at a higher level: unless that higher level has already been achieved, the position cannot be regraded.) The academic and manager then agree a new job description for the role. If the manager feels that the role has developed to the level of a higher grade, as defined by the HERA role descriptor, the new job description is forwarded to the Dean/Head of Planning Unit for approval and the manager submits an application to the School/Planning Unit Annual Promotions committee.

As can be seen, the academic's line manager has a central role in the promotions or regarding process. This is the person who carries out annual Performance Reviews, at which targets for further development are set. The line manager is also often the person who allocates administrative responsibilities. This is important because not all criteria for regrading can be satisfied simply by doing one's existing role well. If the role descriptor for a higher grade requires evidence of successfully completing a particular task, then the academic needs the opportunity to take on that task. However, in setting targets or planning an individual's future development, the manager is not concerned purely with the personal and career development of the academic: according to the document "Promotions Exercise 2008",

It is for management to determine how roles are to be developed in the context of strategic and operational requirements within Schools/Planning Units and across the institution. The potential development of any role, along with any associated development plans, should, therefore, be discussed in that context during the performance review (University of Bradford 2008 p1 emphasis added).

While formally there is no "rationing" of regrading, the operational needs of a particular school or planning unit are likely to have this result. If there is no need for more staff to carry out the higher level tasks required for the higher grade, then a staff member will not receive the opportunity to work at that higher grade and therefore will not be regraded.

The support of the manager is also required for any application to reach the School promotions committee: "All evidence submitted in support of a case must be verified by the appropriate line manager. No case for promotion will be considered unless the supporting evidence submitted has been verified" (University of Bradford 2008 p2). If the School committee approves the application, it is put forward by the School to the University committee. Self-submission to the School/Planning Unit committee is not possible but self-submission to the University committee is permitted where the School/Planning Unit committee does not approve the application.. The final decision on promotion is made by the University committee. The manager is therefore a gatekeeper for development and promotion opportunities.

Our findings echo those of Deem and Morley (2006) one of whose respondents articulates well what many respondents told us:

My experience of going through the promotion process... flushed out an awful lot of issues to do with gender... if you wanted to be promoted... you needed... managerial profile roles which were significant... the head of department decided who was going to get those roles... and that... operated as a way of blocking women from being promoted unofficially (Female academic, Cityscape) (p191).

Our respondents regarded publication of research as critical to promotion but it is not clear that the formal criteria in the role descriptors actually give research this central role. There are different HERA role descriptors that are intended to capture different academic career paths – that is, research focussed, administration focussed and all-rounders. However, all role descriptors are written in a very general way and are not discipline specific, let alone lecturer-specific. The result is language that seems strained as a description of what a lecturer or senior lecturer actually does. One of the elements in the HERA role descriptor for grade 9 (lecturer) and grade 10 (senior Lecturers) academics is "service delivery". At grade 9, the "[m]ain focus of role is responding to the needs of others and delivering an agreed service", with the academic "on occasions exploring the needs of students and others and adapting services to meet them." At grade 10, the focus changes to "being proactive in developing the service by approaching customers, exploring needs, developing new services" and the academic "will have responsibility and may be the lead role, for contributing to setting standards or determining the quality of the service to be provided". There are references to research, but there is no reference to *publication* of research at all. The closest that the grade 9 description comes to the perceived all-important requirement of publication, is that "Role holders will be conducting individual and/or collaborative research or scholarly projects and applying knowledge from projects to teaching/external activities." At grade 10, "role holders will be generating new approaches, developing new insights and contributing to the development of knowledge and practice in own field/educational strategies". If their focus is research, they will also be "principal investigator or collaborating on research projects and contributing to the development of research strategies". This language is far

removed from the descriptions of what is required we heard from our respondents.

This suggests either that the respondents were out of date in their perception of what promotion involved or that the "official" criteria did not tell the whole story and that, in reality, research remained the main route to advancement, regardless of what the documentation stated. In either case, doubt is cast upon the transparency of the promotions process.

HIDDEN CRITERIA AND OTHER BARRIERS TO PROMOTION

As well as the formal criteria there are informal or hidden criteria which seem to be influence reward and promotions within the university. These criteria are subtle and relate to issues around expected workloads, value attributed to certain approaches to work and the importance of networking. We will consider these issues in turn.

Working Time and Work Life Balance

The long hours culture is a health and safety issue and is not consistent with a work life balance. It may also impact on progression: if conventions about how much work is required in order to advance within the university assume that long hours will be worked, employees who are either unwilling or unable to work long hours may be less likely to progress their careers.

Work load and the difficulties of achieving a satisfactory work life balance concerned our respondents, most of whom felt that it was impossible to carry out an academic job in a standard working week of around 40 hours.

I'm not sure it is possible, not if you want good research and good teaching. Ones got to give if you stick to 40 hours a week [Andrea, Lecturer, Female]

Studies looking at SET disciplines have long noted the high number of hours worked by scientists (Ackers 2003, Ackers and Oliver 2005) and a long hours culture was also prevalent within the institution studied. This was felt most keenly by those respondents with caring responsibilities. Respondents who managed to work a "standard" working week were few and far between. Moreover, many failed to take all the annual holidays or statutory holidays to which they were entitled. A number referred to coming to work when sick, in order to keep up with their workload. These findings are consistent with those of other studies. Ackers and Oliver (2005) make the point succinctly: "Scientists with children and mothers in particular, are less able to commit these kinds of hours and achieve an equivalent level of productivity" (p3). Caring responsibilities, either in relation to children, partners or other family members clearly do have an impact on how academics can manage their work and family life and as Forster (2000) points out "[t]he arrival of young children often coincides with the age when [scientists] are still expected to make an impact in their chosen fields through high quality research and a regular output of publications" (p319). Their interviews also confirmed "[t]he persistence of gender differences in the proportion of time spent on forms of unpaid/family work in the home restricts the ability of scientists with families, and women in particular, to devote a similar amount of time to their research"(Ackers and Oliver 2005 p3). While things are clearly better than they were in the past and caring responsibilities are being recognised more, it seems there is some way to go before academic institutions can be considered a family friendly place to work.

Gendered Approaches to Work

As various theorists have noted, there is a normative masculinist culture within academia that can disadvantage women (Wolffensberger,1993). Forster (2000) talks of a 'deeply ingrained male

view of performance' (p316) and Bagilhole (1993) notes that 'Universities are prime examples of Lipman-Blumen's (1976) ``homo-social'' institutions, being established and run by men. From this it follows that the rules pertaining to appointment are male driven and are evaluated according to male standards' (p 447). We were therefore interested in comments about a gendered approach to career planning

Many respondents agreed that it was too much of a generalisation to say that men viewed work and progression in a certain way while women did so in another. At the same time, many identified a gendered dimension in the way that the way academics approach their career:

I mean I don't want to make universalising statements about anything you know, but I think, I think men just tend to be more career focused and are having to think the next 2 or 3 steps ahead really, and I'm not saying that no women do that but I think women perhaps tend to be more invested in the job that they're doing at the moment and have perhaps more of a sense of responsibility. I know have a huge sense of responsibility towards students. [Karen, Lecturer, Female]

Some respondents commented that men were generally better at protecting their research time and were less likely to spend significant amounts of time devoted to pastoral care and the 'caring side' of teaching and learning (Martínez Alemán 2008). The quotation below gives an indication of the value assigned to these kinds of roles by the institution.

Women are much more open to doing that pastoral role, naturally, than men, they are perceived as sympathetic, etc, and again the loading there is not advantageous… [Julie, Senior, Female]

Given that the respondents also thought that research was the key to promotion, they were likely to regard this as an approach to work that helped men obtain promotion and hindered women's efforts.

When asking the questions about gendered approaches to work and promotions we were very aware that we were inviting respondents to generalise and draw out stereotypes and we were surprised to find that in many cases these stereotypes seemed to still be translating into practice. Overall respondents agreed that there were male and female characteristics and that we all had both to a greater or lesser extent.

I still think there is maybe a masculine style and a feminine style and it doesn't matter whether you are a man or a woman, it's whether you adopt those things and there is probably a sliding kind of scale [Crystal, Senior, Female]

The question of male and female characteristics and approaches to work often led on to a discussion about management styles and the value of having more women at the top level. This is relevant to the question of promotion in various ways: it provides an indication of whether women academics were motivated to progress to senior positions, what that motivation was, and what they thought had helped other women achieve promotion. Our respondents were overwhelmingly of the opinion that just having more women in more senior positions was not the answer; the key was having the right women there. There was a feeling that those women who had made it to the top level had to act in what was considered a 'male' way to get there.

I think in order to get on you have to take on that patriarchal role. The majority of the senior management are still men which has an impact on who is employed.[…]. I think that you do have to prove yourself more than your equal male. You have to be better at being a man than they are. [Elizabeth, Senior Lecturer, Female]

The answers we received in response to this set of questions were interesting for a number of reasons. They highlight the importance of different approaches to working and the operation of stereotypes or perceptions of skills and approaches which may determine which roles are allocated to certain members of staff. These roles then in turn may impact on progression. The interviews also highlighted that there are different approaches to work and that these may be gendered to a certain extent. The value then assigned to these approaches is what impacts on progression (Martínez Alemán 2008; Lapointe Terosky et al 2008). Roles perceived as 'female' such as pastoral care, personal tutoring, representation on equality committees or heavy first year teaching loads were assigned less value for promotions purposes than roles perceived as 'male' such as research committee memberships, links with outside organisations/ industry or postgraduate teaching roles. It seems, the more prestigious the role, the more likely it is to be seen as and thus filled by a male. Or conversely, if a role is seen as female and mostly filled by women it will lack recognition and prestige. This is clearly problematic if promotion truly is based almost entirely upon research, but it is still problematic if it is wrongly thought that it does. Women academics who believe their involvement in teaching and pastoral care is irrelevant to promotion may not apply for promotion. Line managers who share the view that teaching and pastoral care are unimportant may not support promotion applications by women who spend a lot of their time on teaching and pastoral care. Members of promotions committees looking at applications for regrading may be less willing to accept strong performance of a pastoral or teaching-related administrative role as evidence of the competencies required. The pervasiveness of gender stereotypes therefore has the potential to influence the operation of promotions criteria quite independently of the content of those criteria themselves.

The Old Boys Networks: Alive and Well?

The importance of networks as a factor in career progression cannot really be overstated. It appears crucial for two reasons. Firstly networking increases the profile and visibility of the academic concerned both within the institution and further afield; "The main currency...is reputation" (Becher 1990 p. 52). Academics who are well connected within their institution can rely on support from colleagues and those with networks outside the institution 'look good' for the university. The university's formal promotions criteria do include criteria that are outward looking - for example, networking is mentioned in both grade 9 and 10 academic role descriptors - and our respondents showed some awareness of the importance of this. Rebecca makes the point below in relation to promotion to professorial level but similar views were expressed in relation to moving from lecturer to senior lecturer

I actually think that the thing that does you well for being promoted is being a known face and sitting on committees, networking. Of course you have to have enough research to be seen as valid but I actually think that the networking, […] probably counts more than the research career, up to the chair level. [Rebecca, Senior, Female]

Secondly there is some evidence to suggest that many positions are awarded on the basis of informal networks even where departments go through the seemingly objective process of advertising and interviewing for a position (Gardiner et al 2007). Bagilhole and Goode (2001) claim that men and women rarely relate to each other as equals in professional circumstances and without access to networks and senior mentors, female academics have little chance of progressing in the same way men do. Networks provide access to information about promotions rounds, available positions and importantly to the way the academic game

is played. It is common for academics to use job offers from other universities to fast-track internal promotions applications (retention report) and so developing networks outside an academic's own institution might be relevant to promotion even if there are no formal criteria relating to national or international reputation. Talking to 'the right people' at the right time can significantly increase the chances of a successful promotions application.

It does still so often come down to a kind of old boys network and sort of dodgy handshakes under toilet doors and stuff. ... there are cliques in the place and if you're in then you're ok, but if you're out then you're not [David, Senior, Male]

This culture of cliques or networks is seen to disadvantage women who are less likely to have access to these networks. Ackers and Oliver (2005) suggest that "To the extent that networks play an important role in the career progression in science, differential access to and ability to generate such networks is a factor shaping the career progression of scientists with family/personal responsibilities and of women in particular"(p8). Handley (1994) has argued that women often find themselves on the periphery in organisations including universities and continues "[g]iven this situation it is not surprising that women are often excluded from the informal network and hence may not have immediate access to relevant information or the decision making network within the organization" (p12). She further notes that "The woman who is not part of the informal network does not receive information vital to understanding organizational life "(p12). According to Thanacoody et al (2006) "White (2003) claims that Australian universities continue to be "boys clubs" and that the skills needed for a successful academic career is part of a socialisation process that some men and virtually no women participate in" (P539). It would appear from our research as well as other studies (Bagilhole and Goode 2001) that this is not a phenomenon peculiar to Australian universities. Our respondent Jamie sums this idea up succinctly in the quotation below from which the title of this chapter has been taken:

We don't have the key to the executive washroom, which is critical [Jamie, Senior Lecturer, Female]

The importance of networks lies not only in the visibility they give those within them or in the rather sinister idea of dodgy handshakes and deals made in 'executive washrooms' but also in the support and leadership they can provide. Many of our respondents talked about the importance of having support, strong and positive leadership, mentoring, role models and the management of staff. One of the perceived problems with the promotions criteria and process was the lack of transparency as discussed above and there was a sense that some of that could be overcome if the academic was well managed and supported. If the applicant cannot find out for herself what is required, a good mentor should assist and guide. Networks then are key to progression not only because there seems to be a hidden promotions criteria of 'being well connected' but also because networks allow academics to access information about procedures, processes and expectations that are not captured in any policy or formal document. It allows them to form a more accurate perception of what is expected to gain promotion regardless of what the formal criteria say. Women at all levels are not naturally part of these networks reinforcing what Lapointe Terosky and colleagues (2008) call the "Plexiglas room", making it hard for women to break into male dominated senior positions and forcing them to learn the 'academic game' by themselves.

While networks can provide some of these functions there is no guarantee that they will or that those excluded from them will have access to alternatives. In order to fill this "gap", many universities have introduced a more formalised mentoring scheme (Gardiner et al 2007). Mentoring was seen as having the potential to play a

big part in helping staff make the most of their careers at all levels (Gardiner et al 2007; Thanacoody et al 2006, Joiner et al 2004, Heward et al 1997). Thanacoody et al (2006) in their study of Australian and Mauritian contexts suggest that "Senior male mentors act as the gate-keepers in both cultural contexts providing female academics with access to resources and networks that enable them to move up the university hierarchy" (p550).

The University of Bradford operates a mentoring system, and we asked respondents both about their experience of it and about more informal mentoring they may have received. As our respondent Karen as well as a variety of scholars (Gardiner et al 2007; Thanacoody et al 2006, Joiner et al 2004, Heward et al 1997) have noted "*If the university seriously wants to address the issue [of gender equality] then the mentoring process is key"* [Karen, Lecturer, Female] Gardiner et al (2007) note that emotional and personal support is important but "they are not sufficient in terms of a large investment in time and money in a well-run mentoring scheme. As such, positive career outcomes also need to be established" (P429) Most respondents felt that they were well supported emotionally but other types of support were not so forthcoming. Sylvia highlights the problem, saying "Oh, *my mentor was lovely but my mentor didn't have the right skills and lacked the expertise to support me* [Sylvia, Lecturer, Female]

The mentoring role could be much better used by women and our respondent Rachel considered why there is not the same mentoring network amongst women as there seems to be amongst men. In other words, if there is an 'executive washroom' for men why is there not an equivalent for women?

I think often getting to the top in a historically male dominated position, women have to go through things that change them in order to fit in and get promoted and get up there and by the time they get up there and they have that autonomy or a possibility, they've become changed, they've denied themselves. You kept hidden all the things in you that might help other women get there, in order to get there yourself and by the time you get there you're so changed and these things are so hidden, you don't think to do any backtracking to make it a little bit more appropriate for women to come up after you, which is not what the men do. The men do the old school thing, that's why the other men climb up, but when women get there they don't do it, so they don't because that's the very thing that they don't like about men, they don't do that because they are women, nothing is changed on the way up for the next woman who has to climb up that way. I can understand why women do it, but if we don't make changes, it's like rebuilding the wheel every time. Every woman who breaks through that ceiling, it's not like it gets a little bit weaker, it's like we are closing the door behind us and putting all the same locks back on it instead of using that influence to consider how we might make things different and more enabling down that chain [Rachel, Lecturer, Female]

The HERA role descriptors give no indication that research takes primacy over other skills in applications, and this might suggest that the problem of a research focus perceived by Forster (2000) has in fact been removed. However, the reality is more complex, because the HERA role descriptors do not capture the way in which the reward and promotion system is perceived by academics working in the institution. There is a prevalent perception that research is the key to promotion and that long hours and less of a focus on pastoral care and teaching and learning are therefore a necessity. Being in the right networks or "having the key to the executive washroom" were also seen as important in helping academics achieve promotion. In the next section of this chapter, we will look at the implications of this apparent mismatch between perceptions and reality for the efforts of women academics to achieve promotion.

PROMOTIONS CRITERIA AS A TOOL FOR PERSONAL CAREER PLANNING

The preceding sections highlight the problems faced by academics seeking promotion and draw attention to the fact that some of these problems are likely to affect women and men differently thus putting women at a disadvantage when seeking career progression. Confusion about what the criteria are and how they operate is however worrying for another reason. In order to undertake any meaningful career planning academics need to plan strategically, taking on those roles and responsibilities which will assist them in promotion while avoiding those that will hinder them. A lack of transparency or a misunderstanding of what is required to progress can therefore have disastrous consequences for academics. If for example a new lecturer with a particular strength and interest in teaching and learning believes that they can achieve promotion on the basis of excellence in that area with less emphasis on research activity, they are likely to focus their attention on teaching and learning matters. If the criteria in their department are then interpreted and applied in a way that emphasises research, the new lecturer is likely to have to spend a significant amount of time and energy changing the focus of their activities, if indeed this is possible or desirable on a personal level.

As the section above on networks has highlighted, women are likely to benefit less from mentoring and networks within the institutions which could help them to work strategically towards achieving both the formal and hidden criteria for promotion. In order for a promotions system to eliminate bias against particular approaches to an academic career, it has to have criteria which allow for career paths with different emphasis through academia and those criteria then have to be internalized by women academics; for them to be able to internalize the system, it has to be transparent and clear and unconflicting guidance from managers has to be given. Given the gate keeping role of line managers, it is not sufficient for academics themselves to fully understand the official criteria and their application as line managers may be interpreting them differently or be applying some of the hidden criteria discussed above. In other words managers themselves need to internalize the criteria and the extent to which line and senior managers have truly embraced the official transparent criteria which should allow for various pathways through an academic career remains questionable. In Bagilhole's (1993) words "…appraisers often reflect prevailing social expectations and attitudes which reinforce stereotypical expectations and assessments of women" (p. 435).

TRANSPARENCY AND FAIR PROCESS

An explicit goal of the new promotions process at the University of Bradford was to improve transparency. Lack of transparency in university systems has been criticised in earlier studies. Metcalf et al (2005) found that "The transparency of the procedures varied. It was clear that stated procedures and criteria were not universally followed and that staff had varying ideas on what these procedures and criteria were. …Many staff who had not yet considered promotion were unaware of the procedures and criteria. However, some other staff appeared not to know the actual procedure or criteria. A head of department in a new university thought this was, in part, the fault of the university, saying 'The criteria are not always clear" (p180-181). It was hoped that the adoption of HERA role descriptors, a system of performance reviews and greater scrutiny of what happened at promotions committees would result in greater transparency and fairness at Bradford: our study suggests that this may not yet have happened

In one respect, the Bradford procedures are fair and transparent: the role descriptors used for the

regrading process are available to all through the university's intranet. This study did not interview line managers about how they decided whether to recommend a candidate for promotion, nor did it consider the decisions made by promotions committees at School or University level. It is not possible to say, therefore, whether line managers and committees themselves followed the formal criteria. However, some of our respondents doubted whether they did.

It's a bit disturbing that there are areas where there are quite staggering differences in practice, I'm not thinking particularly of personnel, but quite staggering differences in practice across the university schools. [Julie, Senior, Female]

Another respondent mentioned a committee making use of a department-specific checklist:

April: [The promotions panel] literally have bullet points and if you meet them all, they have to think of a really good excuse not to give you it [...] if I meet each of these bullet points then I have a really good chance [April, Lecturer, Female]

This checklist was shown to the panel member: it was not the HERA role descriptor and was not a document available on the Faculty's own website. The respondent then added that she herself only received a copy when she attended the promotions panel meeting.

But in any event, publication of job descriptors and transparency at the point when a decision is made about promotion are not the only requirements for a system that is genuinely fair or transparent. Promotion in academia is slow and many years may pass between each promotion: there are seven increment points in the Lecturer B band on the Bradford pay structure, and four further optional increments above that, suggesting it would not be unlikely for promotion from Lecturer B to Senior Lecturer to take seven or more years. Decisions made over a number of years are crucial to whether that promotion will occur. The belief, whether correct or not, that the true criteria differ from the formal criteria, adds to the complexity of individual academics' career planning.

Transparency and fairness therefore require an academic to have access to and a clear understanding of promotions criteria throughout their career, not just at the moment when a decision is made about whether they now satisfy them. A decision to reject an administrative post in favour of retaining research time, or a decision to focus on teaching rather than research, may not at the time be clearly a decision that is about promotion, but if those decisions are made without adequate information or support, then no amount of fairness in the University promotions committee will rescue the application. Many of our respondents lacked this kind of information; as indicated earlier in this chapter, they were not very familiar with the HERA job descriptors, did not know much about what promotion involved or required, and their picture of what they needed to do was often incomplete or at odds with the university's formal criteria. The authors themselves completed the university induction process in, respectively, 2006 and 2007: promotion was not covered during the two day induction. Whether the problem is that that the formal and informal criteria are different, or that there is widespread ignorance of the formal criteria, this points to a lack of transparency.

The other way in which our findings cast doubt upon both transparency and fairness is embedded in the whole idea of 'regrading' rather than promoting academics. As noted earlier, regrading is a retrospective process, and in order for an academic to be regarded they need to have already taken on new responsibilities or developed new skills, above those they possessed on appointment. The new promotions procedure is closely allied to an annual performance review system, but there are various ways in which this aspect of promotion lacks transparency and can result in unfairness. The university's guidance to staff preparing for

annual reviews contains a number of things "to think about"; these do not include reviewing the role descriptor for the next role and considering what might be done to develop the skills not currently demonstrated. Academics are asked about their own perception of the previous year's performance, their objectives for the forthcoming year, and any training they need. There is no overlap in the language of performance review documents and those of role descriptors. As a result, the performance review system is a haphazard method of educating academics about what promotion requires, and assisting them to meet it, and yet it is through this system that decisions are made by line managers about whether to recommend a particular academic for promotion.

Another source of potential unfairness lies in the way in which line managers and Heads of Schools allocate administrative roles. Our respondents were clear that not all administrative jobs were equal: some were seen as the key to advancement, others as the "kiss of death". Given that regrading requires a lecturer to be performing the job of a senior lecturer, and that administrative responsibilities are central to this (at least, according to the job descriptors), lack of transparency in the allocation of these jobs is a precursor to a lack of fairness in the eventual promotions process itself. One respondent said about her appointment to a senior position in her School, that a senior manager just "put his arm around me" and said that she should be given the position. "*So in terms of getting that job, it wasn't fair and it wasn't open, but he wanted me urgently to play that role, to have some authority*." [Amber Senior, Female]

Finally, our respondents often commented on their reluctance to put themselves forward, to take the risk of failure or rejection. This is not solely a problem at the time when a promotions application is made: an aversion to risk, will also mean that some women academics do not volunteer for the very tasks that they need to be doing in order to be promoted. This is also the point at which difficulty with taking on additional workload, because of caring responsibilities, may impact. The promotions committee may be gender blind, but gendered decisions both by women academics and their line managers filter out many cases for promotion before they ever reach those committees.

FUTURE RESEARCH DIRECTIONS

This chapter has attempted to highlight a further aspect of women's progression in academia by drawing attention to the way in which formal and hidden criteria operate in promotion in a UK institution and highlighting the impact the perception held by academics of criteria can have on their chances of gaining promotion. In order to fully understand how to address the continuing underrepresentation of women in senior positions in academia more work needs to be done on understanding how promotions criteria are perceived. The mismatch we detected between what the criteria are, what they are perceived to be and how they are applied needs to be understood fully so that it can be addressed. Our research indicates that the issues raised in this study are fundamental to promotion in academia. Other studies cited in this chapter would suggest that ours is not the only institution to face these issues but further research in this area would increase our understanding of how inequalities can be better addressed.

CONCLUSION

Our study reinforces the results from previous work on women in academia. It also however goes further by considering how academic staff perceive promotion and rewards processes in one institution in the UK.

We found a mismatch between what academics think the criteria for promotion are, what the criteria actually are and how the criteria then operated on the ground. This mismatch can have particularly

serious consequences for women academics for a number of reasons. Research shows that women are less likely to break into institutional networks which allow them to access information not only on formal and objective promotions criteria but also on hidden criteria and the way the 'academic game' is played. This results in female academics having a perception of promotions criteria and processes which may actually not be accurate or which is formally accurate but which operates differently in their schools or departments. This, coupled with women's reluctance to promote themselves actively and traditional barriers to promotion such as caring responsibilities, puts women at a disadvantage when attempting to progress into more senior positions within universities.

The effect of the HERA role evaluations on the promotions process is to create a one-size-fits-all job description for academics. There are two ways in which this may impact on women in SET disciplines. The first is SET specific. The nature of an individual academic's job in reality may differ across academic disciplines: for instance, not all disciplines have a culture of collaborative or inter-disciplinary work. If concepts of the academic role that are not actually universal are embedded in role descriptions, those working in academic disciplines that do not conform may be disadvantaged. The second impact of the process is that it may potentially discriminate against women more generally. The difficulties our respondents encountered with balancing home responsibilities with work and their general risk-averse approach to promotion may mean that they are even less likely to pursue regrading. If taking on a major administrative role is a precondition of regrading, rather than something that follows promotion, women who are uncertain about their promotion prospects may conduct a personal risk assessment and choose not to take on that role, because the cost is too high when eventual regrading is so uncertain. It is not possible to conclude whether the move to a single spine will have these effects as yet, as the process is in its infancy, but it is something that should be studied in more detail in the future.

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ENDNOTE

[1] We would like to thank our research participants who gave up their time to be interviewed and without whom this study would not have been possible. We have changed all their names and only given general details about their job titles to protect their identity. Thanks must also go to the Bradford University Human Resources Directorate who supported the study financially. Thank you also to the reviewers of this chapter for their insightful and constructive comments.

APPENDIX

Technology Career Spotlight: Developing a Dynamic Environmental Calibration Technology for Cost Effective Online Water Quality Monitoring

Shoshana Fogelman, South East Queensland

Figure 1.



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Shoshana Fogelman is a research academic staff member at the Advanced Water Management Centre, The University of Queensland. She has over six years research experience in the area of developing intelligent on-line water quality monitoring sensors and tools for water and wastewater systems. Her PhD was undertaken at Griffith University, which focused on developing a new analytical method specifically designed for continuous and field based water monitoring applications. It was an interdisciplinary project that combined the areas of science and artificial intelligence. A range of intelligent water quality monitoring sensors for the water industry were developed, that were capable of dynamically responding *in situ* to their environments negating the need for calibration, reagents or strictly controlled measurement conditions. Shoshana previously worked as a Research Fellow on the Urban Water Security Research Alliance Project – Water Quality Information Management Program and was the Acting Program Coordinator for Water Quality and Diagnostics, at the Smart Water Research Facility. Shoshana is currently working as the Project Manager on the Anaerobic Digester Stability Sensor Project. She is currently the president of the Australian Water Association (AWA) Queensland Young Water Professionals special interest network and was recently elected to the AWA Queensland Branch Committee. Through her

involvement in AWA, she actively promotes and supports the needs of the next generation of water professionals within Queensland, through her involvement on committees including branch, conferences and professional/technical workshops and other related activities. In addition she has published over 10 peer-reviewed journal and conference publications and has served on several international and national conference committees.

INTRODUCTION

I was born and grew up in Papua New Guinea, in the eastern highlands before moving to Australia with my family in 1985. I believe my experiences as a child with no television and living in a very small town, in an isolated, undeveloped area really developed my passion and love of the environment. In addition, as a child my father always promoted and exposed me to the science and technology area, so it seemed important to me to develop technology to better protect the environment. In 1999, I enrolled at Griffith University in a Bachelor of Science and met Dr Michael Blumenstein, who worked then as a lecturer in the School of Information and Communication Technology. Dr Blumenstein introduced me to this exciting field of artificial intelligence and pattern recognition, which was getting computers to "intelligently" think like the human brain. I thought this could really be applied to environmental field to better manage our water systems and consequently approached the university to do an interdisciplinary honours research project in the water quality area and my career blossomed from there.

I have currently worked on three projects aimed at developing more reliable and cost effective water quality monitoring technology for the water and wastewater industry.

Project 1: Developing a Dynamic Environmental Calibration Technology for Cost Effective Online Water Quality Monitoring

This innovative project develops a range of new online water quality monitoring sensors using a dynamic environmental calibration technology that can enable conventional sensors to intelligently respond insitu to dynamic matrix conditions, without the need for conventional calibration, reagents or sample pretreatment.

The project outcome pertaining to my PhD has been the development of a new generic technology that can enable a traditional laboratory based sensor to be converted into a direct insitu online sensor. The technology developed employs a combination of software and hardware to environmentally calibrate a traditional water quality monitoring sensor so that it is capable of autonomously and intelligently responding to its environment irrespective of sample matrix conditions. The applications of the technology have been successfully demonstrated for the online monitoring of Fluoride, Ammonia, Ammonium and pH.

The success of the project was based on the innovations that were created through a multidisciplinary project that combined the main areas of Science and Information Technology, in addition to a small engineering component. The environmental calibration technology incorporated the areas of analytical and environmental chemistry with ecology principles, combined with computationally intelligent techniques, such as artificial intelligence to instruct the sensors how to respond insitu to their environments. Once the selective sensors were environmentally configured using the technology, they were capable of intelligently responding to their environments, without ideal measurement conditions, calibration or reagents being required.

The project was designed to respond to the needs of the Australian water industry by developing simple to use, accurate, real time online water quality monitoring tools that are economically feasible to implement in rural as well as urban environments. This is so continuous information can be reliably and simply obtained by authorities to ensure the continued safe supply of potable freshwater to the Australian consumers. This is because currently, accurate and cost effective online monitoring of various water quality parameters has proven difficult to achieve, as direct sensor deployment often means sensors are unavoidably exposed to a wide range of measurement conditions. As the majority of current online monitoring technologies employed are direct adaptations of traditional laboratory based analytical methods, they are not originally designed for field based monitoring purposes. Hence they require frequent calibration, maintenance and large quantities of costly reagents to maintain their reliability in the field. The costs associated with maintaining the instruments based on this measurement principle has greatly reduced their wide spread application, especially for large scale environmental water quality monitoring in places like the European Union. Therefore technology that can improve the accuracy and economic costs associated with online monitoring such as maintenance and reagent consumption would be of great benefit to industry, government and research organisations.

An outcome from the intellectual property developed in my thesis was that it gained commercial attention, as I was approached in my final year of my PhD by an Australian Venture Capital Company. As I was successful in being offered a term sheet, this lead to negotiations with Griffith University to determine a potential venture capital investment. A paper describing the work has also been drafted to submit to Science.

Project 2: Western Corridor Recycled Water Project Urban Water Security Research Alliance

In 2008, through the development of my expertise in the area of intelligent water quality monitoring sensor design and tools, I received an appointment by invitation that was approved by the Vice Chancellor of Griffith University to work on a research project related to the Western Corridor Recycled Water Project. The project seeks to develop new online water quality monitoring technology and tools to enhance operational monitoring strategies in barriers 1 and 2. The technology and tools developed will be designed specifically for a closed loop purified recycled water system and are designed to assist operators and grid managers with the maintenance and management of barrier integrity.

Project 3: Anaerobic Digester Stability Sensor Project

In 2009, I commenced employment at The University of Queensland to begin work on the development of an on-line Anaerobic Digester Stability sensor that was part of an ARC linkage project in conjunction with Gold Coast Water and Brisbane Water. The sensor is designed to improve process stability of the treatment process and regulate renewable energy for the biogas waste stream, thereby decreasing green house gas emissions. The sensing system has been designed, built and we have installed two on-line monitoring systems and are currently validating and verifying the accuracy of the system.

Also during my PhD candidature and employment I have also been involved in industry and community services activities pertaining to my research that have aimed at promoting the area of water quality monitoring, in addition to encouraging and supporting younger people to pursue careers in the Queensland Water industry.

COMMUNITY BENEFIT OF RESEARCH

Through my PhD and work I have also been actively communicating the need for innovative, multidisciplinary research in the water industry, through my involvement in student supervision, international and national reviewing of research, conference organisation and through workshops and forums.

STUDENT SUPERVISION

In addition to my research I have engaged and mentored younger undergraduate students to get involved in water quality technology developments, through undertaking research projects which encompass the new concepts developed in my thesis. This can be demonstrated by my supervision of a third year project student, Wade Button, Chris Carney and Nicolas Brodu. Through their experiences, most of them have pursued a career in the water industry

INTERNATIONAL AND NATIONALLY RECOGNISED RESEARCHER

I have also been internationally and nationally recognised for my expertise in the field of sensor development and computational intelligence. This is evidenced through being a regularly invited to review research papers for science and IT journals and conferences in my respective research fields. In addition I have published a number of peer reviewed journal and conference papers in the area.

FOUNDING AUSTRALIAN WATER ASSOCIATION (AWA) QUEENSLAND YOUNG WATER PROFESSIONALS (YWPS) SPECIAL INTEREST GROUP

To attract, support and retain YWPs in the Queensland Water Industry, I was a founding committee member who developed the first YWP Special Interest Group in Queensland in July 2005. This was developed after the success of the AWA Queensland YWPs Forum in 2004. Since its inception in 2005, the group has gained momentum, members and strong industry support. The technical and career develop sessions cover new and relevant issues that affecting YWPs working in Queensland.

I also served on the organising committee that first developed and launched the National Australian YWPs conference in Sydney in 2006. The aim of the biennial conference was to provide a national platform for YWPs working in the water and wastewater fields where they can engage, network and share their experiences and research outcomes in a relaxed environment. It also provided opportunities for YWPs to interact with senior industry professionals through mentoring and professional development activities. Since the launch of the 1st conference, the YWP group has gained in strength and numbers with active committees being developed in most states in Australia. We have developed our own logo, website and mentoring program and are continually gaining strong industry support.

In 2008, I Co-chaired the 2nd National Australian YWP Conference in Brisbane. Through my involvement with the committee, we highlighted the role that YWPs play in the water industry and encouraged a national insight into areas such as indirect potable reuse, desalination, sustainability, as well as new infrastructure and technology developments. Through my involvement as Co-Chair we were able to gain

government support for the group with the Premier of Queensalnd Anna Bligh MP endorsing the conference. The conference was a great success bringing 150 of the brightest young minds to Queensland, representing all facets of the Australian Water Industry.

DEVELOPED NATIONAL MENTORING PROGRAM FOR THE AUSTRALIAN WATER INDUSTRY

To ensure YWP have the skills necessary to become the next generation of leaders, I developed, launched and convened a national mentoring program for the Australian Conferences IWA/AWA 1st and 2nd National Australian YWPs Conference Water Industry.

This was to support YWPs in developing their managerial and technical skills, in addition to providing them with an opportunity to engage and build mutually beneficial relationships with senior industry and research professionals. Initially the mentoring program was developed in Queensland for the YWP group in mid 2005. However in late 2005, I was invited by the International Water Association (IWA) and AWA to expand the program nationally. In 2006, in conjunction with AWA members the program was launched nationally at the 1st YWP Conference in Sydney. Since then the program has gained strong industry and AWA support.

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Section 8
Emerging Trends

This section highlights research potential within the field of Human Resources Management while exploring uncharted areas of study for the advancement of the discipline. Introducing this section are chapters that set the stage for future research directions and topical suggestions for continued debate, centering on the new venues and forums for discussion. A pair of chapters on human resource flexibility makes up the middle of the section of the final 11 chapters, and the book concludes with a look ahead into the future of the Human Resources Management field, with "Anonymous Workblogging and Organizational Coping Strategies." In all, this text will serve as a vital resource to practitioners and academics interested in the best practices and applications of the burgeoning field of Human Resources Management.

Chapter 75
Innovations in Technology for Educational Marketing:
Stakeholder Perceptions and Implications for Examinations System in Rwanda

John Rutaisire
Rwanda National Examinations Council, Rwanda

EXECUTIVE SUMMARY

This chapter highlights the importance of educational marketing through modern innovative technologies. It explores how teachers who mark Rwandan primary and secondary examinations perceive the Rwanda National Examinations Council and what the implications are for the effective management of the examinations system. The chapter highlights the Rwandan context in which before the 1994 genocide, the education system was characterized by nepotism, corruption, discrimination and victimization based on ethnicity, regionalism, and gender. Thus, after 1994, the task of the education system was to reverse the imbalance in favor of equity, transparency, accountability and responsiveness in public service. In terms of national examinations, this demanded, among other things, a vigorous marketing strategy through innovation and technology. In spite of the relative success, however, the chapter acknowledges challenges associated with post-conflict educational reconstruction focusing mainly on human resource capacity development and management, and highlights some lessons learned as Rwanda looks forward to the future.

ORGANISATION BACKGROUND

The Rwanda National Examinations Council (RNEC) referred to as the 'Council' throughout this chapter was established in 1998, and law No 19/2001 of 12.3.2001 outlines its major responsibilities as follows: (i) to be responsible for national examinations for primary and secondary school (ii) establish rules regulating the conduct of national primary and secondary school examinations (iii) uphold transparency and justice in examinations'

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administration and other related issues (iv) award certificates or diplomas to successful candidates (v) place successful candidates in different secondary schools and higher education institutions.

The education system in Rwanda before 1994 had been guilty of discrimination, injustice and sowing seeds of division based on ethnicity, sex, regionalism (home background) and religion; and this form of injustice was mainly implemented through examinations (Rutaisire, 2007). Before 1994, entry to all government and assisted schools and tertiary institutions was determined mainly by "Ethnic and Regional" quotas. The results of primary and secondary schools were never published. Also, students' personal identification files known in French as *'fiches signeletiques'* were used to identify them as 'Tutsi, Hutu or Twa.' The purpose was to identify individuals and, or groups for discrimination and victimization (Rutaisire, etal, 2004). Thus after 1994, there was urgent need to redress this imbalance for purposes of promoting national reconciliation and healing the nation. This entailed reforming the examinations system by considering performance standards which are considered to be the obvious measures of outcome (Gipps and Storbart (1993). As a result, 'since its establishment, the Rwanda National Examinations Council has been improving transparency, accountability and responsiveness in the Rwandan public service' (United Nations Public Service Awards, 2009:174). The establishment of the Council after the 1994 genocide was in line with international best practice. For example, West et al (2000) argue in favour of the importance of self management because of the possibility it offers eventually to increased control over policies and resources and expanded scope for leadership. This has implications for effective management of the examinations system in Rwanda.

Management Structure

The recently revised law number 36/2007 of 02/09/2007 determines responsibilities, organization, functioning and powers of the Rwanda National Examinations Council for primary and secondary education. The law designates the Council as an autonomous institution supervised by the Ministry in charge of primary and secondary education. The Council is composed of a Board of Directors (policy making) which has full powers and responsibilities to take all decisions; and an Executive Secretariat (management) which runs day today affairs of the institution. The responsibilities of the Board of Governors are to: adopt the internal rules and regulations of the Council which shall be approved by the Order of the Minister in charge of primary and secondary school; provide a strategic vision and programme of action for the Council; consider and approve the annual draft budget before it is transmitted to relevant authorizes; monitor the performance of the Council in accordance with the plan of action and the budget; approve the activity and financial reports of the previous year; offer advice to the Council management and staff; participate in determining an effective general policy relating to primary and secondary examinations; institute directives on how examinations are to be conducted and on those relating to similar issues; and take decisions on persons who act contrary to this law and those who do not respect the directives relating to examinations.

The Executive Secretariat (management) has five professional units/departments namely: (i) Preparation & Administration of Examinations (test development); (ii) Orientation, Selection, Training and Documentation; (iii) Planning and Research (iv) ICT; and (v) Administration and Finance. It is responsible for the management of daily operations of the Council and has 69 members of the professional staff. Its responsibilities are to: coordinate and conduct all daily activities of the Council; represent the Council in everyday activities and take administrative decisions; establish relations and cooperate with other national and international agencies carrying out similar responsibilities; allocate successful candidates in

secondary schools, universities and other Higher Education Institutions; ensure measures of effective staff management according to competence, the nature of the work and the required numbers; make a report of the Coincil's activities and that of budget management; sign certificates and diplomas; issue certificates and diplomas to successful candidates who pass examination; sign contract with employees; and determine equivalence between certificates and diplomas issued abroad and those issued in Rwanda.

Candidates registering for national examinations come from a wide spectrum of primary and secondary schools. Some are government owned, government supported, while others are, private. We also have private candidates aspiring to complete high school diploma. Trends show that the number of candidates for examinations has been steadily increasing over the years and it will certainly go on increasing considering that Rwanda implemented a fee- free and compulsory 9 years of basic education in 2009. Additionally, there exists a strong government drive to promote Public-Private-Partnerships (PPP) as an incentive for entrepreneurship in the education sector which will certainly result into the creation of new schools ready to receive students at all levels of secondary and higher education.

Financial Considerations

Today's quality service delivery imperatives demand innovative strategies and reinforced inputs to be invested in the process. A number of measures that Council has been putting in place not only to improve the quality of services, but also generate some income include: speedy candidates' registration where forms are correctly filled out; properly done printing of registrations forms; timely availing of examination sheets for all the candidates throughout the country; comprehensive training of teachers on evaluation methods for all subject matters, in all primary and secondary schools, throughout the country; hiring the entire required staff and cutting down on outsourcing needs to preserve confidentiality of examinations; expanding logistic resources during examinations periods; availing to the staff opportunities to access knowledge development sources; investing in technology to take advantage of the most advanced ICT software and equipment; running its own printing press in order to cut down on costs of having examination questions and answer sheets printed outside the country while ensuring more security and confidentiality of documents; training of staff in a variety of subjects including evaluation methods and computer skills; compiling and disseminating old examinations syllabuses; and developing and disseminating models of answers. The following Table 1 shows the council's budget allocation from 2007 to 2011 in United States Dollars.

Against this background, the Council is determined to supplement the current budget funding mechanisms with its own income generating activities which include, but are not limited to the following: Online registration and publication of results where by the Council would share benefits with the service provider; increased candidate registration fees to match the Council's unit cost of running national examinations; operating Council's own printing press for income generation purposes; availing examination syllabuses and past papers for a fee; research and consultancy on assessment issues; and other service charges. The Council makes use of a financial management and accounting software known as SAGE Pastel which will soon be replaced by the "Smart Government" (SMART GOV) to harmonize with other government agencies. SMART GOV is a Ministry of Finance Accounting Software

Table 1. Budget allocation from 2007 to 2011 in US Dollars

2007	2008	2009/2010	2010/2011
2,567,638.6	4,032,487.6	5,402,619.3	6,617,534.9

designed to manage government expenditure across all government public institutions including central ministries, autonomous agencies, provincial, districts and other local administration budget institutions. Staff trains on the job or takes advantage of various opportunities presented and organized by the Council, or the Ministry of Public Service and Labor. Budget preparation and execution, supply and logistics, office furniture, transport, etc are also executed in strict respect of government procedures and regulations. Requisition forms have been issued to facilitate and put order in the procurement process, while facilitating units and individual staff members' involvement in the execution of the budget. The Council works very closely with the Rwanda Public Procurement Authority (RPPA) to train the Internal Tender Committee (ITC) in procurement and tendering procedures and regulations. Also, the Council has a full-time internal auditor who ensures compliance with the national finance and procurement laws.

SETTING THE STAGE

The Council deals with an array of both internal (staff) and external stakeholders most notably schools whose relationship is the focus of this chapter. Therefore, it should be able to communicate to them its mission and activities to ensure they are fully aware of and understand the importance of working together for effective service delivery. Thus it is important that the Council examines its relationship with its stakeholders especially schools from a marketing perspective. One of its stated aims is to inform all the stakeholders especially schools about its mission and priorities and enable them to be involved in future direction, for networking, for dissemination of the Council's operations, and crucially for consulting with them about the way forward. For example, during the marking exercise, teachers can identify weaknesses and errors in student scripts. The Council can then use teachers' feedback to improve on the management of the examination process and marking as part of the overall management of the examinations system. In this way they have contributed immensely to its future direction.

Communicating the Council's mission and priorities is important because as Bush (1999) points out, the increased emphasis on external relations and the 'permeability of boundaries means that education managers cannot ignore the need for marketing their institution'. In the case of the Council, marketing is used here to mean the process through which it communicates and in fact, tries to 'sell' its reforms (products) to the teachers who should in turn communicate 'sell' the reforms to their communities. This is important if the reform is to be accepted and implemented. Thus the fact that the Council already has a relationship with schools is not in itself sufficient to create an environment in which schools feel comfortable with the post genocide examination products or packages. It is therefore important to improve the partnership and collaboration with schools. However, accepting change goes beyond improvements as it entails new ways and patterns of thinking (perceptions) by teachers which requires effective communication (marketing) on the part of the Council to 'sell' the reforms.

The Council regards schools as its customers, clients, partners or stakeholders. Anderson, et al (2004) distinguish between customers and clients; partnership and stakeholders. According to them customers and clients are people who seek a service, and they may be internal to the institution or external. Partnership involves 'a working relationship that is characterized by a shared sense of purpose, mutual respect and the willingness to negotiate.' This implies sharing of information, responsibility, skills, decision making and accountability. According to Warring (1999), stakeholders refer to 'all those who have a legitimate interest in the continuing effectiveness and success of an institution.' This implies that all clients and all partners are stakeholders, together

with others who may have 'a legitimate interest'. Stakeholders may be internal (staff) or external, in this case, schools. However, Anderson, et al, (2004) argue that external stakeholders are said to 'rely to a very large extent, on past experience, or on information communicated to them by internal stakeholders' for their information about the institution.

The relationship between the Council and the schools which it serves may be analyzed within the context of institutional openness and what it regards as marketing to serve their needs. Anderson, et al, (2004, p. 58) cite Hoy and Miskel (1987) who argue that the open system concept highlights the 'vulnerability and interdependence of organizations and their environments'. I find this observation relevant to the Council because it implies that the environment is important as it affects the internal structures and processes of the Council. For example, in 2009, there were about 2700 primary and secondary school teachers involved in the marking of national examinations. Their views and perceptions regarding the way examinations are run are important because the Council should consider them during the process of organizing, coordinating and managing the examinations system. This is so because those who do the marking are the ones who can see and identify areas for improvement, for example in the way examinations are set, packaged, administered and graded. Teachers are on the front line of the examinations processing.

This process may be analyzed through the lens of the match between the institution and its environment and this phenomenon is not only limited to the Council. Viewed from a wider perspective especially from that of schools, Anderson, et al (2004) assert that schools and colleges may 'respond to external demands through planning and forecasting where likely changes and future pressures may occur'. They argue that 'the move towards having an institutional development plan may be seen in part, as a response to the demands and influences from outside the institution'. This argument holds for the Council as well because the impetus and urgency for its effective management has been dictated mainly by external circumstances. For example, in Rwanda, the recent financial law (2006) requires public institutions to design within their strategic plans income generating activities outside government budget. Thus the Council needs to generate income to cater for about 2700 teachers who participate in marking primary and secondary school national examinations each year. This requires a substantial amount of innovations in technology to enhance the marketing strategy.

Before 1994, institutional planning was minimal in Rwanda. Foskett (1999) argues that in the past 'building an external relations component into institutional planning or strategy was simply a matter for professional judgment'. In fact in Rwanda it was nonexistent. Even today in many institutions in Rwanda, its presence or absence depends on the management's view of the value of the relationship it wants to develop with its external stakeholders. In the case of the Council, it would seem inconceivable to ignore the significance of about 2700 teachers involved in its work. From this perspective, stakeholder perceptions of the Council's management of the examinations system become crucial. As Farnham (1993) observes, political and social change embedded in a commitment to 'the ideology of the market and of consumer choice in pursuit of economy, efficiency and effectiveness' has been steadily absorbed into the 'educational culture and given statutory authority through legislation.' However, in Rwanda as in many developing countries, this is for most educationists an imported, even alien concept.

Although the Council seeks to market itself, Foskett (1999) points out two important issues which complicate marketing in education. First, service industries, even in the private sector, have not traditionally taken a strong marketing perspective because service products are inherently intangible which makes their promotion

difficult, particularly where the 'product' is long term in its rewards, such as education; services in the professional sector may see marketing as unethical, compromising the objectivity of their relationship with their 'client'; some service sectors experienced demand far in excess of their ability to provide it, such as in higher education, so promotion was unnecessary; most educational organisations have enjoyed monopoly power; and little professional guidance or training on adopting a marketing perspective has been available. Secondly, Foskett argues that traditional concepts of professionalism and public service in education do not sit easily with the notion of marketing; and that the view of the professional as 'expert' and the monitor of quality may be interpreted to mean that responsiveness to the market is unnecessary.

Gray (1991, p. 25) has suggested that 'the purpose for which public sector institutions such as schools were established goes far beyond mere customer satisfaction'. According to this view, educational institutions have 'public service duties and responsibilities to tackle real needs which may not be appreciated by these customers'. The argument here is that educational institutions have many different external links which go beyond transactional or exchange relationships and that while managing external relations is of great importance to the institution, each is embedded in its internal processes. However, Foskett (1999, p. 36) quotes Worcester (1985) who asserts that "no organization can sustain a good reputation that it does not deserve". This is relevant because in this case, it implies that each member of the Council, for example, ought to have a role.

Effective external relations will probably require significant internal marketing to support it and staff are key players within this process since their activities define the quality of the organization and they represent a key stakeholder group with whom management must manage relationships with great care. Earlier research by Foskett (1992) points out that external relations management relates to those aspects of an organization's activities that in any way cause it to relate to an audience beyond its own boundaries. This includes both processes with an overtly external connection and those processes which, while largely internal to the organization, have a direct impact on some external stakeholders. The implications are enormous because such processes need effective management. Johnson & Scholes (1993) argue that the whole concept of effective management comprises three components namely; strategic analysis, strategic choice and strategic implementation. Although a detailed discussion of each is beyond the scope of this chapter, suffice it is to say that each one of these may be identified with stakeholder relations components at the Council. For example, establishment of effective internal quality assurance systems in the Council should ensure that the service or product meets school expectations. It is also important to develop mechanisms for collecting external data using available technology on how the examination system in Rwanda is perceived as part of its marketing strategy.

The objective of attempting to gauge teacher perceptions is by all intents and purposes to establish an audit of the effective management of the examinations system which relates to how far the Council has been communicating its mission to teachers. From a schools' perspective, Knight (1993, p. 19) defines and illustrates educational effectiveness as 'the fullest possible attainment of the goals and objectives of the school'. Examples include improved performance, possibly against performance indicators such as improved examination results or test scores; improved student attitudes and behaviour; better parent and community relations and improved school environment. It may be reiterated that effectiveness is concerned with maximizing the benefits due to educational provision within the constraints of cost or resource availability. Mortimore et al (1994, p. 23) do not necessarily disagree but instead put it in another way by suggesting that 'cost effectiveness is concerned with selecting

the least cost alternative for securing the desired outcome'. However, Thomas (1990) disagrees. He argues that the most cost-effective will be the 'least costly of the alternatives compared, but this is not necessarily the cheapest possible method of obtaining the objective'. In any case, the limits of experiences, knowledge and attitudes one is able to draw upon limits the decision.

To effectively manage the national examinations system in Rwanda, the Council will have to deal with organizational and institutional dilemmas if it has to develop and improve its own ratings by teachers. To improve teacher perceptions of the Council, the management should address crucial issues as highlighted by Middlewood & Lumby (2003) to include: Appropriate and effective communication process, full integration of all stakeholders, positive resolution of conflict, a code of conduct which reflects the organization's culture and appropriate degrees of stakeholder involvement in decision making. It should be acknowledged that the critical success factors in terms of the effective management of the examinations system in Rwanda is the linking together of the work of different operating units and stakeholders. Bush & Coleman (2002) argue that the coordination of such factors and the establishment of a culture which promotes them lies with the over all management and ethos of the institution. This is relevant to the Council considering that its stated goal and purpose is to support learning and teaching in Rwanda schools. Other researchers such as Briggs & Sommefeldt (2002) are of the view that the placing of different interest groups is open to debate according to the factors at play in a particular cultural, social and political situation and those external influences are said to impact on organizational effectiveness. Indeed with about 2700 teachers involved in the Rwandan examinations processes, the significance of their perceptions cannot be underestimated.

CASE DESCRIPTION

Experiences and Expectations: Players Involved and Their Roles within the Council

In April 2007, I was about to start my second year of the Doctorate in Education (EdD) at the University of Sussex, Brighton, (United Kingdom). The last assignment of year 1 of the Doctoral Programme required students to research or evaluate an educational institution. I decided to research my own institution. I selected three secondary schools in Kigali city whose medium of instruction is English. I did this because my previous experience with non –English speaking schools had proved problematic in terms translation from French or Kinyarwanda (mother tongue) into English. I had requested head teachers of each of the schools to select four teachers, where possible both male and female who mark national examinations. The combined number of teachers in the three schools was twelve. One school is a girls' school, another is a boy's only school and the third school is mixed sex. The girls' school is government supported (*libre subsidie)*, the boys' school is public and the mixed school is private. The intention was to create a variety in the hope that responses would be varied as well as to reinforce the trustworthiness of results.

Below, I summarise the findings according to each question:

To what extent has the Council marketed itself to ensure stakeholder understanding of its mission?

This question challenges the Council's identity which must be perceived and evaluated against societal needs and aspirations. The Council needs a clear sense of purpose that people understand. Here purpose and belonging are the two facets of identity. The Council's identity must spring from the organisation's own roots, its personality, its strength and weaknesses. It must be so clear that it

becomes the yardstick against which its products, behaviour and actions are measured. Here, teacher perceptions put this identity through a magnifying glass. According to this lens, teachers in the sample stated that the mission of the Council was to set and mark examination and that they identified with it.

There were some common responses concerning how schools could contribute to the mission of the Council. They indicated that schools could contribute in a number of ways such as: (i) analysing student performance in national examinations (ii) covering the curriculum so that students do not fail national examinations (iii) each school having a secretariat that communicates to teachers about examination updates and issues (iv) evaluating students periodically before they seat national examinations in order to meet the Council's mission and providing feedback to the Council. Perhaps more intriguing was the teachers' suggestion that teachers should start examination departments in their respective schools. These departments would come up with mission statements that eventually lead to formulation of the Council's mission statement. This suggestion implies that school mission statements related to examinations should be integrated into the Council's own mission statement which has implications for the relationship between the Council and the schools.

Notwithstanding the teachers' declaration of their awareness of its mission and potential contributions to the Council's work, the same number also reported that although they have been marking national examinations for an average of five years, they were not aware of its plans and only responded when called upon to mark national examinations. If this had been a larger sample, it would have said much to the Council's identity as a national organisation. And in fact, it did since such a big number of the research sample said that the Council has had no formal ways of communicating its plans and activities to the very stakeholders who say they identify with it and have clearly indicated the roles they can play in contributing to its mission, then there exists a weakness on the part of the Council for its inability to tap into such a reservoir of knowledge and experience – the teachers.

There is therefore a need for a vigorous marketing (communication) strategy especially at this crucial time when the Council is in the process of transforming itself in the context of Rwanda's entry into the East African Community and now the British Commonwealth of Nations. The search for a marketing strategy cannot be ignored because marketing in this sense is seen as a means of enhancing the position and value of the Council as a whole. In this way, the institution begins to make a more proactive attempt to develop a reputation within the wider community especially with the teachers. Marketing here is measured through improving the image of the Council. It becomes a clear task of communicating information that will lead teachers to develop a better and more accurate picture of the Council.

What are the teachers' perceptions of the Council regarding its present management of the examinations system?

Analysis of the responses showed that teachers are an invaluable source of knowledge on the examinations system. They raised issues concerning timing of papers during setting. They said that three hour papers are too long and tiresome suggesting that two or more papers be introduced in future. This would give room for few hours' examinations and room to examine the whole subject content as in the curriculum of the particular course. What the teachers implied was that shorter time papers can examine students better. This raised the question of training not only for teachers but also for student's in attempting national examinations. Respondents wondered whether one paper per subject (current practice) could cover a whole syllabus. In fact, this seems to be a legitimate observation considered against the earlier concern about a three hour paper, which is long and given

more time supposedly to ensure wide coverage of the curriculum. Respondents argued however, that shorter, but more papers would cover the syllabus better than one long one. This seems to be a legitimate argument since the examination is meant to measure skills rather than just how much knowledge one has acquired.

In terms of the examination papers and examiners, respondents pointed to some major weaknesses in the system. For example, there was constant reference to some questions not coming from clearly indicated topics of the subject curriculum and that the curriculum did not show clearly the examinable areas. This has implications for an examinations syllabus which is a responsibility of the Council. Here again considerations of a 'fair and transparent' system matched against practical and professional considerations become a challenge in terms of management of an examination system in conflict affected societies. I make this observation because it seems that the system might have concentrated its effort on the more 'political' concerns of justice, equity and reconciliation of a post – genocide educational reconstruction and less on practical and professional issues raised by the teachers in the study.

Another area of concern raised by the teachers was that of training. Again there was a general concern about examiners who should be trained teachers and experts in their area. Scoring was raised as an issue of concern in which respondents felt that depending on the technicality of the questions, scoring should be done professionally so as not to underscore or over score. Thus examiners require in service training on regular basis to set and mark to the expected standards. This issue relates to the one on coverage of syllabus content where a balance needs to be exercised during the setting of examinations so that some curriculum content is not over examined or under examined.

The issue of educational materials seemed to revolve mainly around those items used during examinations such as scientific calculators. Some teachers complained that there were many models nowadays of scientific gadgets. Many were unfamiliar to most students. This called for the need of specifying the models to be used in national examinations. I consider this to be a relevant observation. For an institution that prides its self of being fair to its stakeholders, it is a major weakness to set examinations without spelling out the relevance of different scientific models to the questions on which the models are to be applied or used, the availability of the models on the Rwandan market and the cost of the model, with considerations of whether or not it would be affordable to the common student considering the poverty levels of the country. This also means that teachers should be required to be conversant with the model and to train students accordingly.

What are the teachers' future expectations of the Council in terms of its management of the examinations system?

Responses here were mixed. The teachers thought that there was plenty of room for the Council to improve its image and services to schools. They referred to the Council's management of the examinations system as satisfactory and fair, but also pointed out that there were some areas which needed to be improved. They said that the Council should address the issues of the link between the curriculum and national examinations so that questions are not set outside the syllabus. The Council should ensure that examinations follow the order and sequence of the curriculum. Teachers also stressed the need for introduction of practical examinations especially in the natural sciences and setting application and other higher order questions covering the rest of the curriculum; and regular in service training of teachers involved in examination work. A majority of the teachers said that only teachers should set examinations and should be trained to become experts in their respective areas.

Secondly, the research revealed that Rwandan teachers were increasingly becoming aware of and

making connections between their own school works with that of other educational institutions. The fact that teachers were able to link teaching and learning issues in the classroom with assessment at national level places a challenge to the Council as awareness of the interests of the teacher's demands a place in its policy and strategic plan. This is so because any reputation the Council attempts to present to external stakeholders must be based upon the reality of the situation. As a matter- of- fact, respondents in this research came out quite clearly by holding the Council 'accountable' through their perceptions which not only reinforces the need for creating partnership with them, but also puts new pressure on the Council to do so sooner rather than later as the institution transforms itself to meet the 21st century challenges.

What are the implications for effective management of the examinations system?

The research highlighted some interesting features. For example, the teachers wanted the Council to involve them more and more in its activities. That school perceptions happened to point to this direction is in itself a wakeup call for further investigation regarding how examinations are organised and managed, by whom and with what impact, and what relationship it has with the schools. The research revealed that teachers were seeking further involvement and participation in the life and activities of the Council which is an expression of a strategic partnership. This kind of partnership should be managed strategically and should be characterised by a shared sense of purpose, mutual respect and a willingness to negotiate. This implies sharing of information, responsibilities, skills, decision making and accountability. Here, the concern for the Council should be how such information might be shared and how the Council may gain respect from the schools and vice versa. The Council should be waking up to the reality that educational institutions, even in a developing country context like Rwanda can no longer work in isolation.

From this perspective, Anderson, et al (2004) argues that although the reputation of an institution may vary from a stakeholder group to another, it will always be based on the perceptions they hold. These perceptions may have very little basis in fact, or may be out dated and biased, but they must still be recognised as the views these particular groups hold. Thus the Council should as a matter of urgency develop a clear appreciation of the experiences, expectations and perceptions held by the different stakeholders especially teachers who are directly involved in its work. The Council should learn what various stakeholders are saying, what it wants them to say and how it can get them to say that.

Following that experience, I organised some in-house workshops in my institution to discuss the results of my research with all the 69 members of the professional staff. Consequently, in 2008, we were able to reform the way we set our examinations to make them more practical and skills oriented. We focussed especially on the science related examinations and since then laboratory and other practical work is a compulsory and major component of the examinations system. We also designed a table of specifications (Blue print) based on Benjamin Bloom's taxonomy of instructional objectives, so that in the humanities, we determined the number of questions per paper that demand recall of information, comprehension, application, analysis of a situation, synthesis and evaluation of outcomes. We also reviewed the way we mark and score and reformed the national grading system.

Guiding Questions

1. What do you think is the mission of the Council? Is this a mission you identify with? Why?
2. How can schools contribute to the mission of the Council?

3. How would you evaluate the way in which the Council manages the marking of secondary school national examinations? In your opinion, is it doing so fairly and accurately?
4. From your experience of marking national examinations, do you see areas where it can improve? How?
5. What is your opinion of the ways in which the Council places successful candidates in different schools?
6. From your experience, what do you see as some of the challenges the Council faces in managing the examinations system?
7. What should the Council do to improve its image and services to schools?
8. How can schools play a supportive role to the work of the Council, especially in improving the management of examinations?

Technology Concerns

In the national examinations process, the Council undertakes various massive tasks of registration of candidates, preparation of examinations, conducting of examinations, marks processing, grading and publication of results and then orientation of successful candidates to the next level of secondary and university education. These tasks involve processing of large databases and message exchanges through internal communications; and interaction with students, parents or guardians, teachers, heads of institutions and district education officers through announcements, rules and regulations governing the conduct of examinations. Engaging this array of stakeholders demands innovations in technology for educational marketing, in this case of national examinations reform products, such as the recently introduced 'Conveyor – Belt' Marking System, the new grading system based on the new curriculum, the introduction and emphasis on practical science examinations and the new changes in the content and format of certificates and diplomas. These products need relevant technology for effective and efficient marketing to various stakeholders. The next section describes the technologies that the Council has been trying to put in place to enhance not only service delivery, but the actual marketing of its products.

Technology Components

ICT Project (i)

The Council has a number of ICT equipment including two server machines, a fully wired computer network with fibre optic back borne, and an Optical Mark Reading Machine. In 2005, the Council signed a contract with HAMLET COMPUTER GROUP LTD, a United Kingdom based company to develop an examination processing application called FAIM running on SQL server and windows 2003 server. This has facilitated the RNEC to develop its ICT capability in order to deliver its services to the public much more efficiently and effectively. This also is necessitated by the fact that the number of candidates increases every year, hence ICT capability to deliver and meet the long term needs and expectations of Rwandan primary and secondary schools is essential. As a result of this initiative, the Council is able to carry out the following functions with relative efficiency.

Registration of Candidates

The ICT system captures candidate's surname, first name, sex, date of birth, father's name, mother's name, district name, district number, sector name, sector number, school number, subject combination, student number, language of examination, (candidates have been allowed to write their examinations in either English or French), disabilities, choices (candidates have 3 choices of schools and 3 choices of subject combinations). These data are usually collected in MS Excel and have to be integrated in the database. Marks are entered against the candidate details already

in the data base and provision for marks entry is designed into the system.

As part of the process, lists and reports are produced which include lists of all registered candidates by school and by district with their full details for typing error corrections; list of candidates by sex; lists of grades for each candidate based on the weights of the subjects and the raw marks obtained, list of candidates by school and by district indicating marks in every subject and the average mark, list of first 20 candidates by their average mark, list of the first 20 candidates in each subject by their mark, list of the first 20 female students in the country, list of the first 20 female candidates in each subject by their mark, list of the first 20 schools by the average mark of all candidates in that school, list of the bottom schools by the average mark of all candidates in that school, the first 20 public schools by the average mark of all candidates in that school, the first 20 private schools by the average mark of all candidates in that school, the best candidate overall by average mark and his/her school, the best female candidate overall by average mark and her school, total number of candidates at registration, total number of candidates at registration by sex, total number of candidates who attended examinations in that year, total number of candidates who attended examinations by sex, total number of candidates who obtained a pass mark, total number of candidates who obtained a pass mark by sex, percentage of candidates who obtained a pass mark and percentage of candidates who obtained a pass mark by sex.

In this process, the ability to do selection of candidates to the Advanced Level of the secondary school cycle based on the available vacancies and the candidate choices that were recorded at registration is paramount. After this selection process, a number of lists and reports must be generated. These include lists of selected candidates by choice and allocated school, lists of selected candidates by district of the allocated school and lists of selected candidates by sex. The Ministry of Education and other stakeholders require different kinds of statistical data and the Council must have a facility to produce such data. The Council's success may be attributed in part to having generic report templates which are completed by providing input parameters and redefining the display layout which is very important for effective service delivery.

ICT Project (2)

In 2008, the Council signed a contract with AGILE LEARNING TECHNOLOGIES, an American company (which has acquired a licence to operate in Rwanda), to develop a web -based tool to enable the Council to improve the coordination and managements of high stake public examinations processes. The system / Project is known as the 'Rwanda Examinations Coordination and Management Information System' (RECMIS). As a result of the support emanating from this Public-Private-Partnership, AGILE LEARNING TECHNOLOGIES has helped develop local capacity at the Council through technology transfer and the Council was able to achieve the following targets in record time:

1. *Online registration of candidates, publication of results and SMS cell phone based system*

A highly secure online system for checking results was installed where students and parents or guardians can access Council's databases by providing their registration number and then their results are displayed in non modifiable format through web based application or SMS. The candidates can also register online through an interface that is linked to our data base. The Council has built an Online- Based- Results Information System that has been used to provide primary and secondary school leaving candidates with online access to their results through cell phones by SMS text and the Internet through the Web

and provides other services such as registration verification by SMS text.

The Council has installed and configured the system to enable students query its databases by SMS text for their results as well as through the Web and also to verify their registration status. The Council has built all the necessary capacity needed to run, support and maintain the developed system. The system includes querying of examination timetables for all sets of examinations. We have developed a database that enables the collection of statistics on the traffic and usage of the SMS and Internet system. This is important for SMS service provider (a local company called MTN Rwanda) with which the Council signed a separate contract; and for monitoring purposes.

The Council has trained staff to develop a strategy of implementation for the marketing and public awareness of the system to ensure sustainability. One of the important features of the system is to conduct system requirements analysis, design and development, deployment, testing and providing a clear maintenance plan of the system comprising of both client and server system components and staff have been trained on its use. No effort has been spared to ensure effective and efficient server configurations including the implementation of SMS and Internet interfaces (gateway configuration) between the system and the selected mobile telecommunications operator. We have established a central database and server software for storage and retrieval of examination results information. This information has been correlated and aggregated in the manner required by the Council and its stakeholders.

An enhanced website has been in place for use to publish examination results and student registration details and additional promotional information about the system including but not limited to basic information about the Council. There exist built-in reporting mechanisms to support statistical analysis of examination results data. Data collected are summarized and made available through the website and other media formats (Tables, Graphic Charts, PDF, Spread sheets, GIS Maps, etc). Candidates are able to query the database using specific student codes such as registration numbers or other pin numbers to be determined in order to retrieve examination results either by SMS or directly from the website. Users, who use SMS to receive examination results, are charged a premium rate for the SMS messages by the service provider and the fee is shared with the Council equally. Queries are also made directly into the database through a web interface. Information retrieved from the website is also available for downloading. The system has the ability to create historical trend reports (annual reports on primary and secondary schools examination results) using the electronically stored data, to use in planning and reporting on the activities of the sector.

2. *Collaboration tool*

The RNEC has developed a collaborative tool to enhance marketing and communication amongst stakeholders. Below are some of the data/message elements collected by the RNEC which is utilized by this application. They include list of registered students, list of withdrawals from examinations, rules, regulations and guidelines to conducting examinations in centers and districts, announcements, reports on administration of examinations, lists of students selected for the next level of study, list of transferred candidates, urgent messages to centers and districts, internal messages by Examinations Council staff, where possible voice and video chats for virtual meetings and video conferencing and general chat. The content format is designed in such a way that the lists are either word processing documents or spread sheets, reports, rules, regulations and guidelines are word processing documents; ***a***nnouncements, urgent messages and live text chat are in text or html formats; and there is also some voiceXML and MPEG or Avi for video chats.

The user categories include *s*ystems administrator, regular user and moderator. Every district officer, Head of department and Chief Executive Officers can be upgraded to moderate their group chats. In addition a user may access the application by providing a user name and password that was previously set at registration by the system administrator. Then users are authenticated and only information related to their duties is made available to them. This means that (a) officers who head examination centers are now able to upload or download their own lists of students and reports, view rules and regulations, announcements, urgent messages, district and the Council's reports and also join chat sessions of their group or the general chat; (b) District officers are now able to upload or download their own lists of students and reports, view rules and regulations, announcements, urgent messages, district and the Council's reports and also join chat sessions of their group or the general chat and posting announcements and urgent messages; and the Council staff are now able to upload/download rules and regulations, lists of students and reports, view rules and regulations, announcements, urgent messages, also join chat sessions of their group or the general chat.

3. *Selection process*

This module enables the Council to gather important statistics as indicated below. Schools or institutions can now submit these vacancies online into the server indicating number of places available at Ordinary (lower secondary) and Advanced (upper secondary) school levels and at the University level; and the number of places available at A' level by option for candidates completing O' level. Very high degree of security and privacy is required.

4. *Examiners tracking system*

This module covers the following items using online interfaces that are well designed which make use of appropriate technology concepts: Registration of examiners, giving their personal details; the examinations an examiner sets and also the examination he/she marks; examiner/teacher's qualifications; the class a teacher teaches and the subject that he/she teaches including the team leader's comments. Very high degree of security and privacy is required

5. *School performance*

The Council is now able to track the results and examine the performance of schools. This system generates statistical data on the performance of each school.

Benefits

Owing to these technological innovations, the Council received media attention for a while for having gone 'high tech.' The leading and influential daily English news paper 'THE NEW TIMES' had on 26th January 2009 as its front page caption: 'EDUCATION MINISTRY REFORMS THE EXAMINATION SYSTEM'; and on 28th January 2009, the same paper carried an article on page 7 titled: 'THANKING THE EDUCATION MINISTRY FOR EXAMINATIONS REFORM'. Consequently, during the budget process in June/ July 2009, in the midst of a global economic crunch (recession), the Council still received an additional six hundred million Rwandan francs equivalent to one million two hundred thousand United states Dollars for reforming the science examinations in that year. The funds came from '*internal re-allocations'* within the ministry of education in recognition of the Council as change agent in the Rwandan educational system.

CURRENT CHALLENGES

The Issue of Human Resource Development and Management

The main challenge facing the Council is the lack of sufficient human resource capacity. The Council has been struggling to develop and build a human resource base as a basis for spurring institutional growth and development. The Council needs to acquire such values as to enable them to be more effective and challenging in changing situations. They need to recognise that the Rwandan society and the Council in particular is under pressure to provide higher levels of quality service and value and that experience alone does not count anymore as the environment in the "global village" is changing fast. Middlewood & Lumby (2003, p. 5) are of the view that the quality of staff in an educational organisation "is an issue of both specification and development, and that quality is about much more than appointing the most suitable candidate". Professional development is an imperative. Bush and Bell (2002) also believe that this entails ongoing process of education, training and learning in either external or work based activities, proactive engagement and promotion of learning and development of professional knowledge, skills and values.

Recently, the focus has included learning to be able to influence, motivate and work in closer working relationships, in teams with vision that aligns with and contributes to the achievement of the overall vision of the Council. However, the whole concept of 'teamwork' presents a dilemma not only at the Council, but also in Rwandan educational institutions as a whole. At the Council, in spite of all the effort to create a team work environment, work ethic and a changed mindset, the results have not been as forthcoming as expected mainly owing to human resource capacity considerations. Wallace & Hall (1994) have suggested that team working can be fraught with difficulties over the balance between equity and hierarchy, meaning that not everyone wants to work in a team, yet the joint work that teamwork represents depends on the commitment of all involved. The challenge facing the Council therefore, is to analyse the effectiveness of its staff development provision in terms of its impact upon a 'learning organisation' that the Council aspired to be. This is no easy task as there is an urgent need for change and the Council cannot change unless the its staff develops an attitude to change of both mind and heart to enable them to see, make informed choices and take the opportunities that change brings (Middlewood, 1997c). This is fundamental to the improvement of organisational performance and therefore as a core task of the Council.

From this perspective, the Council needs to be careful not to take educational marketing for granted in terms of its impact on a learning organisation because of the challenges associated with developing the people responsible for such marketing. Bush & Middlewood (1997) suggest that such a programme has to be devised in the context of attempting to meet the varying and sometimes conflicting needs within the institution. Whatever the programme, the effectiveness of its components depends in part, upon the extent to which there is recognition of those factors which affect the learning of adults. Southworth (1984) sees the whole process as essentially adult education and warns that educational institutions need to be aware of the technological developments and organisational change which has gradually led some employers to realize that success relies on the skills and abilities of their employees. This has also been underscored by the rise in human resource management with its emphasis on the importance of people and the skills they possess in enhancing individual, team and organisational performance and efficiency (Armstrong, 2003; Beardwell & Holden, 2001; Summons, et al, 1995).

Educational marketing involves providing structures, resources and support which will help staff learn how to learn and all staff need to be involved in the collaborative learning. Never-

theless, external pressure, particularly financial pressure limits the scope of strategic planning in educational marketing. Thus the Council will need to create an environment in which people continually expand capacity to create the results they truly desire, where new and expansive patterns of thinking are nurtured, where collective aspiration is set free, and where people are continually learning how to learn together (Senge, 1990; 1993). Thus, if the speed of innovation means that the problems and solutions of the past are no longer an adequate basis on which to plan, then new ways of coping with change are imperative. New forms of learning are needed and the concept of the learning organisation appears an enticing goal (Burgoyne, 1994).

To do so, the Council has to overcome the challenge of developing the skills for identifying needs, designing activities, deciding on monitoring and allocating resources and this depends upon the evaluation of previous activity and includes consideration of the monitoring and subsequent review processes (Anderson, et al, 2004; Bush &Coleman, 2002; Briggs & Sommefeldt, 2002). In the prioritisation process, the opportunities that will be foregone will need to be considered in terms of their educational and resource impact. For example, Middlewood & Burton (2003) advise that the act of reprioritising the acquisition of one multi-media computer over the purchase of text-based reference materials for the same cost is one that needs to be judged in terms of the overall educational impact. This in fact, seems to be a leadership challenge because leaders are designers, stewards, and teachers. They are responsible for building organisations where people continually expend their capabilities to understanding complexity, clarify vision and improve shared mental models –that is, they are responsible for learning since they need to ensure that the learning is moved to those parts of the organisation which need it, valuing and rewarding learning and transforming the organisation through the application of its learning (Garret, 1994; Senge, 1990). This remains a challenge for educational marketing and technology development.

SOLUTIONS, RECOMMENDATIONS AND LESSONS LEARNED

Anderson, et al (2004) quote Beare, et al (1992, p. 235) as saying: 'image begets public esteem; esteem creates public support; public support begets political attention; and political influence begets finance and staff numbers and governmental priority.' I find this argument quite valid for the Council. For example, created in 1998 to redress injustice and discrimination that prevailed before the 1994 genocide, the young institution has seen public support grow from year to year largely due to the public image as a transparent, fair and accountable organisation. From the experience of the Council, education can win tangible public support and finance when respect for its operations and out puts is high; but as Anderson, et al (2004, p. 79) observe, 'kill community regard and in the same process one kills the supply of resources.' This means that stakeholders should be proactively engaged and their importance should not be underestimated.

Another consideration is that the Council has to change the way it does business with schools which requires regular communication so that they are not only aware of its new 'products', but support and feel they are co-owners for effective implementation and service delivery. According to Bush (1999, p. 4), educational institutions can no longer 'operate in isolation' and expectations of society whether expressed by individual parents, identifiable groups, or government legislation, mean that educational institutions need to be aware of views being expressed by stakeholders. Citing Bagley, et al (1996, p. 125), Bush points out that educational institution must take account of public perceptions of 'how well they are performing and be prepared to respond to those articulated concerns which are genuinely representative.'

There is therefore a need for closer stakeholder partnership and collaboration.

A lesson learned here is that once the Council has developed a clear concept of such a relationship, then the management of the examinations system will be clear. Also, there ought to be a change in the relationship between the Council and the schools. This calls for renewed power relations and a pragmatic approach has to be taken to work out more effective teacher participation beyond marking examinations. This implies an effective co-learning relationship with the teachers involved in its work.

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KEY TERMS AND DEFINITIONS

Discrimination: This was a state of affairs in which the Tutsi and other social groups were systematically excluded from participation in the education system. Social discrimination included the exclusion of girls in favor of boys, and others based on religion and place of origin.

Education System: This refers to the Rwandan education system which provides for six years of primary (elementary) education, three years of the lower secondary education, known in East Africa and the British Commonwealth as the 'Ordinary Level', three years of the upper secondary education, known as the 'Advanced Level', and four years of University education (6+3+3+4).

Effective Management: Refers to the results oriented post-genocide paradigm shift in attitude and management practices in which the Council implements its policies and decisions to assist in directing its activities towards its specified goals and objectives. This includes monitoring and controlling of its activities, how we make our decisions, and how we control our resources.

Innovation and Technology: This refers to the improvements and changes in technology that the Council has instituted to assist in the effective management of the national examinations system for more cost-effective and cost-efficient delivery of its reform packages. It applies to the way candidates register for national examinations, in test development, marks processing, grading, and publication of results and in orientation of successful candidates to Ordinary and Advanced Levels of secondary schools, and to Universities and other Higher Education Institutions.

Marketing the Council: Refers to the efforts that the Council has been taking to communicate its vision, mission, goals and activities to its stakeholders. The last ten years have marked a series of reforms in the national examinations system which demanded among other things stakeholder consultation and making sure that they felt part of the ownership of the reform packages.

Nepotism: This refers to a phenomenon in which before 1994, for a learner to proceed from one level of the education system to another, they had to be related to, or be friends with the president of the republic, a government minister, or other government and political party officials regardless of performance at school.

Rwanda National Examinations Council: This institution was created after the 1994 Tutsi genocide in Rwanda to address the imbalances that obtained in the education system. These were based on inequities in the system related mainly to nepotism and discrimination which affected upward mobility of learners from the lowest level of the education system to the highest.

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Chapter 76
Toward Understanding Ethical Decision Making:
A Redefined Measure of Intent to Act Ethically

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ABSTRACT

This paper proposes a step-wise methodology for the development of a scale measuring intent-to-act ethically, which is a step forward in the ethical decision-making process. To test the robustness of the methodology, data from two different populations gathered from 75 students and 181 professionals were examined to ensure reliability in ethical workplace scenarios. This research is relevant to recent issues like the current economic crisis lead by the sub-prime banking failures. The failures of Enron and Tyco are extreme examples of failure of societal members to act ethically. The construction of scale-measuring items was based on a theory of intent, and issues identified from the human resource management literature related to reasons employees do not report perceived unethical behavior in the workplace. Tested for social desirability bias, the results show that the proposed scale offers an improved reliability for assessing behavioral intent related to ethical decision-making. With these findings, this paper provides a tool for research that relies on a measure of ethical intent as a proxy for ethical behavior.

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1. INTRODUCTION

Organizations are concerned with two types of behavior – organizational citizenship and dysfunctional behavior. Organizations want to encourage citizenship, which refers to behaviors that provide a positive overall contribution to the organization, and they want to discourage dysfunctional behaviors detracting from contributing to organizational performance (Moorhead & Griffin, 2004). Measuring behavior however, relies on observation and/or retrospective reporting. Observation has many practical implications and limitations in the workplace, and retrospective reporting relies on memory and accuracy of those providing the information. Consequently, another measure, intent or intention to behave, has served as a proxy for behavior in several disciplines interested in predicting behavior under certain conditions.

Recent issues such as the current economic crisis lead by the sub-prime banking failures (Terhune & Berner, 2008) and the failures of Enron and Tyco are extreme examples of failure of societal members to act ethically. The value of this research is to develop a construct which measures ethical intent which fills a gap in this portion of ethics research. This is important because intent is considered a proxy for behavior. Better understanding of ethical intent may aid academicians in improving education in this area of societal behavior.

The rest of the paper is made up of six sections. Section 2 reviews the pertinent literature, Section 3 identifies the problem, Section 4 suggests the methodology and explains the data used, Section 5 analyzes the empirical results, Section 6 recognizes the limitation of the findings, discusses the implications for future research, and concludes the paper.

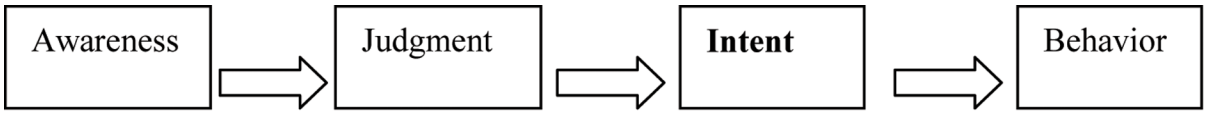
2. LITERATURE REVIEW

One area of research, ethical decision-making, relies on conceptual models that describe the steps that are antecedents to ethical or unethical behavior. One model is the four component ethical decision-making model attributed to Rest (1986), which includes (1) awareness, (2) moral judgment (Kohlberg, 1969), (3) moral intent and, (4) moral behavior. This constellation of components forms the basis of most ethical decision-making studies (Barnett & Vaicys, 2000; Jones, 1991; Kelley & Elm, 2003; Trevino, 1986; Trevino & Youngblood, 1990). This model is displayed in Figure 1. The first component, awareness, provokes the initial step in ethical decision-making. Highly nuanced, complicated, or ambiguous situations of individual experience must first be identified as having ethical relevance in order to activate the decision-making process. Pardales (2002) refers to making this first step as the capacity to perceive moral issues, exhibited as an issue enters individual awareness.

The second component in this model of ethical decision-making process is moral judgment, an unconscious and cognitive evaluation made by individuals depending on the level or stage of their moral development. Theories of cognitive moral development, described by Kohlberg (1969) and Rest (1986), explain how levels of moral reasoning evolve over a lifetime and have been found to be linked to education level and age.

The interaction between moral judgment and moral development has been studied variously, with authors attempting to measure the level of moral judgment by identifying hierarchical stages of development of the individual. The results of this research, called stage theory, are questionable, as

Figure 1. Four component ethical decision-making model



the findings correlate level of moral development with age and education. According to Krebs et al. (1991), the explanation that the level of moral development increases with education fails to explain variation in judgment among educated, mature adults, demonstrating how research on the level of moral judgment seems to have limitations.

Wark and Krebs (1997) examined stages of moral judgment comparing individuals' projected behavior in hypothetical situations with real life situations and found that in real life situations these people exhibited significantly lower judgment levels than in those projected hypothetically. Critics of Kohlberg (1984), Krebs et al., (1997) demonstrated that when students were asked to consider philosophical dilemmas similar to the ones used in Kohlberg's (1984) test, they generally exacted the highest stages of moral judgment available to them. However, when faced with personal, real life situations they found that the students used different forms of moral judgment, suggesting that the type of moral issue acted differently in context despite fixed cognitive structures available to the person. These and other limitations suggested by Robin et al. (1996a) indicate that alternatives to measuring the judgment component of the ethical decision-making process must be found. Consequently, research in ethical decision-making in the last decade has started to use moral evaluation (Reidenbach & Robin, 1988, 1990) as the individual's context specific response to an ethical dilemma based upon individual organizational and situational factors.

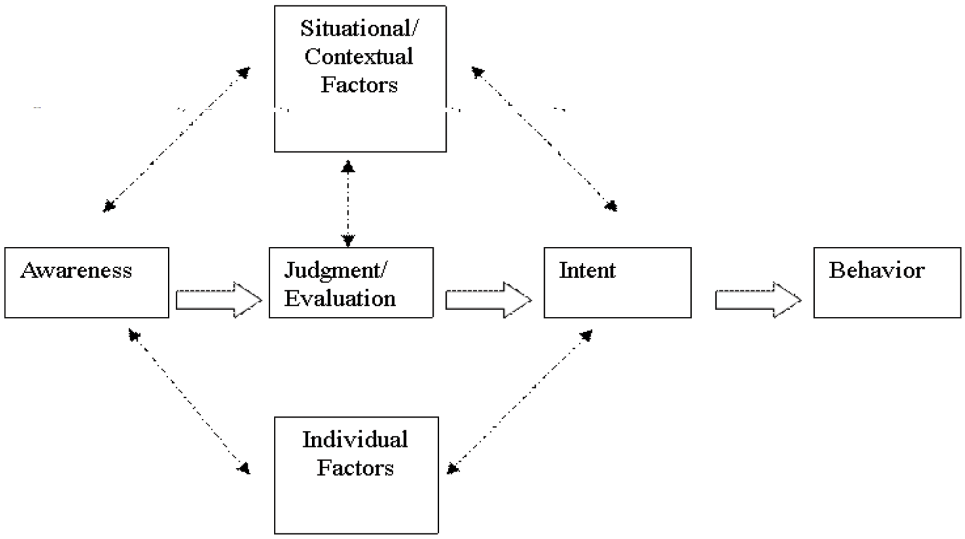
The third step in the ethical decision-making process, moral intent, directly precedes the actual ethical or unethical behavior. A very difficult area to assess, this component has largely been overlooked in the relevant research (Low et al., 2000) or somewhat superficially handled. Essentially, intent can be described as the individual's internal decision in relation to the issue (Meiland, 1970), and the most immediate determinant of behavior (Ajzen & Fishbein, 1980).

The final step in the four-step decision-making model is the expression of intent, the resulting behavior either ethical or unethical. Specifically, the behavior of the person is expressed in ethical terms as the commission or omission of action. The ethicality of the behavior is subjective, determined by the actor and/or observer of the behavior.

An interactionist model expands the four-component ethical decision-making model by including individual differences (individual factors), organizational factors, and issue-specific factors. Several variations of this model exist (Jones, 1991; Kelley & Elm, 2003; Trevino, 1986). Individual factors such as decision style (Pennino, 2002) and religiosity (Barnett et al., 1996) have been studied together with parts of this ethical decision-making model. Organizational factors, such as hierarchy (White, 1998) and organizational climate (Barnett & Vaicys, 2000; Flannery & May, 2000; VanSandt et al., 2006), have also been studied. Also appearing in the research are issue-specific factors, referred to by Jones (1991) as moral intensity factors, including magnitude of consequences or benefits, probability of effect, temporal immediacy, proximity, concentration of effect, and degree of social agreement on the morality of the issue. While the direction and the relationship among these factors and ethical decision-making has been the interest of researchers for 20 years, numerous contextual and individual factors could be identified and related to the ethical decision-making process. The interactionist model can be found in Figure 2.

The theory of planned behavior (Ajzen, 1991), an extension of the theory of reasoned action (Ajzen & Fishbein, 1980) has its foundation in social psychology. It is based on the belief that when faced with a behavior decision, individuals make a systematic, rational use of available information to form intent. Azjen and Fishbein suggested that the most immediate determinants of behavior are the individual's behavioral intention, a result of the individual's attitude toward the behavior and subjective norms, which represent the social pressure

Figure 2. The interactionist model of ethical-decision making



put on the individual to perform or not perform the behavior in question. Intention, according to Ajzen, also depends on the individual's perceived behavioral control; that is, the individual must find the behavior in questions under volitional control. This concept affecting intent to act corresponds to Rest's (1986) claim that the first component of his model, awareness, has to do with the individual realizing that "she/he can do something that would affect the interests, welfare, or expectations of other people" (p. 5).

The theory of planned behavior model has been used primarily in social psychology to examine individual intent particularly related to participating in self-improvement behaviors such as weight loss, exercise, and smoking cessation. Intent therefore has become a principle construct in understanding and predicting behavior in ethical decision-making research and social psychology. A model of the theory of planed behavior can be found in Figure 3.

3. STATEMENT OF THE PROBLEM

Both models, the interactionist model and theory of planned behavior, include intent as a step in the decision making process. As a concept, intent is often confused with belief, expectation, desire, or decision-making (Meiland, 1970). Intent refers to a *determination to act in a particular way.* Presumably, the greater one's intention is to act, the more likely that action would be to occur. This is the primary reasoning used in research to consider intent a valid proxy for behavior.

Most studies that have attempted to measure intent to act have either used two to four very similar items, a semantic differential scale, or measured ethical intent with one item. The majority of the research studies examined for the studies referenced here were related to ethical decision-making; others were related to the theories of planned behavior. Some of the measures used in these studies came from the consumer behavior literature in studies examining consumers' likelihood to make a particular purchase. Table 1 displays ethical decision-making studies in management, marketing and accounting which have relied on one item to measure ethical intent.

The use of one item to measure intent calls into question the reliability of the measure. Obviously, internal consistency cannot be calculated. Some studies have been conducted using multiple

Figure 3. A model of the theory of planned behavior

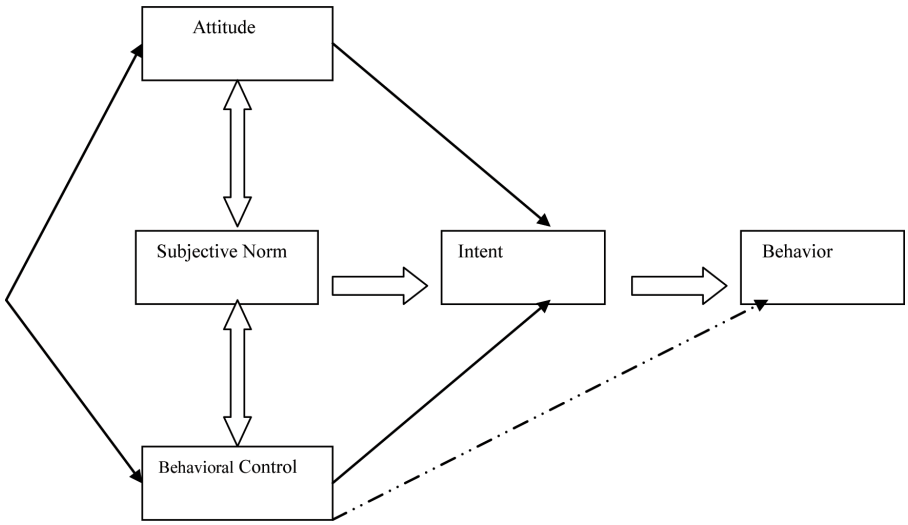


Table 1. Ethical decision-making studies measuring intent with one item

Authors	Single Item Questions
· Chia and Mee, 2000 · Dubinsky and Loken, 1989 · Flannery and May, 2000 · Flory, et al., 1992 · Robin, et al., 1996a · Robin, et al., 1996b · Beekun, et al., 2005 · Paolillo and Vitell, 2002 · Karande, et al., 2000 · Singhapakdi, et al., 1996 · Singhapakdi, el al., 1999	· How likely is it you would … · What is the likelihood that you would … · What is the probability that you would … · The probability that I would take this action is … · I would likely … · I would act in the same manner as XXX did in the scenario

item scales comprised of questions that are almost identical to each other; consequently, any reliability analysis is suspect. A. Singapakdi (personal communication, March 31, 2006) indicated that he and other researchers that have used primarily one item to measure intent acknowledge its limitations, and that this has been a common criticism by journal reviewers. At least for the ethics literature in marketing, this criticism has become a "*reviewer's mantra,"* repeatedly suggesting the need to use more items. Although acknowledged as a problem, the questionable reliability and limitations of items used in previous research have not been dealt with effectively.

4. METHODOLOGY AND DATA

This paper proposes a step-wise methodology for the development of a scale measuring intent-to-act ethically, which is a step forward in the ethical decision-making process. To test the robustness of the methodology, data from two different populations gathered from 75 students and 181 professionals were examined to ensure reliability in ethical workplace scenarios.

Item Construction. The items developed to create a scale for the two different populations presented here were based on an analysis of reasons why employees in the workplace do not report ethical wrongdoing (Joseph & Esen, 2003), and incorporated the conditional approach to intention discussed by Meiland (1970) in *The Nature of Intention.* Meiland delineated two important characteristics of intent: purpose and condition. This theory accepts that intent is always conditional, revealing a cognitive structure of the type: "he intends to do X if C obtains" (Meiland, 1970,

p. 16), where C stands for some circumstance. Further, every intention is conditional even if no condition is expressed. Meiland explains, "For it is taken for granted that the act in question will be performed if and only if certain conditions obtain" (p. 16). Since intention is subject to influence by the particular conditions that surround the activity, items for these studies were constructed to contain qualifiers or explanations about the respondent's inclination to indicate how they would behave in a particular situation. These qualifiers or explanations were derived from Joseph and Esen's (2003) Business Ethics Survey.

When asked what prevents employees from reporting a behavior they perceive to be unethical, reasons were cited such as fear, a belief that retribution would occur, the possibility that harm (such as job loss) would come to the reporter or those involved, nothing would be done about it, no one cared, or ethical conduct was not rewarded. The rationale for the item construction for these two studies was based upon an analysis of reasons why employees in the workplace do not report ethical wrongdoing, together with the conditional nature of intention. The rationale for the construction of eight items is based upon an analysis of Joseph & Essen's (2003) work and can be found in Table 2.

Testing of Ethical Intent Scale. Scenarios in research allow the researcher to change variables of interest within the scenario while keeping other variables constant. Ethics researchers have frequently used scenario-based research methods. In their review of several scenario-based ethics studies, Cavanagh and Fritzsche (1985) found that the majority of the studies used scenarios containing constant variables; however, several manipulated variables within the scenario. Taylor (2005) advocated that appropriate variables to vary are those derived from a qualitative study or a review of the literature. In these studies the variable of interest is referred to as the actor/observer perspective. Saltzstein (1994) indicated that the self and observer perspectives are an

Table 2. Rational for moral intent items

Conditional Moral Intent Item: If I were Pat, …	[1]**Background Behind the Development of the Items**
I would not choose the same course of action because of the potential negative consequences.	Employees reported potential negative consequences associated with reporting unethical behavior: they feared that it would not be kept confidential, retribution by peers and/or manager would occur, they would be labeled a whistle-blower, and/or they wouldn't be viewed as a team player.
I would choose the same course of action if there was no rule against it.	Employees thought that although unethical behavior occurs, most employees follow the organization's code of ethics, policies and procedures.
I would choose the same course of action if no one will be harmed in the situation.	Employees reported that they did not want harm to come to themselves or others (particularly job loss) and that unethical behavior was sometimes required to save jobs, and ensure the organization's survival (prevent harm to the organization).
I would choose the same course of action because everyone does it.	Employees reported that the behavior of co-workers on the job influenced their own on-the-job behavior.
I would choose the same course of action because there is nothing wrong with doing this.	Employees reported that they believe many employees rationalize unethical behavior as normal workplace behavior.
I would choose the same course of action because no one cares.	Employees reported that nobody cared about business ethics in their organization and/or no action would be taken if instances were reported, and there was no commitment to ethics in the organization.
I would choose the same course of action because of the benefit to me.	Employees reported that ethical conduct was not rewarded and participating in unethical behavior advanced their own career interests.
I would not choose the same course of action because it is not right.	Employees reported that they believed in the values and standards of their organization.

[1] Source: Joseph and Esen, 2003

important distinction that has been largely overlooked in scenario-based research. Cavanagh and Fritzsche (1985) reported that responses to these two perspectives can provide valuable and quite different information. In organizations we see the actor/observer phenomenon at work when individuals tolerate behaviors in others that they view as wrong and would not engage in themselves. The scenarios in these studies were based upon scenarios previously used in research by McMahon (2002). McMahon's research was an analysis of the factor structure of the Multidimentional Ethics Scale, a measure of moral evaluation. The scenarios were work-related and considered to be easily understood by individuals with workplace experience.

The proposed newly developed items to measure ethical intent were applied to two separate populations. The scenarios used in each of the studies are presented in Appendix A. To achieve maximum information, the more robust statistical method is to use a multistep approach to improve reliability and validity (Anderson & Gerbing, 1988; Tukey 1991; Hair et al., 1998; Kline, 1998), Internal consistency of the scale was measured using Cronbach's alpha (Nunnally, 1978), and to better assess the reliability of the newly developed intent scale both explatory factory analysis and confirmatory factor analysis were used.

In the following paragraphs, the co-authors will discuss the measures (social desirability and intent-to-act ethically), subjects, and procedures adopted in implementing the new intent scale to the two populations used in this paper.

Population One

Social Desirability Measure. In addition to the scenarios and newly created ethical intent scale, a measure of social desirability was used. The Marlowe-Crowne 2 (Strahan & Gerbasi, 1972) was included to determine if either the newly developed scale or the previously established semantic differential scale were influenced by social desirability. This measure consists of 10 true and false questions. Five questions of this scale were reverse scored.

Social desirability is a style of responding to questions in a way that is socially acceptable so that the respondent can manage impressions of him/herself. A measure of social desirability is a recommended control in studies of self-report data, particularly data that may be considered sensitive in nature (Nederhof, 1985), such as responses about one's ethicality. A measure of social desirability is used in the first population as a statistical control because social desirability bias could influence the questions being researched. It controls for lying or less than truthful answers. A strong correlation between the social desirable measures and ethical intent measure could distort or contaminate the ethical intent measure. A social desirability scale was included in the first population to determine if it should be included, or could be eliminated in subsequent research using the intent scale.

Intent-to-Act Ethically Measure. The intent items were measured on a seven-point Likert scale, ranging from strongly disagree to strongly agree, anchored at each point. Three items were reverse scored. These items can be found in Table 3.

Subjects. One hundred senior and graduate-level business students and 60 human resource development graduate students were invited to participate in this study. The business students attended a regional university located in the Mid-Atlantic region of the United States. The students were at the university's main campus and in five distance learning centers that are within a five-hour radius of the main campus. This university has an extensive distance learning capability, with classes originating from, and broadcast to, various sites. The human resource development graduate students were from a different university in the same general area. There was a 47% response rate (n = 75). Males represented 32% of the respondents.

Table 3. Intent scale items

1. I would choose the same course of action.
2. I would not choose the same course of action because of the potential negative consequences.
3. I would choose the same course of action if there is no rule against it.
4. I would choose the same course of action if no one would be harmed in the situation.
5. I would choose the same course of action because there is nothing wrong with doing this.
6. I would choose the same course of action because everyone does it.
7. I would choose the same course of action because no one cares.
8. I would choose the same course of action because of the benefit to me.
9. I would not choose the same course of action because it is not right.
10. I would not choose the same course of action.

Procedures. Classroom participants included students from the authors' classes. Other instructors teaching business courses invited their classes to participate. The author went to the classes and gave a brief description of the purpose of Population One and told students their participation was voluntary. Afterwards, all the students were sent an email which explained the survey's purpose and procedures with a link to the electronic survey. Some students were provided with optional extra credit for their participation. At the end of the survey data were uploaded into SPSS.

Population Two

Social Desirability Measures. Unlike the situation in the first population, the Marlowe-Crowne social desirability scale was not used in this study based upon the outcome of Population One which found no social desirability bias.

Intent to Act Ethically. The intent items were measured on a seven-point Likert scale, ranging from strongly disagree to strongly agree, anchored at each point. Three items were reverse scored. These consist of the same items used in Population One previously discussed and found in Table 3.

Subjects. The subjects for Population Two were drawn from the membership list of a professional association and represented a sample of convenience. Females dominated the responses with 60% female and 40% male responding. A total of 70% of all responders worked for a university and the remaining 30% were employed by business organizations or consulting firms. The mean age of participant was 43 years and they were with their organizations an average of 7 years.

Procedure. An announcement about the survey was sent to potential participants via email three days prior to an electronic distribution of the questionnaire. Two versions of the questionnaire were used, differing only by the scenario presented. A total of 319 actor questionnaires and 321 observer questionnaires were distributed. These groups were determined through a randomization procedure in Excel which did not divide the groups equally. Thirty-five (21 actor and 14 observer) email addresses were eliminated because the emails were returned as undeliverable due to incorrect or outdated email addresses present on the membership list. As a result, of the 605 actual questionnaires were distributed electronically; 298 contained an actor perspective scenario and 307 contained an observer perspective scenario. After one week and two weeks, a reminder email was sent to non-responders. The overall response rate for this study was 37%. Randall and Gibson (1990) in their review of 94 empirical articles related to ethics found that ethics research suffers from low responses, due to "the nature of the research" (p. 464). In a review of 17 more recent ethical decision-making studies, it was found that response rates averaged 24.8% and ranged from 12.4% to 62.8%, with the majority under 30%.

Additional cases were eliminated due to missing data. This reduction in the number of cases resulted in a total of 181 valid responses used in

the data analyses. At the close of the survey, data were uploaded into SPSS and analyzed.

5. EMPIRICAL RESULTS AND ANALYSIS

Results on Population Two

Descriptive statistics and correlations among the scales and items, and reliability were computed. This information appears in Tables 4, 5, and 6. The means and standard deviations for the ethical intent scales and semantic differential items were fairly consistent and not greatly skewed to one end of the rating scale. They all were somewhat in the direction of disagreeing with the action depicted in the scenario.

Table 4. Descriptive statistics for population one

	N	Min	Max	Mean	Std. Dev.
Intent (Actor)	74	1.00	7.00	2.6	1.3
Intent (Observer)	71	1.00	7.00	2.7	1.3
Semantic Differential (Actor)	75	1.00	7.00	2.6	1.7
Semantic Differ. (Observer)	73	1.00	7.00	2.7	1.8
Social Desirability	74	1.00	7.00	1.5	0.2

Correlations among the ethical intent scales were high, as would be expected. The Marlowe-Crown 2, social desirability scale, was not statistically significantly correlated with the ethical intent measures, except for one weak but statistically significant correlation (r =.25) with the ethical intent scale for the second scenario.

A correlation matrix for the ethical intent items is shown for the first scenario in Table 6. The result for the second scenario was very similar. A range of moderate to high correlations among the items was indicated. These range from a low of.35 to a high of.86.

The correlations demonstrate a moderate to high degree of homogeneity between the ethical intent items and suggested that the items measure the same phenomenon.

Internal consistency (Cronbach's Alpha) was examined for the ethical intent items. The obtained alphas (including when single items were deleted) were above.93, suggesting a very reliable measure (Nunnally, 1978). Additional reliability coefficients were calculated for a smaller number of items, eight, six, and four. The alpha coefficients decreased slightly, but not below.90.

Similar results were found for the ethical intent measures from the second scenario. There were no statistically significant differences between the two scenarios for the ethical intent items or

Table 5. Scale correlation for population one

	Intent (Actor)	Intent (Observer)	Semantic Differential (Actor)	Semantic Differential (Observer)	Social Desirability
Intent (Actor)	1.00				
Intent (Observer)	.59[1]	1.00			
Semantic Differential (Actor)	.78[1]	.42[1]	1.00		
Semantic Differ. (Observer)	.48[1]	.68[1]	.56[1]	1.00	
Social Desirability	.17	.25[1]	.16	.04	1.00

[1] Correlation is statistically significant at the.01 level (2-tailed)
[2] Correlation is statistically significant at the.05 level (2-tailed)

Table 6. Item correlations for population one

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Item 1	1.00									
Item 2	.62	1.00								
Item 3	.67	.35	1.00							
Item 4	.86	.63	.71	1.00						
Item 5	.65	.46	.57	.64	1.00					
Item 6	.75	.48	.61	.68	.80	1.00				
Item 7	.76	.51	.60	.74	.68	.80	1.00			
Item 8	.74	.54	.65	.75	.59	.72	.83	1.00		
Item 9	.79	.72	.60	.85	.57	.58	.63	.67	1.00	
Item 10	.75	.61	.55	.69	.52	.60	.62	.67	.75	1.00

the semantic differential items based on a paired t-test comparing the two sets of scores.

A principal component factor analysis performed on the 10 ethical intent items (one for each scenario) produced one factor, accounting for 68 to 69% of the variance. Two additional factor analyses using Varimax rotation were conducted on the data from both scenarios. Tables 7 and 8 display the factor loadings for the ethical intent items.

Factor loadings above.40 are meaningful (Hatcher, 1994). In the actor perspective scenario, seven items loaded on one factor and three loaded on a second factor. This indicated that the items potentially represented more than one construct. In the observer perspective scenario, all 10 ethical intent items loaded on one factor, giving an indication that the items are essentially measuring one construct. When two factors were forced, 65 to 68% of the variance was explained.

The confirmatory factor model is shown in Figure 4 and the data from the confirmatory factor analysis (CFA) for this study is shown in Table 11.

The data from this analysis suggest that this is an acceptable construct. All path coefficients were statistically significant ($p<.001$). Also, the fit measures for the CFA are all within acceptable ranges (Hair et al., 1998). In addition, the construct reliability and the variance explained were simi-

Table 7. Factor loadings for ethical intent items for population one

Item	Factor 1	Factor 2	Factor 3
Item 1-O	.87		
Item 4-O	-.82	.33	
Item 10-O	-.82		
Item 2-O	.82		
Item 7-O	.80	.39	
Item 5-O	.77		
Item 6-O	.75	.38	
Item 8-O	.71		
Item 9-O	-.70		
Item 3-O	.68	.46	
Item 6-A		.84	
Item 8-A		.82	
Item 7-A		.82	
Item 1-A		.79	
Item 4-A	.32	.74	
Item 5-A		.73	
Item 3-A		.72	
Item 2-A		.35	.75
Item 9-A	.31	.54	.66
Item 10-A		.54	.64

Items 1-A to 10-A: Actor Perspective Questions Items 1-O to 10-O: Observer Perspective Questions Loadings below.30 are omitted

Table 8. Factor loadings for ethical intent items for population one: two factors forced

Item	Factor 1	Factor 2
Item 1-A	.89	
Item 4-A	.85	.35
Item 7-A	.79	.32
Item 6-A	.79	
Item 8-A	.78	.32
Item 9-A	.77	.34
Item 10-A	.77	
Item 5-A	.76	
Item 3-A	.72	
Item 2-A	.65	
Item 1-O		.87
Item 4-O		.83
Item 10-O		-.83
Item 2-O		-.82
Item 7-O	.38	.81
Item 5-O	.32	.78
Item 6-O	.40	.76
Item 8-O	.32	.72
Item 9-O		-.71
Item 3-O	.32	.68

Items 1-A to 10-A: Actor Perspective Items 1-O to 10-O: Observer Perspective Loadings below.30 are omitted

lar to the results of the exploratory factory analysis (EFA) and are acceptable for CFA analysis as recommended by Hair et al. (1998), which are 0.70 for construct reliability and 0.50 for variance extracted.

Results on Population Two

Analyses were conducted to determine how the scale performed. Descriptive statistics, intercorrelations among the items, and reliability were computed. The means and standard deviations for the intent scales were fairly consistent and not greatly skewed to one end of the rating scale. (Actor perspective: M = 2.7, SD = 1.4; Observer perspective: M = 2.8, SD = 1.3). They all were somewhat in the direction of disagreeing with the action depicted in the scenario. A T-test for the two groups (actor scenario and observer scenario) revealed no statistically significant difference between them. Correlations among the intent items were high, as would be expected.

A Cronbach alpha score was used to examine the reliability of the scale. The obtained Cronbach alpha was.93, suggesting a reliable measure. A minimally acceptable level of reliability based on Nunnally's (1978) recommendation is.70.

A principal component factor analysis conducted on the 10 ethical intent items produced one factor that accounted for 66% of the variance. The factor loadings for each ethical intent item are listed in Table 10. According to Hatcher (1994), factor loadings above.40 are meaningful. All items loaded on one factor with loadings ranging from.71 and.91 with the exception of Item 2. This item loaded below.40 at.37.

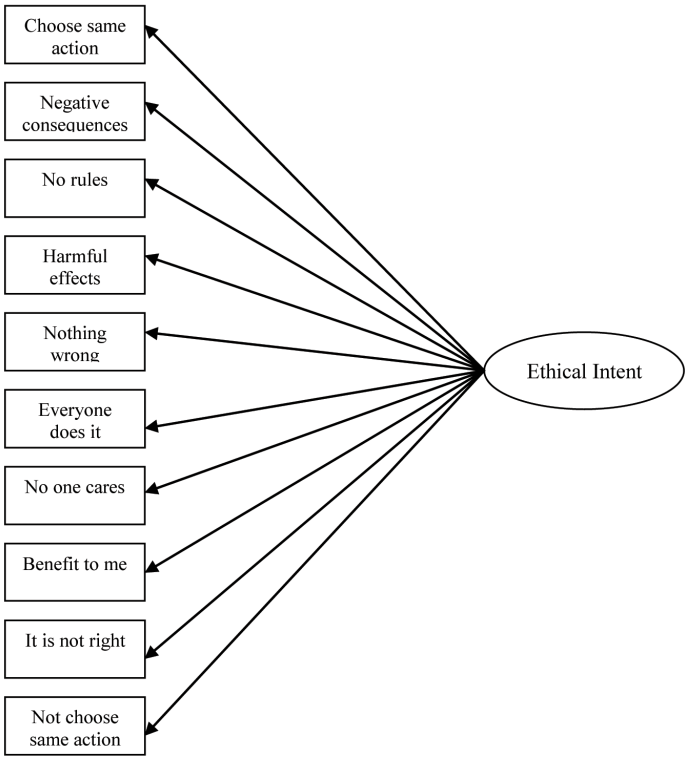
Correlations were computed on the ethical intent items and with the exception of correlations with Item 2 all ranged between.45 and.86. This

Table 9. Confirmatory factor analysis results for population one

	CFA Fit Measures								
	X^2	X^2/df	RMSEA	TLI	NFI	PNFI	PCFI	CR[1]	VE[2]
Study 1 Actor	46.94	1.56	.08	.97	.95	.63	.65	.97	.77
Study 1 Observer	35.23	1.36	.06	.98	.96	.56	.57	.99	.87

1=Construct Reliability
2=Variance Explained

Figure 4. Confirmatory model for ethical intent



demonstrated a moderate to high degree of homogeneity between the items suggesting that the items measured the same phenomenon. All correlations were statistically significant at the.01 level. These correlations are seen in Table 11.

Item 2, "I would not choose the same course of action because of the potential negative consequences", did not perform as well in this study. Based upon the results of the factor analysis shown in Table 9 and the correlations in Table 10, Item

Table 10. Factor loadings for ethical intent items for population two

Item **If I were XXX, I …**	**Factor Loading**
Item 1: would choose the same course of action	.91
Item 10: would not choose the same course of action	.90
Item 6: would choose the same course of action because everyone does it	.89
Item 8: would choose the same course of action because of the benefit to me	.88
Item 7: would choose the same course of action because no one cares	.85
Item 4: would choose the same course of action if no one would be harmed in the situation	.83
Item 5: would choose the same course of action because there is nothing wrong with doing this	.83
Item 9: would not choose the same course of action because it is not right	.80
Item 3: would choose the same course of action if there is no rule against it	.71
Item 2: would not choose the same course of action because of the potential negative consequences	.37

Table 11. Ethical intent item correlations for population two

	Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7	Item 8	Item 9	Item 10
Item 1	1.00									
Item 2	.35	1.00								
Item 3	.58	.11	1.00							
Item 4	.76	.24	.71	1.00						
Item 5	.64	.24	.51	.62	1.00					
Item 6	.74	.29	.55	.65	.69	1.00				
Item 7	.69	.27	.57	.65	.65	.76	1.00			
Item 8	.78	.31	.59	.71	.66	.78	.78	1.00		
Item 9	.70	.38	.45	.57	.63	.61	.60	.61	1.00	
Item 10	.86	.35	.56	.70	.71	.71	.66	.74	.81	1.00

2 should be removed from the scale when used again. The Cronbach alpha for the scale with this item removed changed from.93 to.95.

The confirmatory factor model previously shown if Figure 4 was again tested using CFA and the data from this study is shown in Table 12.

The data from this analysis also suggest that the construct is acceptable. All path coefficients were statistically significant ($p<.001$). As with the results of Population One, the fit measures for the CFA are all within acceptable ranges (Hair et al., 1998) as were the construct reliability and the variance explained.

6. CONCLUSION, LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

This paper proposes a step-wise methodology for the development of a scale measuring intent-to-act ethically, which is a step forward in the ethical decision-making process. However, the co-authors are cognizant of the following limitations, which would be addressed in future research papers. First, it depended on self-report responses to the questions based upon their own personal ethical beliefs. Second, although the first study did not indicate a need to use a social desirability scale, it is possible that participants in this study may have responded to questions in a certain way to enhance traits they deemed desirable. Third, the scale demonstrated sufficient reliability, however it has not come under the scrutiny of psychometricians. Fourth, some researchers have found that developmental levels related to ethics are greater for persons with more education and with increased age (Kohlberg, 1969; Rest, 1986). The sample of 70% university employees is likely to have been more highly educated than other populations. Perhaps the outcome would have been different with less educated and younger populations or with

Table 12. Confirmatory factor analysis results for population two

	CFA Fit Measures								
	X^2	***X^2/df***	***RMSEA***	***TLI***	***NFI***	***PNFI***	***PCFI***	***CE[1]***	***VE[2]***
Study 2	43.19	1.54	.06	.98	.97	.60	.62	.94	.63

1=Variance Extracted
2=Construct Reliability

other types of organizations such as government, nonprofit and for-profit organizations. Finally, qualities related to the scenarios may have also presented limitations in this study.

A plethora of research exists on ethical decision-making and many empirical studies have relied on a single measure of ethical intent. Moving forward, research in the arena of ethical decision-making should concentrate on arriving at a common conceptual understanding and framework that includes creating a clearer conceptualization of ethical intent which may lead to improved approaches to measurement. Other recommendations for future research are:

- This study could be replicated within other contexts. This could mean other ethical decision-making scenarios with different magnitudes of intensity, or other contexts such as conflict behavior which is another important behavior in organizations and a management concern.
- Similar studies need to be replicated with samples other than one dominated by university employees.
- Similar need to be replicated in other cultures to determine if it is reliable in a global environment.
- A validation study of the intent scale needs to be conducted.
- The intent scale can be further refined. A modified scale with a smaller number of items may prove to be sufficiently reliable for certain research.

Although much more needs to be done, these studies provide us with a useful step in the right direction toward a reliable measure for this important construct which has been missing in the ethical decision-making research, which often relies upon ethical intent as a proxy for ethical behavior.

This paper proposes a construct to measure ethical intent and tests its robustness by applying it two different populations (students and professionals). This paper tries to bridge a research gap in business ethics. Specifically, this line of research has become timely and relevant to recent issues such as the current economic crisis lead by the sub-prime banking failures (Terhune & Berner, 2008) and the failures of Enron and Tyco are extreme examples of failure of societal members to act ethically.

The findings are preliminary in nature but promising. The co-authors argue that additional items could be created to measure intent-to-act ethically that could demonstrate sufficient reliability. The co-authors suggest that the scale (or some refinement of it) may be useful for research related to intent to act ethically. The items appear to be sufficiently distinct to provide variance in measurement, yet form a consistent scale measuring a single factor.

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APPENDIX A

Scenarios

Population One

Actor Perspective Scenario. Pat decided to buy a new laptop computer. Pat was able to purchase a state-of-the-art computer at a very affordable price, but the trade-off for getting the low price was that it came with a very limited amount of pre-loaded software. One day at work Pat decided to install the software licensed exclusively to the workplace onto the new laptop computer recently purchased for personal use.

Observer Perspective Scenario. Chris and Lee share the responsibility for ordering and distributing supplies for their department. In this week's shipment of supplies, Chris discovered a package containing several laser printer ink cartridges that did not appear on the invoice. Chris asked if Lee knew anything about the ink cartridges that were included in the week's order, and mentioned that they looked like the same type that fit Chris' printer at home. Both Chris and Lee concluded that the office supply store sent the cartridges in error. At the end of the day, Lee saw Chris put the cartridges into a bag and take them home. Lee decided not to say anything to Chris about it, and not to tell anyone about what occurred.

Population Two

Actor Perspective Scenario. Pat decided to buy a new laptop computer. Pat was able to purchase a state-of-the-art computer at a very affordable price, but the trade-off for getting the low price was that it came with a very limited amount of pre-loaded software. One day at work Pat decided to install the software licensed exclusively to the workplace onto the new laptop computer recently purchased for personal use.

Observer Perspective Scenario. Pat's co-worker decided to buy a new laptop computer. Pat's co-worker was able to purchase a state-of-the-art computer at a very affordable price but the trade-off for getting the low price was that it came with a very limited amount of pre-loaded software. One day Pat saw the co- worker in the office installing software, licensed exclusively to the workplace, onto the new laptop purchased for personal use. Pat decided to ignore the situation.

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Chapter 77
Toward a Unifying Framework for Defining Internal Human Resource Flexibility:
A Proposal Based on the Resource-Based View Approach

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1. ABSTRACT

A flexible workforce is emerging as a critical success factor to counteract certain organizational rigidities and to guarantee organizational competitiveness in challenging environments.This chapter provides a review of the relevant definitions and classifications of human resource (HR) flexibility that have appeared during recent years. Furthermore, the chapter presents a definition of internal HR flexibility based on the resource-based view approach. From this perspective, HR flexibility is defined as a multidimensional concept. Specifically, this chapter assumes that employees are flexible when they show intrinsic flexibility (i.e. they can easily move between tasks and roles), modification flexibility (i.e. they alter their skills and/or behaviors to adapt to new circumstances), and relational flexibility (i.e. they participate in collaborative activities).

2. INTRODUCTION[1]

Tendencies such as the increasing spread of market globalization, new technological developments, the reduction of product life cycles and aggressive competition, are generating high levels of environmental changes and uncertainty for organizations of all types (Volberda, 1996; Sanchez, 1997). These circumstances require rapid responses through adaptations of organizational attitudes and capabilities, which lead to innovative management approaches and organizational methods (Bueno, 1996: 262).

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Traditional sources of competitive advantages are changing and it is imperative to deploy new strategies to successfully compete under changing external conditions. In this context, flexibility is emerging as a competitive weapon that allows organizations to counteract current market evolution and competitive levels (Ahmed et al., 1996; Volberda, 1996). Flexibility is a broad concept that can refer to operational issues such as manufacturing flexibility, or to strategic decisions such as alterations in the organization's product-market combinations. All these factors are associated with the organization's efforts to adjust available means to external challenges. Regardless of the specific response adopted by organizations, it is broadly believed that environmental dynamism forces managers to pay increasing attention to the management of the organization's social issues (Wright and Snell, 1998).

Nowadays, organizations require a new type and level of contribution from their workforce. In order to successfully compete under dynamic conditions, people's performance of a fixed set of prescribed tasks is no longer considered adequate. Instead, competitive advantage comes from employees who are engaged in broad open-ended and interdependent roles (Campbell, 2000; Parker, 2000). The recognition of the importance of employee flexibility for modern organizations has led to a body of research on labor flexibility or human resource flexibility[2]. Broadly speaking, HR flexibility refers to the possibility of varying the quality and quantity of personnel to suit changes in the environment (Gouswaard et al., 2001; Peiró et al., 2002). Interest in these questions arose in the early 1980s and has expanded during recent decades, as can be seen from the development of large-scale studies (e.g. Brewster et al.'s, 1994 study of labor flexibility strategies in Europe) or from the appearance of academic journal special issues on human resource flexibility[3].

Due to the growing interest in people as a source of flexibility, it is worth analyzing whether HR flexibility has the same meaning for everyone. Literature on HR flexibility has generated a large number of definitions of this term and is sometimes difficult to have a full picture of these contributions. The first purpose of this chapter is to provide a review of the relevant definitions and classifications of HR flexibility that have appeared during recent years. In this vein, researchers have emphasized two distinct strategies of HR flexibility: external and internal HR flexibility. On the one hand, external HR flexibility refers to alterations in the volume of labor employed, and it coincides with the use of "flexible employment contracts" (Storey et al., 2002) such as short-term temporary workers, temporary help agency or part-time employees (Kalleberg, 2001). On the other hand, internal HR flexibility refers to the flexibility manifested by the pool of human resources in the organization at a certain point of time. From this point of view, higher flexibility can be attained when managers develop and encourage employees to adopt permeable and expandable work roles (Tsui et al., 1997).

Of these two strategies, recent studies have recommended to increasingly rely on internal HR flexibility strategies, which are assumed to result in mutual gains for both the organizations and their employees (Valverde et al., 2000: 650; Kalleberg, 2001: 482). The relevance of internal HR flexibility in modern organizations demands a clear definition of the concept. In this regard, some recent studies have attempted to advance the conceptualization of internal HR flexibility, by delimiting employee features that may contribute to develop organizational responses to external challenges (e.g. Pulakos et al., 2000, Shafer et al., 2001). However, a review of these studies shows a lack of congruence among the dimensions and variables that the previous literature has considered as components of this concept, mainly for two reasons: first, because existing studies belong to a variety of different research fields, and second, because some of these studies lack a clear theoretical basis to guide the definition of the internal HR flexibility components (Breu et al., 2001).

Therefore, it is important to address the study of internal HR flexibility with a well-delimited theoretical approach that provides a structured logic for the conceptualization of this concept.

In line with several scholars (Dyer and Shafer, 1999; Chadwick and Cappelli, 1999, 2002), I believe that the Resource-Based View (RBV) provides interesting insights for developing a definition of internal HR flexibility that complements prior conceptualizations of the term. The RBV, critical for the development of Strategic Human Resource Management (SHRM) research, seems appropriate to address the conceptualization of the internal side of HR flexibility due to its organization-focused orientation that emphasizes the contribution of the internal resources of the firm to the organization's success and the consideration of human resources as one of the key resources of a firm (Wright et al., 1994). In particular, some authors have taken the RBV approach to identify a set of criteria that define flexible resources (Sanchez, 1995, 1997), which provides a systematic framework to delimit the features that define a flexible workforce. Thus, the second purpose of our research is to apply these criteria to the analysis of internal HR flexibility, thus providing a definition of this concept from the RBV premises.

3. BACKGROUND

The purpose of this section is to provide an overview of the HR flexibility concept, given the relevance of employees' flexibility for modern organizations and the lack of agreement in the literature regarding its meaning. In doing so, I first introduce different modes of conceptualizing HR flexibility starting with the model of the flexible firm and following with the dimensional interpretation of HR flexibility, based on the distinction between internal and external HR flexibility. Following this, in the second section I propose a general framework for the definition of HR flexibility based on the RBV premises and in the third section, I apply this framework to the definition of HR flexibility.

3.1. Modes of Conceptualizing Human Resource Flexibility

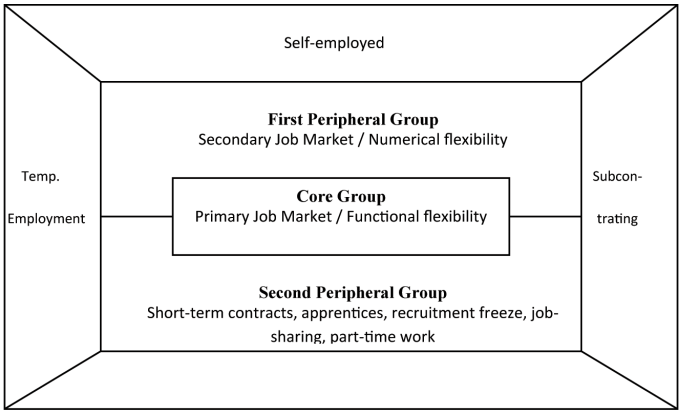
HR flexibility emerges as a key aspect in organizations operating in uncertain environments and whose efforts are oriented towards the development of rapid and diverse responses. It is believed that neglecting social issues in favor of technological and cost variables can lead to the failure of flexibility initiatives in organizations (Upton, 1995; Karuppan, 2004). The *Model of the Flexible Firm*, formulated by Atkinson (1984), Atkinson and Gregory (1986) and Atkinson and Meager (1986) is the most well known framework on HR flexibility and one of the first studies to deal with the multidimensionality of HR flexibility. Other recent studies coincide with the idea that human resource flexibility is a multidimensional concept and complement the Atkinson et al. framework.

3.1.1. The Model of the Flexible Firm

One of the most popular models of HR flexibility is the *Model of the Flexible Firm*, developed at the Institute of Manpower Studies (Atkinson, 1984; Atkinson and Gregory, 1986; Atkinson and Meager, 1986). According to this model, different groups of employees provide the organization with different sources of flexibility, as depicted in Figure 1.

First, there is a core group of employees ("primary job market") who are full-time, manifest high levels of commitment towards the organization and possess a broad pool of skills. Employees within this group are usually managers, designers or technicians and due to their attributes, they can easily move between functions and roles, accepting responsibilities that go beyond their job descriptions (Valverde et al., 2000: 651). In other words, they manifest "functional flexibility".

Figure 1. The model of the flexible firm (Source: Atkinson (1984))



Second, organizations can also obtain flexibility from peripheral groups of employees, by altering the size of the workforce according to organizational needs (i.e. "numerical flexibility"). In this regard, Atkinson distinguishes between a first and a second peripheral group of employees. The former group – secondary job market – is made up of full-time employees who do not perform activities others than the duties specified in their job descriptions. The second peripheral group comprises fixed-term or part-time employees, among others. Organizations can reduce or increase the number of peripheral employees without incurring high costs because these employees do not belong to the central activities of the organization (Mayne et al., 1996).

Despite the popularization of the *Model of the Flexible Firm* in studies on HR flexibility, several authors concur that the work of Atkinson and his colleagues suffers from a lack of solid theoretical underpinnings (Pinch et al., 1991; Blyton and Morris, 1992; Kalleberg, 2001). Kalleberg (2001) considers that this model does not provide a clear definition of what constitutes the "core" and the "peripheral" workforce. Kalleberg (2001) also points out that the *Model of the Flexible Firm* assumes that core and peripheral employees belong to completely separate parts of the organization, thus ignoring the potential interrelationships and collaborative processes that can emerge between core and peripheral groups.

These weaknesses do not prevent Atkinson's model from representing an important advance in disentangling the meaning of HR flexibility. The distinction between functional and numerical flexibility has been adopted by a number of studies in the literature since the publication of the model (e.g. Gooderham and Nordhaug, 1997; Creagh and Brewster, 1998; Friedrich et al., 1998) and it constituted a critical step in the multidimensional interpretation of HR flexibility. In line with this framework, a further set of studies has contributed to the multidimensional definition of human resource flexibility. In the next section, I provide a more detailed review of the dimensions of HR flexibility.

3.1.2. A Multidimensional Interpretation of HR Flexibility

The *Model of the Flexible Firm*, together with other studies within the SHRM field, introduced classifications of HR flexibility types based on two interrelated dimensions: a) scope of the analysis and b) nature of variations in the workforce.

In terms of the *scope of the analysis*, HR flexibility can be interpreted as the flexibility that can be attained from the external labor market, beyond

Figure 2. A multidimensional view of HR flexibility (Source: Adapted from Looise et al. (1998) and Peiró et al. (2002))

	External	Internal
Quantitative	Modifications in the number of employees. Contract flexibility (e.g. short-term contracts)	Modifications in the number of hours worked by current employees. Time flexibility (e.g.
Qualitative	Modifications in the content of work carried out by external employees. Contract flexibility (e.g.	Modifications in the content of work of the existing workforce. Functional flexibility (e.g. job rotation)

organizational boundaries and current workforce (external HR flexibility) or as the flexibility manifested by the pool of human resources in the organization at a certain point of time (internal HR flexibility) (Looise et al., 1998; Arulampalam and Booth, 1998; Kalleberg, 2001). The *nature of the variations in the workforce* can involve qualitative modifications in the tasks performed by the workforce or quantitative modifications in the number of employees or in the number of hours worked (Figure 2).

External HR Flexibility

External HR flexibility focuses on the set of potential employees available to the organization and refers to the improvements in organizational flexibility as a result of alteration in the volume of labor employed. It usually coincides with the use of the external labor market when the organization needs it (e.g. with temporary employees). External HR flexibility has been the subject of numerous studies, which associate HR flexibility with atypical working practices, broadly called flexible employment contracts (Storey et al., 2002) or flexible working patterns (Volberda, 1998). This type of flexibility resembles the "quasi spot contract" in Tsui et al.'s (1997) model, which rests on a pure economic exchange model and attempts to create a market-like flexibility so that the employer is free to hire and fire employees. According to this model, the employer offers short-term, purely economic inducements in exchange for well-specified contributions by the employee.

Much of the literature considers that external HR flexibility is related to *quantitative* modifications in the amount of work available to organizations, providing the organization with a higher or lower number of employees according to its needs (e.g. with seasonal employment to cover "peaks" of work demands) (Peiró et al., 2002). It corresponds with the notion of numerical flexibility introduced in Atkinson's model. Numerical flexibility[4] entails flexibility "on the extensive margin" (Beatson, 1995; Michie and Sheehan-Quinn, 2001) and refers to the ability to adjust the volume of work to changes in environmental forces.

From this quantitative interpretation, organizations can attain higher numerical flexibility through a set of non-standard employment relations or atypical working patterns, whose aims are to limit either the duration of the employment relation or the number of hours worked (Mayne et al., 1996). First, the organization has greater freedom to adjust the volume of work to changing circumstances when contracts have a predetermined duration. This can be achieved through temporary workers hired for finite periods, or through temporary help agency employees. These employees may be highly skilled (e.g. consultants, independent professionals) or low skilled (e.g. food service) (Kalleberg, 2001). Second, organizations can alter the number of hours worked in the organization by recruiting part-time workers.

Qualitative external HR flexibility only appears in specific cases, such as when the organization uses independent consultants that assume responsibility for more than one task in the organization (Looise et al., 1998).

Internal HR Flexibility

When referring to *internal HR flexibility*, attention centers on the current workforce of the organiza-

tion and it is defined as the extent to which existing employees contribute to the organization's flexibility. Several authors have interpreted HR flexibility from this point of view (Table 1), such as Molleman and Slomp (1999), who associate labor flexibility with the responsiveness of a fixed team of employees (referred to as the "labor system" in their study). Molleman and Slomp's (1999) study is formulated under the constraint of the "autonomy of the labor system". This refers to the extent to which the organization can deal with external challenges through its current set of employees, without employing outer-system capacity (i.e., without recruiting new employees). Similarly, Chow (1998) and Karuppan (2004) adopt an internal vision of HR flexibility, as both scholars propose that flexibility depends on employees' adjustments in the development of their tasks according to the organization's needs (Table 1).

Internal flexibility is similar to the "mutual investment" approach in Tsui et al.'s (1997) framework[5]. According to these authors, higher flexibility can be attained when managers develop and encourage employees to adopt permeable and expandable work roles. Managers adopting this approach care about employee well-being and professional careers and, in exchange, the employee's obligations and contributions include working on job assignments that fall outside prior agreements or expertise. Employees managed through this approach easily accept job transfers when requested by the employer to do so.

The meaning of internal HR flexibility can also be examined by analyzing its nature. To this end, I include the concepts of quantitative and qualitative HR flexibility in the analysis of internal HR flexibility (Figure 2).

On the one hand, *quantitative* internal HR flexibility is related to "time flexibility" (Peiró et al., 2002), and implies that the workforce of the organization is willing to enhance the number of hours worked (e.g. overtime work or variable working time).

On the other hand, *qualitative* internal HR flexibility entails modifications in the content of work in accordance with employee qualifications, and is usually associated with the ease with which employees move between tasks, for instance through job rotation or multi-tasking (Looise et al., 1998). This is the most commonly adopted definition of HR internal flexibility, and it corresponds with the idea of functional flexibility in the *Model of the Flexible Firm*. That is, qualitative internal HR flexibility refers to the adaptability of the internal workforce to face non-routine circumstances and events that demand creativity and initiative (Huang and Cullen, 2001: 34). It is usually associated with the employee's ability to undertake a range of tasks and/or employ a variety of skills (Blyton and Morris, 1992). For this reason, functional flexibility has also been termed "flexibility on the intensive margin" (Michie and Sheehan-Quinn, 2001).

Functional flexibility involves the processes of increasing employees' range of skills in such a way

Table 1. Definitions of internal human resource flexibility

Study	*Definition*
Molleman and Slomp (1999)	Responsiveness of a *labor system* (fixed team of employees) to variation in the supply and demand of labor, without resorting to outer-system capacity
Chow (1998)	Organizational abilities to constantly motivate employees who possess multiple and firm-specific skills so as to adjust their tasks to the needs of the organization
Karuppan (2004)	Job enlargement, i.e. the number of tasks or operations performed, the number of machines operated, intradivisional jobs that a worker can perform, and intradivisional workstations at which an operator can work

that they acquire the capacity to work across traditional occupational boundaries (Cordery, 1989; Cordery et al., 1993). In this regard, functional flexibility is linked to the human capital of the organization (i.e. employee collective skills). This strategy allows organizations to quickly respond to changes in products, production methods and technology since it enables the firm to allocate employees where and when needed easily and without extra costs (Atkinson and Meager, 1986). Consequently, the operational concept that underlies functional flexibility is *labor substitutability* or the extent to which one employee in a job can be substituted by another. This substitutability can be complete, when employees carry out other jobs as required (e.g. a waiter is transferred for the whole day from the restaurant to the bar), or incomplete, which comprise "boundary loosening approaches" oriented towards the combination of certain aspects of different jobs (e.g. the restaurant hostess helps in the bar in the early evening before she gets busy or goes into the kitchen) (Riley and Lockwood, 1997).

The conceptualizations of HR flexibility presented in this section on the whole adopted a practice-oriented perspective. That is to say, previous studies on HR flexibility included a set of recommendations for managers that strived to attain high levels of flexibility in their organizations. While this *managerial perspective* of HR flexibility offers helpful recommendations for daily practice in organizations pursuing flexibility, from a theoretical perspective they are to some extent incomplete. According to Looise et al. (1998), the analysis of HR flexibility has ignored relevant frameworks in the human resource management field. For this reason, the connection between the HR flexibility field and SHRM research has been weak, thus preventing researchers from analyzing either the antecedents of HR flexibility (including the role of HRM strategies) or the consequences that HR flexibility strategies have for employees (e.g. satisfaction, commitment, etc.) and organizational outcomes. The model of the flexible firm formulated by Atkinson and the subsequent studies on the concept of HR flexibility can be considered as suitable starting points for developing a more comprehensive definition of HR flexibility. I coincide with Looise et al. (1998) in considering that greater efforts should be made to define HR flexibility from a more solid theoretical framework. In the following sections, I focus on the conceptualization of HR flexibility based on the RBV.

3.2. A Framework of HR Flexibility from a RBV Approach

The RBV approach is a prominent framework in the SHRM literature. The RBV, with its emphasis on the internal workings of organizations, conceives employees as sources of sustainable competitive advantage, and it has enriched theoretical and empirical research on the influence of human resource-related issues on organizational performance (Lado and Wilson, 1994; Wright et al., 1994; Boxall, 1996).

In line with several scholars (Dyer and Shafer, 1999; Chadwick and Cappelli, 1999, 2002), I believe that the RBV provides interesting insights for developing a definition of HR flexibility that complements prior conceptualizations of the term. Others scholars, such as Wright and Snell (1998), Lepak et al. (2003), Bhattacharya et al. (2005) and Beltrán et al. (2009) have adopted the RBV perspective to analyze HR flexibility.

In this section I present a general framework that can serve as a guide to adapt the RBV to the definition of HR flexibility and to identify the features that characterize a flexible workforce. In doing so, I try to clarify two questions that should be taken into account when applying the RBV premises in the field of HR flexibility. First, I discuss the internal focus that the RBV posits on the study of HR flexibility and that differentiates it from previous definitions of the term. Secondly, I introduce the concept of flexible resources from a RBV approach.

3.2.1. The Internal Nature of HR Flexibility: A Review of Prior Studies

The RBV has been proved to be a valid framework in the field of SHRM, and it provides a theoretical basis for moving knowledge about HR flexibility forward. The RBV has an organization-focused orientation, as it considers that sources of competitive advantage come from the internal resources of the firm. Resources are stocks of available factors that are owned or controlled by the organization (Peteraf, 1993). Thus, the application of the RBV in the conceptualization of HR flexibility means that the level of analysis lies in *internal human resource flexibility*. By focusing on internal HR flexibility, a longer-term perspective on organizational competitiveness is adopted. As Murphy (1999) states, organizations that rely too heavily on contingent workers (i.e. external HR flexibility) run the risk of depleting the pool of available high-quality workers and are likely to fail to develop the core workforce they need. Although short-term gains might be realized by replacing permanent employees with contingent workers, the long-run implication of an over-reliance on contingent workers can be fatal to organizations.

Thus, from the perspective of the RBV, it is important to examine which features of the organization's current workforce are relevant in achieving higher levels of organizational flexibility. Specifically, the conceptualization of human resources from the RBV highlights the consideration of employees as "cognitive and emotional beings". Thus, from this theoretical model, the definition of HR flexibility should be based on the employee attributes that can best contribute to generating flexibility in organizations. By focusing on the skills, attitudes and behaviors of employees, the RBV assumes that individual members are the important resource in organizations, rather than the practices and procedures used by the firm (e.g. use of temporary work contracts) (Wright et al., 1994). Consequently, a further benefit of the RBV as the guiding framework is that it examines HR flexibility from the point of view of the variables that may be influenced by organizational human resource decisions and practices (Wright et al., 1994; Dyer and Shafer, 1999). Defining the dimensions of HR flexibility in terms of employee characteristics is important in order to make advances in the activities that best promote them. For example, it is important to know what kind of skills are necessary to promote flexibility in order to design training activities that encourage them or staffing practices that select employees with these skills (Pulakos et al., 2000: 614).

Some recent studies have attempted to advance the conceptualization of internal HR flexibility by delimiting a set of employee attributes (skills, attitudes, behaviors, etc.) that best contribute to the generation of flexibility in organizations. For example, Wright et al. (1994), by adopting a logical-incremental perspective (Quinn, 1980), suggest three ways by which employees can contribute to the organization's flexibility. According to these authors, to be flexible employees should manifest a proclivity to detect external changes and appropriate responses, together with the abilities to implement the required activities.

Pulakos et al. (2000) develop a taxonomy of "adaptive job performance" from an organizational behavior point of view. These authors, through a review of previous literature on adaptability at the individual, team and organizational levels[6], offer a conceptualization of flexible-related aspects of employee performance that differentiates between eight dimensions (handling emergencies or crisis situations, handling work stress, solving problems creatively, dealing with uncertain work situations, etc.).

Breu et al. (2001) review several conceptualizations of HR flexibility and introduce an operationalization of workforce agility based on twelve attributes, such as responsiveness to external change, speed of skill development, knowledge sharing, virtual team working, implementation of collaborative technologies, etc.

Shafer et al. (2001) carried out an exploratory study in a healthcare organization that allowed them to extract a set of agile attributes, in terms of people's flexible competencies and behaviors. Dyer and Shafer (2002), following the conclusions of Shafer et al.'s (2001) exploratory study and focusing exclusively on employee behaviors, suggested their own conception of HR flexibility, which (as the same authors affirm, pp.15) is a *tentative list* of requisite flexible attributes. These authors group flexible behaviors into three categories: 1) proactivity (includes initiative and improvisation), 2) adaptiveness (includes assumption of multiple roles, rapid redeployments and spontaneous collaboration), and 3) generativeness (referring to willingness to learn and share knowledge and information). Similarly, Kara et al. (2002) carried out an exhaustive review of previous literature on flexibility and proposed four human resource flexibility indicators, namely, keenness to improve skills, functional flexibility, work group and willingness to change.

In Table 2, I offer a summary of the abovementioned flexible variables. In elaborating this table, I have attempted to establish correspondences between the concepts considered by these studies in order to identify common themes and differences among researches.

A review of these studies shows that some limitations still exist regarding the conceptualization and operationalization of internal HR flexibility. On the one hand, as regards the conceptualization of this term, there is still much debate over what constitutes internal HR flexibility. A review of previous studies reveals that definitions of this concept are dispersed across various literatures (Breu et al., 2001: 23), such as strategic management (Wright et al., 1994; Shafer et al., 2001; Bhattacharya et al., 2005), quality management (Verdú, 2002), psychology (Pulakos et al., 2000), information technologies (Breu et al., 2001) or manufacturing flexibility (Kara et al.., 2002), which makes it difficult to draw unequivocal conclusions about which aspects to include as components of internal HR flexibility. In addition, some of these studies employ an exploratory methodology (Breu et al., 2001; Shafer et al., 2001; Kara et al., 2002) to elaborate tentative lists of flexible employee characteristics, rather than relying on a theory that delimits the dimensions of the concept and their interrelationships. Finally, studies differ in their focus when defining these dimensions, with some studies emphasizing employee attributes and characteristics (Wright et al., 1994; Pulakos et al., 2000; Breu et al., 2001; Shafer et al., 2001; Kara et al., 2002; Bhattacharya et al., 2005) and others combining this employee-focused definition with organizational activities associated with the improvement of internal HR flexibility, such investments in training (Volberda, 1998; Verdú, 2002).

For these reasons, there is no agreement on the dimensions that integrate the internal HR flexibility concept, as can be seen in Table 2. For example, while employee willingness to share information and knowledge is considered a dimension of internal HR flexibility by Breu et al. (2001), this question is ignored by other scholars. A similar discrepancy appears with regards to employee keenness to change or organizational commitment, among others. The lack of consensus over the internal HR flexibility concept presents a hurdle to the understanding of the meaning of this term as well as to the analysis of its antecedents and consequences in the organization (Breu et al., 2001). Therefore, a clear theoretical perspective must be introduced to define this concept that will help to integrate previous approaches and clarify the meaning of the construct (Looise et al., 1998).

I seek to bridge these gaps by applying the RBV premises in order to offer a systematic theoretical analysis of internal HR flexibility. In doing so, I apply the features of flexible resources to the definition of internal HR flexibility to extract the dimensions that integrate this concept from the RBV point of view. The next section provides an overview of the features of flexible resources from the RBV that will guide the rest of the chapter.

Table 2. A review of internal human resource flexibility characteristics

Wright et al. (1994)	Pulakos et al. (2000)	Breu et al. (2001)	Shafer et al. (2001)	Dyer and Shafer (2002)	Kara et al. (2002)
Detection of environmental changes			Capacity to pursue new business opportunities and threats	Initiative to spot threats and opportunities in the market-place	
Capabilities to identify strategies in response to the detected changes					
Implementation of strategies according to environmental changes		Responsiveness to external change	Take action to minimize potential effects of threats		
		Benchmarks for skill assessment			
	Learning work tasks, technologies, and procedures	Speed of skill development		Abilities to learn	Craft (increasing labor skills)
		Speed of adaptation to new work environments		Assumption of multiple roles Rapid redeployments	Functional flexibility
		Speed of information access			
		Speed of information systems change			
		Use of mobile technologies			
		Workplace independence			
	Demonstrating interpersonal adaptability	Collaborative technologies		Spontaneous collaboration	Group work
		Virtual team working			
		Knowledge sharing		Knowledge and information sharing	
		Employee empowerment			
			Commitment		
				Improvisation	
			Accountable		
			Efficacy		
					Willingness to change

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Table 2. Continued

Wright et al. (1994)	Pulakos et al. (2000)	Breu et al. (2001)	Shafer et al. (2001)	Dyer and Shafer (2002)	Kara et al. (2002)
	Handling emergencies or crisis situations				
	Handling work stress				
	Solving problems creatively		Focused		
	Dealing with uncertain and unpredictable work situations		Comfortable with ambiguity		
	Demonstrating cultural adaptability				
	Demonstrating physically oriented adaptability				
			Business-driven		

3.2.2. Resource Flexibility Dimensions

The RBV has formed an integrating ground for most of the work in SHRM in the past decade. As Wright et al. (2001: 703) affirm, "the RBV has become by far, the theory most often used within SHRM, both in the development of theory and the rational for empirical research". The RBV provides a rich and integrated approach that helps focus and organize research efforts in the strategic human resource management field and enables the practice of this field to become a truly strategic discipline (Ulrich, 1997; Colbert, 2004). The RBV has provided a rationale for how a firm's human resources could constitute a potential source of sustainable competitive advantage, but its premises have been also considered central to address flexibility issues (Sanchez, 1995, 1997). The novelty and speed of external challenges that characterize dynamic environments recommend the analysis of flexibility from the point of view of the firm's strategic choices and actions that are appropriated to those challenges, with researchers considering flexibility as an organizational property (Evans, 1991; Volberda, 1998). Firms improve flexibility and therefore, their chances for being successful in an uncertain environment, by having access to flexible resources that allow them to create a range of strategic options (Sanchez, 1997; Wright and Snell, 1998). Therefore, the RBV has been applied to study the flexibility of different resources -flexible production technologies, information systems, etc.- and how they provide the organization with strategic alternatives to counteract external pressures. (Parthasarthy and Sethi, 1993; Garud and Kotha, 1994; MacDuffie, 1995). If we consider that people are critical resources in today's organizations, the RBV provides as well an interesting framework to address the study of their flexibility (Wright and Snell, 1998; Dyer and Shafer, 1999; Bhattacharya et al., 2005).

Similarly to the role that value, rareness, durability and inimitability play in the generation of sustainable competitive advantages (Barney,

1991), the RBV suggests a set of criteria that define flexible resources, which can be applied to the analysis of HR flexibility. The RBV approach considers that flexible resources, when managed through appropriate organizational activities and in accordance with information about external events, provide the organization with a "strategic option bundle" (i.e., with access to various viable paths for both exploration and exploitation of the environment) (Helfat and Raubitschek, 2000; Mathews, 2002; Sanchez, 2004).

According to the RBV, organizational resources are flexible when they are suppliers of *novel services*. This is possible when resources 1) can be used in several ways or 2) can be easily transformed so as to be valid under novel circumstances (Penrose, 1959; Galunic and Rodan, 1998; Sanchez, 2004). Drawing from these studies, it is possible to extract the dimensions that define resource flexibility. The first question (use of resources in various ways) corresponds to the intrinsic flexibility of resources. Concerning the second question (transformation of resources), the organization can obtain new resources from existing ones so long as they are easily modifiable or combinable with other resources.

Therefore, from the RBV approach, resource flexibility is a multidimensional concept, whose components are: a) *intrinsic flexibility*, that is, resource applicability to different situations, b) *modification flexibility* or the extent to which a resource can be easily transformed (with low costs and time) in order to be used in new circumstances, and c) *relational flexibility*, which facilitates the combinability of one resource with others.

Resource Intrinsic Flexibility

The intrinsic flexibility of a resource refers to its applicability in multiple situations. Intrinsic flexibility corresponds to resource versatility, which refers to the number of alternative uses to which the resource can be applied without being modified. Examples of versatile (or multiple-use) resources are: cash, general-purpose machines, mail order and internet-based marketing channels, information technologies, flexible production systems, a group of engineers with capabilities valid for a range of products, etc. (Sanchez, 1995, 2004; Ghemawat and Del Sol, 1998). All these resources are valuable in situations characterized by high resource obsolescence, rapid technological changes or uncertainty about future technology, among others factors (Wernerfelt and Karnani, 1987; Sanchez, 1997).

In contrast, non-versatile resources are called specialized or specific resources (Sanchez, 1997; Ghemawat and Del Sol, 1998) and are only highly efficient in limited uses. This kind of resource constrains the options available for the organization to increase or decrease production volume or to change from one product to another. For instance, Friedli et al. (2004), when exposing the obstacles to becoming flexible faced by a manufacturing organization (*Fashion Inc.*), detected that specificity of implicit and explicit knowledge required for the smooth working of production sites imposed constraints on the relocation of such facilities. As a result, when the need to expand the product range arose, costs of switching production facilities forced the firm to outsource production or to adjust its internal structure.

The relevance of resource intrinsic flexibility derives from the fact that the firm can apply these resources to a variety of situations (e.g. Sanchez, 1995, 1997). When the organization detects specific environmental contingencies that require rapid responses and when it activates the appropriate resource allocation routines (Burgelman, 1994; Malone and Crowston, 1994), intrinsic flexibility guarantees that internal resources are applied in different situations according to organizational needs, and at the right moment.

In summary, resources that manifest high intrinsic flexibility guarantee their application by the organization to a wide range of alternative uses. Consequently, the firm can face new situations with its existing resources, without the need to

acquire, develop or modify them. In other words, the organization has a great number of paths or degrees of freedom to adjust its strategy (Evans, 1991; Teece et al., 1997).

Resource Modification Flexibility

Apart from their general applicability, "resources also differ in their flexibility to be incrementally improved" (Sanchez, 2004: 526). Thus, the second dimension of resource flexibility corresponds to modification flexibility. This refers to resource malleability, or the amenability of resources to change and their capacity to accommodate multiple transformations (Johnson et al., 2003). Modification flexibility involves changes in the nature of the resource that make it valid for application to new uses (i.e. resource extendability), without incurring high costs that offset the benefits obtained from the new resource (Sanchez, 2004).

For instance, machines equipped with electronic controls are highly malleable, since the organization can easily add new functionalities by, for example, adding a fax card to the computer. Other examples of malleable resources are certain organizational techniques, such as management by objective systems, whose evaluation criteria can be easily adapted to each employee and position within the organization (Wright and Snell, 1998). Nonetheless, the degree of malleability of a resource is dependent upon its nature, and is higher in knowledge-based resources (Galunic and Rodan, 1998). Thus, employee know-how, organizational learning or commitment are highly malleable resources that are easily modified and improved with suitable organizational activities.

The possession of malleable resources enables the organization to easily transform (with low costs and time) available resources in order to guarantee their appropriateness in novel situations. Thus, the impact of modification flexibility on organizational responses is similar to the benefits provided by intrinsic flexibility, but in this case the focus is on the longer term, and organizations need to identify potential improvements in current resources that can make them suitable for different uses. In this regard, firms should analyze internal knowledge, extend existing resources with the accumulated organizational knowledge and leverage knowledge into new applications (Mendelson, 2000; Pavlou and El Sawy, 2004).

To continue with the example used previously, when analyzing the transformation process of *Fashion Inc.* to become a more flexible organization, Friedli et al. (2004) observe that the success of this process was greatly due to the transformation of internal production facilities. Specifically, this organization divided its production sites into three sub-units, each of them providing flexible responses to the specific demands of a group of customers.

Resource Relational Flexibility

The final dimension in my analysis of resource flexibility is relational flexibility, which facilitates the emergence of a new combination of resources. Combinable resources can easily be reconfigured, that is to say, linked to each other so that they can jointly achieve a broader objective (Galunic and Rodan, 1998). While modification flexibility implies resource transformations, relational flexibility only requires altering linkages between resources. These new combinations do not necessarily involve changes in the nature of the resources (Mathews, 2002).

Resource relational flexibility has received attention from a variety of fields. In the innovation literature, Henderson and Clark (1990: 12) state that the essence of architectural innovation is the reconfiguration of an established system to link together existing components in a new way. In the field of production management, modular product designs constitute an alternative to traditional design systems, which can increase a range of product model variations, the creation of new families of derived product models and the development of new products through the

substitution of upgraded components of previous products (Sanchez, 1995). Resource combinability (or "relatedness") has also received attention in studies analyzing relations between industries, organizations or organizational segments (Fan and Lang, 2000). For instance, in territorial agglomerations of organizations, firms share some knowledge-based resources that are combined with each organization's specific knowledge. This can result in the generation of new resources that represent a source of flexibility. On the other hand, cooperation agreements favor resource combinability and enhance the likelihood of a wider pool of knowledge being generated. In such cases, intangible resources are more easily combined with others such as organizational cultures, information and communication technologies, managerial processes or customer base.

In summary, the range of strategic options that organizations can develop in order to respond to environmental changes is dependent upon the availability of flexible resources. Resource flexibility is a multidimensional term, including intrinsic, modification and relational flexibility (Table 3).

The above resource characteristics play an important role in organizations operating in changing environments, allowing them to develop appropriate responses in light of external challenges. These dimensions have appeared in studies on the flexibility of different resources (e.g. flexible production technologies, information systems, etc.), but their application in the field of HR flexibility is still scarce. I believe that the reasoning employed by the RBV to study the features of flexible resources can also be used to advance the conceptualization of HR flexibility.

In conclusion, the definition of HR flexibility from the point of view of the RBV should take into account two questions:

1. HR flexibility is an internal characteristic of the organization, and it is defined in terms of employee features.
2. The flexibility of organizational resources can be assessed by attending to three dimensions, namely intrinsic, modification and relational flexibility.

Since human resources are one of the most important resources in current organizations, they can be considered flexible when they fulfill the criteria of flexible resources. To date, practically no study has clearly delimited these requirements

Table 3. Summary of resource flexibility dimensions

Dimension	Definition	Examples
Intrinsic flexibility	Extent to which resources are versatile, i.e. they can be employed in a number of alternative uses without high costs and time	• Cash • General-purpose machines • Mail-order channels • Information technologies • Polyvalent employees
Modification flexibility	Extent to which characteristics of resources can be easily altered (malleable resources)	• Machines equipped with electronic controls • Employee know-how • Organizational learning • Employee commitment • Organizational reputation • Organizational culture
Relational flexibility	Extent to which resources can be easily combined, i.e. linked to each other so that they can jointly contribute to common goals	• Modular production systems • Organizational culture • Managerial processes • Customer base • Information technologies

(Peiró et al., 2002). I aim to fill this gap in next section by defining the characteristics of human resources that meet the requisites of flexible resources.

3.3. Definition of the HR Flexibility Dimensions from the RBV

In this section, I apply the concepts of internal, modification and relational flexibility to the analysis of HR flexibility in order to provide a more systematic definition of HR flexibility from the employee perspective. Following the premises of the RBV approach, I argue that HR flexibility is a multidimensional construct, as depicted in Figure 3.

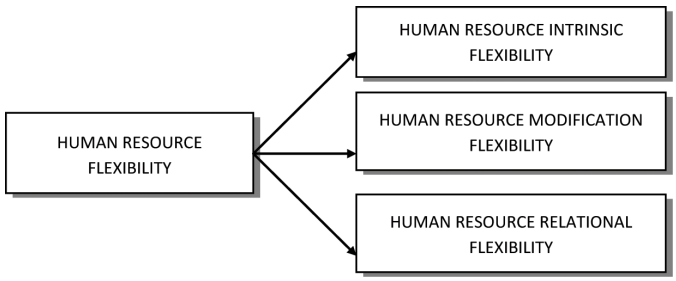
3.3.1. Human Resource Intrinsic Flexibility

The first dimension dealt with in my discussion of resource flexibility in the previous section was the adaptability of resources to different uses; in other words, their versatility or intrinsic flexibility. HR intrinsic flexibility implies that employees are able to work on different tasks and under diverse circumstances and that the costs and time needed to mobilize employees into new duties or jobs are low (van den Berg and van der Velde, 2005). This kind of employee usually possesses a wide repertoire of competences[7] (MacDuffie, 1995; Riley and Lockwood, 1997) or a set of general abilities such as leadership skills, problem-solving abilities, etc. that allow them to carry out a high number of tasks easily and without high costs.

The conceptualization of HR intrinsic flexibility under the RBV is similar to that of "functional flexibility" in the *Model of the Flexible Firm* (Atkinson, 1984; Atkinson and Gregory, 1986; Atkinson and Meager, 1986), as it refers to changes in the nature of work that allow the organization to respond to novel contingencies. Human resource intrinsic flexibility is manifest in the organization either through employees accepting responsibilities with a similar level of complexity to those in their everyday job (i.e. cross-functional movements), or when they perform duties belonging to different organizational levels such as administrative or leadership activities (i.e. vertical movements). For instance, in research by Rosenblatt and Inbal (1999) among schoolteachers, employee intrinsic flexibility involves teaching more than one subject and performing school roles other than their lessons, such as implementation of databases. Furthermore, as discussed above, the labor substitutability implicit in functional flexibility can be complete (when employees move between jobs) or incomplete (when they assume certain tasks belonging to other jobs).

In summary, organizations with a versatile workforce can easily assign employees to the appropriate tasks, in accordance with their knowledge of environmental challenges and demands and their consequences for organizational processes (Tüselmann, 1996; Sparrow, 1998; Storey et al., 2002). This type of employee provides the

Figure 3. Dimensions of the HR flexibility concept



organization with the freedom to modify its strategies, thus reducing the need for the alternative forms of extended labor supply, such as casual or short-term labor (Riley and Lockwood, 1997: 418).

3.3.2. Human Resource Modification Flexibility

The second dimension considered in the analysis of resource flexibility from the RBV was resource malleability. A resource is considered malleable when its characteristics can be modified without difficulty. In terms of HR flexibility, and following the same reasoning, employee malleability indicates the extent to which the workforce's characteristics are easily modifiable. Since the RBV conceives human resources as the pool of skills possessed by employees and the behaviors they exhibit, malleability should be analyzed in terms of both skills and behaviors. That is, employees will manifest modification flexibility when they innovate their skills or modify their behaviors ahead of need (Boudreau and Ramstad, 1997; Wright and Snell, 1998; Breu et al., 2001). While HR intrinsic flexibility corresponds to immediate employee features (i.e. people perform tasks in accordance with their possibilities), modification flexibility entails changes in individual traits. In order to advance the conceptualization of HR modification flexibility, I propose the differentiation between "skill malleability" and "behavioral malleability".

Skill malleability refers to how easily and quickly employees obtain the abilities needed to carry out new tasks (Maurer et al., 2003). In this sense, employees manifest skill malleability when they train and retrain as necessary, anticipate future skill requirements, demonstrate enthusiasm for learning new approaches to conduct their jobs and perceive every event in the organization as an opportunity to learn something significant for the future (Arulampalam and Booth, 1998; Pulakos et al., 2000; Dyer and Ericksen, 2005). For instance, in environments characterized by rapid technological innovations, employees must continuously learn new ways to perform their job and try to keep their skills as up-to-date as possible in order to make valuable contributions to the organization's goals. According to Ilgen and Pulakos (1999), employee abilities or willingness to engage in continuous learning and actually learn effectively should be a formal aspect of performance definition and assessment.

Indicators of skill malleability should reflect the processes of development planning, learning, and applying new knowledge and skills to changing organizational conditions. People who are committed to continuous learning search for new information about themselves and about emerging performance requirements that suggest a learning gap. Moreover, they are willing to devote the time, energy, and financial resources to gain the education needed to close the gap and improve their performance.

The concept and definition of *behavioral malleability* has received relatively little research attention in the human resource management field. However, useful contributions stemming from the organizational behavior literature can help researchers to understand this term[8].

As the starting point for my reasoning, I adopt the analysis of employee behavior in organizations provided by Wright and Snell (1998). These authors conceive employee behaviors as *scripts,* which are sequences of routines adopted by employees in their jobs. Behaviors are considered rigid (or non-malleable) when employees who have applied a particular script in the repetitive handling of situations, select the same script to deal with a novel situation. In contrast, if employees look for new sequences of actions with which to perform their daily activities or to face new circumstances, their behaviors are malleable. Thus, behavioral malleability refers to adjustments in the routines usually followed by employees. An employee with malleable behaviors adapts his or her responses to new circumstances, based on improvisation and not on fixed patterns of action.

Several concepts in the organizational behavior literature bear a similarity to the idea of behavioral malleability, such as proactivity, improvisation, initiative or role innovation, among others. These terms broadly refer to change-oriented employees who are willing to face novel problems through innovative solutions (Dyer and Ericksen, 2005). In my opinion, one of the concepts that best represents the notion of behavioral malleability is that of *taking charge* (Morrison and Phelps, 1999), close to the idea of individuals' *initiative* at work (Frese et al., 1996). These concepts refer to employee efforts to alter the way they perform their duties in the context of their jobs, work units or organizations.

In their study of employee initiative, Frese et al. (1996) used an interesting example that may clarify the meaning of behavioral malleability. These authors introduced the example of an accountant who does not receive the information required to calculate the salaries of the organization's employees on time. This accountant decides to work overtime in order to finish the salary calculation in time to pay the staff salaries. Furthermore, the accountant takes steps to ensure that this situation does not happen again in the future, by introducing changes in his or her job. In this case, for example, he or she may decide to install new computer software that captures the required information immediately. This example shows that one of the features of behavioral malleability is employee ability to manage changing conditions by providing immediate solutions to job problems. The decisions adopted by this accountant (i.e. working overtime and introducing new software) involve alterations to his or her work routines. Employees show behavioral malleability when they take decisions to avoid further mistakes or introduce changes in the way daily activities are performed.

In short, HR modification flexibility indicates the ease with which employees demonstrate change from previous states (Ilgen and Pulakos, 1999). Two concepts make up this second dimension of HR flexibility. First, skill malleability indicates improvements in employees' abilities and knowledge, and is linked to the keenness of employees to continuously master their skills and to avoid specialization in only one area of knowledge. Second, behavioral malleability refers to changes in the way of acting when faced with novel situations.

3.3.3. Human Resource Relational Flexibility

The final dimension in the analysis of flexible resources considers that available resources provide the organization with a higher number of strategic options when they can be easily combined. In terms of HR flexibility, this latter dimension indicates how easy it is to coordinate individuals to work together, and resembles the idea of *collective mind* or *social capital*[9] (Weick and Roberts, 1993; Youndt and Snell, 2004). According to Haiyang and Yan (2002) some employees have better team capabilities than others, as they can easily understand their role within the group and possess suitable abilities to engage in mutual interaction with other employees. When this happens, members of the organization or an organizational unit can easily be integrated into some form of higher-order systems or clusters of resources, such as in technological areas (e.g. printed circuit board assembly) (Teece et al. 1997; Galunic and Rodan, 1998), resulting in the combination of different sources of expertise. Thus, relational flexibility refers to employee mobilization into cooperative tasks (Forsythe, 1997; Breu et al., 2001).

In this regard, Shafer et al. (2001) demonstrated that flexible organizations follow the principle of "reliance on each other", based on the respect for the ideas and work of others, on expressing appreciation for other's contributions, and on giving support and cooperation, making each other stronger. This dimension of HR flexibility can also include cooperative activities with external employees, such as employee collaboration with

customers or suppliers. The existence of HR relational flexibility is manifest in the organization through specific employee actions, which can be used to operationalize this concept. Employees with higher levels of relational flexibility may a) converge with their colleagues and share the same opinions, b) assist others when needed, and c) supplement the actions carried out by others (Weick and Roberts, 1993). Broadly speaking, these indicators of HR relational flexibility are linked to employees' organizational citizenship behaviors (Organ, 1988; Shore and Wayne, 1993) and include their efforts to spontaneously collaborate with and help colleagues, to communicate and to affiliate with others.

In summary, human resource relational flexibility includes collectivistic actions among employees in order to jointly work towards common goals. Collectivist employees emphasize the link between themselves and the group to which they belong and as such, they pursue the well-being of the whole group, even if this sometimes requires that their personal interests be disregarded (Van Dyne et al., 2000; Man and Lam, 2003).

3.3.4. Interrelationships between Human Resource Flexibility Dimensions

A review of the literature on RBV and HR flexibility provides several theoretical arguments that sustain the existence of interdependencies between the dimensions of HR flexibility. In this section, I suggest a broader interpretation of the HR flexibility concept, by discussing how HR intrinsic, modification and relational flexibility are interrelated.

For instance, some authors hold that versatile employees (i.e. manifesting intrinsic flexibility) are likely to be better prepared to engage in collaborative activities (relational flexibility) (Motowidlo and Schmit, 1999). Collaboration between employees entails an extension of employee job responsibilities, since team members need to understand others' responsibilities so as to effectively contribute to the group's goals. Since employees showing intrinsic flexibility can perform several activities beyond their job descriptions, they will probably also be prepared to engage in collaborative activities, which entail combination of tasks within the same unit (Motowidlo and Schmit, 1999). In this vein, scholars such as Horwitz and Townshend (1993: 919) or Molleman and Slomp (1999: 1838) assert that that the attainment of high and diverse qualifications by employees increases their performance in team activities. Similarly, Zammuto and O'Connor (1992: 708), when studying a specific type of compartmentalization (incorporation of manufacturing and staff functions associated with producing a product or component in the same unit) highlights the fact that employees in such work units needs to be multiskilled because of the variety of tasks performed.

However, at the same time, employees manifesting higher relational flexibility may also show a greater tendency to alter their skills and behaviors (modification flexibility). The participation of employees in teams or groups and, in general, the collaboration with other members of the organization extends the employee vision of their own role in the organization. Employees manifesting higher relational flexibility develop a "team-oriented mindset" (LeBlanc and McInerney, 1994), oriented towards the attainment of common goals and the coordination of individual efforts. That is to say, employees with higher relational flexibility will be likely to assume as part of their jobs a broader set of activities and competencies than those that form part of their everyday job, leading to a flexible role orientation (Parker et al., 1997). As a result of this flexible role orientation, employees assume that in order to be efficient in these activities, they need to continuously develop their pool of competences, which favors the malleability of employee skills. Furthermore, when collaborating with others, behavioral scripts often change in order to face diverse and unpredictable situations, which are the result of the social interaction within the group.

Still other authors support the existence of interrelations between the two components of HR modification flexibility (skill malleability and behavioral malleability). According to Simon (1993), continuous learning processes associated with employee skill malleability demand the adoption of new cultural values and structural mechanisms, which eventually change the viewpoint and the role of the individual in the organization. Organizational learning values create an environment in which people widen the focus from the immediate outcomes of their performance to continuous learning by the organization as a whole. Hence, organizational learning values might foster extra-role behaviors, because by promoting strategic thinking, individuals develop an organizational system approach, which expands their perspectives beyond their formal role (Senge, 1990, 1993). This approach may thereby lead them to invest extra efforts in the organization as a whole by making innovative suggestions to improve the organization and volunteering for roles and tasks that are not obligatory, i.e., by showing higher behavioral malleability (Somech and Drach-Zahavy, 2004).

In conclusion, HR flexibility dimensions are interrelated and the interpretation of HR flexibility should be made from a wider point of view. Employees with a higher level of flexibility in one dimension are also likely to manifest better flexibility levels in other dimensions.

4. CONCLUSION

In today's organizations employee performance should no longer be assessed in absolute terms, but rather according to people's responsiveness to changing work demands. The rapid pace of change in job requirements places employees in a situation where they constantly need to demonstrate a capacity to engage in new learning and cope with change. Hesketh and Neal (1999), when referring to this broader conception of employee performance, introduce the term "adaptive performance", also adopted by Murphy and Jackson (1999:345) and Pulakos et al. (2000). Other authors such as Lau (1999) refer to this term as "flexible performance". Regardless of its designation, it is clear that more attention should be paid to the flexibility of the workforce, by considering not only the staff's efficacy levels attained in the daily tasks that their jobs comprise but also employee's ability to cope with change. Flexibility is thus a critical component of employee performance at work, and is separate from task performance.

The purpose of this chapter was to develop a conceptualization of human resource flexibility based on the RBV premises. In doing so, I followed the same logic used in the SHRM field to justify the competitive relevance of the organization's workforce. Research from the SHRM literature (e.g. Wright et al., 1994) assumes that human resources contribute to the organization's sustainable competitive advantages when they satisfy the requirements of strategic resources.

HR Flexibility as a Multidimensional Concept

I considered that human resources are flexible when they fulfill the features of flexible resources. Drawing from this reasoning, I concluded that HR flexibility is a multidimensional concept. Specifically, I assumed that employees are flexible when they show intrinsic flexibility (i.e. they can easily move between tasks and roles), modification flexibility (i.e. they alter their skills and/or behaviors to adapt to new circumstances), and relational flexibility (i.e. they participate in collaborative activities). Furthermore, I defended the existence of interrelations between these dimensions.

The proposed definition complements previous studies on the internal side of labor flexibility. On the one hand, by considering questions such as skill malleability or behavioral malleability, the RBV perspective introduces a proactive element into the HR flexibility concept, focused on the change-initiating role of employees that allows

organizations to anticipate rather than simply respond to external changes. That is, from the RBV, labor flexibility depends not only on what employees can do now, but also on what they will be able to do in the future (for example, by improving their skills). This definition differs from initial conceptualizations of HR flexibility, which emphasized the relevance of functional flexibility (e.g. Molleman and Slomp, 1999; Karuppan, 2004) and therefore, of employees' abilities to move or reallocate once a triggering episode has occurred.

On the other hand, the RBV provides a systematic approach for the definition of HR flexibility that complements the absence of clear theoretical underpinnings in the field of labor flexibility, therefore allowing the dimensions of this concept and their interrelationships to be identified. The RBV pays greater attention to the underlying dimensions of HR flexibility, therefore presenting a framework for integrating previous conceptualizations of the term. For instance, questions such as learning of work tasks, technologies and procedures (Pulakos et al., 2000), benchmarks for skill assessment (Breu et al., 2001) or willingness to change (Kara et al., 2002) can be considered as integrants of a broader concept corresponding to modification labor flexibility.

Several studies have developed measurement scales based on this conceptualization of HR flexibility (Bhattacharya et al., 2005; Beltrán et al., 2009) which may be useful in empirical researchers on HR flexibility. Furthermore, these scales provide value to managers, given that these measurement instruments can be used in the HR audit processes aimed at evaluating the efficacy of the human resource function when promoting workforce adaptability. In addition, managers could use the HR flexibility scale to separate the highly flexible groups of employees from their less flexible colleagues, which can help to detect strengths and weaknesses according to the nature of the environmental challenges. This can provide valuable information for firms, enabling them to more easily identify where improvements may be needed in the workforce when novel circumstances emerge.

HR Flexibility in the Knowledge Society

Organizational learning and knowledge management are gaining increasing significance in the knowledge society. Knowledge Management (KM) helps to create learning organizations that are able to cope with the continuous changes in the environment. Defining KM is not easy, and multiple definitions and KM schools have provided diverse dimensions and meanings of this term. The notion of Organizational Knowledge Management Systems (OKMS) helps to integrate the wide-ranging perspectives surrounding KM. OKMS is the system that enhances organizational learning in the firm through facilitation of knowledge exchange and sharing (Yahya and Goh, 2002). The technical aspect of OKMS comprises an advanced assembly of software and hardware in the firm that supports knowledge and organizational learning through free access to and increased sharing of knowledge. However, authors such as Meso and Smith (2000) have proposed a socio-technical view of OKMS, by assuming that these systems are made up of a combination of technologies, organizational infrastructure, culture, knowledge and people. This perspective considers the core element of OKMS to be people, and in particular employees. While much of the early KM literature focused on technological issues, the importance of human and social factors has since gained recognition. Thus, if HRM refers to the management of people, and if people are the most valuable resource in KM, then HRM and KM are closely interrelated (Hislop, 2003; Svetlik and Stavrou-Costea, 2007). Consequently, HR flexibility can be also linked to KM.

On the one hand, external HR flexibility (i.e. short-term temporary workers, temporary help agency or part-time employees) has been posited to affect KM because employee turnover affects

the balance and location of experience in the organization and, therefore, the organization's ability to learn (Carley, 1992). When a firm relies on external HR flexibility (i.e. when members of the organization leave and are replaced by new personnel) the firm loses the expertise and experience of the departing employee and gains the experience of the person joining the organization. Firms can benefit from external HR flexibility by obtaining gains from specialization in knowledge acquisition and storage, as long as the organization is able to coordinate the efforts of many specialists (e.g. through rules, routines, group problem solving, etc.) (Grant, 1996). However, external HR flexibility may imply certain risks to KM, because without proper mechanisms for transferring experience among old and new employees, knowledge may be lost. An empirical study by Carley (1992) demonstrated that organizations learn less and more slowly the higher their employee turnover rate, since portions of the organization's memory leave with the departing personnel. Other authors have posited that organizations with a high usage of temporary employees risk losing valuable knowledge (Alvesson, 2000), especially when explicit and tacit knowledge is created within the firm and is firm specific (Grant, 1996). Furthermore, the use of external HR flexibility based on short-term contracts makes it difficult to build stable relationships among employees and with the firm (Díaz-Mayans and Sánchez, 2004) and negatively affects employee involvement and commitment in the firm (Amuedo-Dorantes, 2001). According to the norm of reciprocity, if employees perceive that the firm is not concerned about their well-being or labor conditions, they will not make the effort to benefit the firm (Davis-Blake et al., 2003). This lack of commitment on the part of temporary employees will threaten the success of KM in the firm, given that for KM initiatives to be effective, employees must be *willing* to share their knowledge and expertise (Hislop, D., 2003).

On the other hand, internal HR flexibility (i.e. intrinsic, modification and relational flexibility) provides many advantages for the success of KM in the firm. Internal HR flexibility helps to enhance employees' organizational commitment. Committed employees are more likely to be highly motivated, and will probably be more willing to provide extra discretionary effort and share their knowledge within the organization (Hislop, 2003). Furthermore, Grant (1996) suggested that a necessary condition for the success of KM in the organization is the existence of common knowledge, that is, those elements of knowledge that are common to all organizational members or the intersection of their individual knowledge sets. Intrinsic flexibility facilitates the creation of this common knowledge, by assuring that individuals are able to invade one another's functional boundaries. Thus, intrinsic flexibility sustains the idea of redundancy posited by Nonaka and Takeuchi (1995) in that it builds links between individuals. Other benefits of internal HR flexibility for the success of KM stem from the fact that modification flexibility facilitates knowledge accumulation. In Grant's (1996) framework, knowledge absorption depends upon the recipient's ability to add new knowledge to existing knowledge (Grant, 1996). Finally, relational flexibility assures the cooperative behavior required to increase the organization's ability to learn by increasing the ambiguity inherent in the organization (Carley, 1992).

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KEY TERMS AND DEFINITIONS

External HR Flexibility: Flexibility that can be attained from the external labor market, beyond organizational boundaries and current workforce.

HR Intrinsic Flexibility: Employees are able to work on different tasks and under diverse circumstances and that the costs and time needed to mobilize employees into new duties or jobs are low.

Internal HR Flexibility: Flexibility manifested by the pool of human resources in the organization at a certain point of time.

Modification Flexibility: Employees innovate their skills or modify their behaviors ahead of need.

Relational Flexibility: How easy it is to coordinate individuals to work together.

ENDNOTES

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2 Other authors (e.g. Arulampalam and Booth, 1998) use the term *labor market flexibility*.

3 See, for example, the *Canadian Journal of Administrative Sciences*, vol. 18, No.1, or the *European Journal of Work and Organizational Psychology*, vol.7, No.1.

4 As Kalleberg (2001) states, numerical flexibility has been referred to as "flexible staffing arrangements" (Houseman, 2001), "market-mediated work arrangements" (Abraham and Taylor, 1996), "contingent work" (Polivka and Nardone, 1989) and "non-standard" work arrangements (Kalleberg et al., 1997).

5 Tsui et al. (1997) in a further development of a previous study (Tsui et al., 1995) suggest four approaches for the employee-organisation relationship (i.e. employer's expectations of employee contributions). The first two approaches are associated with the creation of distinct types of flexibility for organisations.

6 The development of this taxonomy is based on the job performance model developed by Campbell et al. (1993), which treats alternative models of content and structure of job performance. According to Campbell et al.'s (1993) model, job performance is synonymous with behaviour and can be classified into the following components: 1) job-specific task proficiency, 2) non-job-specific-task proficiency, 3) written and oral communication, 4) demonstrating effort, 5) maintaining personal discipline, 6) maintaining peer performance, 7) supervision/leadership, 8) management/administration. The concept of adaptive performance is considered by Pulakos et al. (2000) as a performance component not included in the previous eight dimensions.

7 Human resources versatility has been given different terms, such as, "multi-skilling", "ability extension" and "polyvalence" (Cordery, 1989).

8 Crant (2000) offers a review of this literature.

9 Social capital is broadly defined as an asset that inheres in social relations at different levels (individuals, communities, networks, societies, etc.) (Coleman, 1988; Shaw et al., 2005). At the organizational level, Leana and Van Buren (1999) proposed a definition of *organizational social capital*, as a resource reflecting the character of social relations within the firm. It refers to individual's levels of collective goal orientation and is comprised of associability (i.e. employee willingness and abilities to engage in collective actions) and trust.

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Chapter 78
Re-Theorizing Human Resource Management and Human Resource Management in Context

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ABSTRACT

In this chapter an attempt is made to focus on the ideological and practical implications of the new people-oriented forms of healthcare management variously described as strategic human resource management, high-performance management, human capital management, or high commitment management. The chapter details the managerial and academic claims concerning the management of human resources and goes on to emphasize the impact that the literature of Human Resource Management (HRM) has had on healthcare employees and healthcare organizations. The restrictions of the applied research approaches are also highlighted and the author argues that the managerial and post-structural literature is limited in that its conceptualization of HRM and changing performances is incomplete. Also considered is a range of literature that has been used to study individual and organizational change with a labour process perspective and explains why an approach based upon the study of the disparity between the "HRM rhetoric" and the day-to-day practice, as well as how people experience and respond to that disparity within a wider frame of social, political, and economic relations, is to be preferred. As a basis for further contextualization, the powerful and privileged positions of healthcare professionals and the distinctive character of their employment relationship are considered. The chapter concludes that a more critical analysis is necessary to challenge the way in which the concept of HRM is examined by healthcare management academics and practitioners.

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THE HUMAN RESOURCE MANAGEMENT (HRM) NARRATIVE: THE CAREER OF THE HRM CONCEPT

During the early 1980s a central theme around the new management of human resources emerged when a number of large companies began to search for the *Competitive Advantage through People* (Pfeffer, 1994), which has changed the rules of the game with regard to personnel management and labour relations[1]. Along with other contributions from management academics and commercial management consultants, new concepts, new strategies, and new policies emerged within organizations that were essentially employee and customer-oriented as well as enabling, innovative and productive organizations. What sparked off the enormous interest was that the employed human resources could actually be managed towards achieving greater organizational effectiveness, and a number of key criteria were identified as "best practices" that could be used as an instrument for obtaining competitive advantage and organizational success. The HRM tradition, which emerged following the publication of a number of success stories from the U.S. and the U.K. (Armstrong, 1987; Beer, Spector, Lawrence, Quinn Mills, & Walton, 1985; Fombrun, Tichy, & Devanna, 1984; Foulkes, 1986; Fowler, 1987; Huselid, 1995; MacDuffie, 1995; Pfeffer, 1994, 1998; Walton, 1985; Walton & Lawrence, 1985), was to promote the concept of HRM in a way unprecedented in personnel theory and administrative labour practice. Managing human resources as the greatest asset of an organization was seen to engage directly with people's sense of self, securing an "exchange that is more than economic" (Kunda, 2006, p. 209). What is important to note is that – irrespective of organizational, sectoral, and national contexts – the management of people's self is working in mutually consistent ways. Here, as Thompson and Findlay (1999, p. 163) note, people "are acted on, but they also have to pick up the cultural cues and construct an organizational self."

Anyone who reads Kramer and Schmalenberg's (1988a; 1988b) investigation of life in 16 magnet hospitals is able to discern the plausible stories of how the new management of nursing resources began to permeate the everyday perceptions and language of employees. Other researchers followed the attributes and practices[2] described by Kramer and Schmalenberg (2002; 2003a; 2003b; 2004; 2005) and searched for what it takes to attract and retain well-qualified nursing staff within hospital organizations that had the reputation of being good places to work and giving good nursing care (Buchan, 1994; 1999; Havens, 2001; Havens & Aiken, 1999; Havens & Johnston, 2004; Lewis & Matthews, 1998; McClure & Hinshaw, 2002). The results were manifold as these magnet hospitals dealt effectively with the personnel shortage by creating administrative conditions and value-oriented HR practices which go beyond accepted standards. As the popularity of the magnet hospital approach spread within the healthcare arena, more authors joined the bandwagon of HRM, trying to emulate the magnetized examples of organizational effectiveness and success (Aiken, Havens, & Sloane, 2000; Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Cimiotti, Quinlan, Larson, Pastor, Lin, & Stone, 2005; Joyce & Crookes, 2006; Laschinger, Almost, & Tuer-Hodes, 2003; Pastorius, 2006). With respect to human subjects and organizational interests, the magnet hospital proponents seek to achieve two objectives to create enabling environments and to put development at the heart of their organizational worlds: first, to convince the potential reader or practitioner that particular "bundles" of labour management strategies and policies associated with HRM are more likely to offer organizational advantage than others; and second, to provide evidence of the link between academic studies and the prescriptive literature on organizational conditions by applying content

analysis or appropriate metrics and statistical measurements, generating empirical proxies as data.

Recent debates on HRM in healthcare organizations do not really differ from the attributes and practices held by magnet hospital promoters; i.e. they make an attempt to identify and measure HR practices, systems, and policies that generate increased individual, organizational, and financial performance and/or can even be associated with better outcomes such as decreased patient mortality, nurse burnout, and job dissatisfaction with contributions from government, academic and practitioner bodies, the mass media, and consultancies (Buchan, 2004; Hogan, Moxham, & Dwyer, 2007; Khatri, 2006; Khatri, Baveja, Boren, & Mammo, 2006a; Kathri,Wells, McKune, & Brewer, 2006b; McHugh, Johnston, & McCelland, 2007; West et al., 2002; West, Guthrie, Dawson, Borrill, & Carter, 2006). Within the British National Health Service (NHS), for example, key indicators focus on performance management and centre on waiting times, financial management, and cleanliness. However, as documented by Harris, Cortvriend, and Hyde (2007), HRM indicators are now included; e.g. improving working lives accreditation, sickness absence rate, junior doctor hours, health, safety and injuries, views about employee appraisal, personal development plans, access to training, team-working, staff attitudes toward their job and their intentions to leave. In effect, primary and secondary trusts within the NHS are now required to implement several HR practices to improve patient care and staff satisfaction. Taken as a whole, the above studies, like the ones on magnet hospitals, highlight the importance of the de-contextualized practices by which HRM is implemented in healthcare organizations and demonstrate an association between HR practices and improved organizational outcomes in the healthcare sector.

However, as Bolton and Houlihan (2007, p.1) maintain, a growing body of literature bears testament to the fact that "HRM has failed to deliver on many of its early promises and been unsuccessful in its attempts to achieve status as either a strategic partner or an employee champion." For example, Hanlon (2007, p. 263) provides the evidence that "[a]lthough HRM makes a range of claims such as enhancing the human, enhancing the individual and the collective; satisfying customer and producer needs and allowing the space to improve and learn, in reality it misses some of the key points of change in the twenty-first century and certainly misses the human." What many researchers have also discovered by in-depth and longitudinal fieldwork was an attempt by various healthcare organizations in different cultural and national contexts to undertake a generalized change program, wrapped up in new language and practices (Beil-Hildebrand, 2004, 2006; Bolton, 2002, 2004; Cooke, 2006; Kirkpatrick, Ackroyd & Walker, 2005; Weinberg, 2003). Further, it is within the more critical reviews that a number of problems with HR practices were identified with regard to their precise meaning, their consistency with each other, and their universal applicability (Bolton & Houlihan, 2007; Hesketh & Fleetwood, 2006; Legge, 2005; Marchington & Grugulis, 2000; Marchington & Zagelmeyer, 2005; Storey, 2001). Moreover, Harley (2005, pp. 44-45) challenges the claims of high-performance work systems in that the evidence on the diffusion of "coherent systems" of HR practices is limited and fragmentary as most scientific studies involve simple "analyses of cross-sectional data using multivariate regression techniques to test hypotheses" which signify – even with good predictive but without robust explanatory power – that "the available evidence tell us nothing about causal processes."

However, there are less prescriptive scholars such as resource based and contingency analysts[3], who maintain that there must be an "internal consistency" between particular HR practices and surrounding contexts to develop distinctive competencies and refined organizational performances (Boselie, Dietz, & Boom, 2005; Boxall & Purcell, 2003; Paauwe & Boselie, 2006; Fombrun,

Tichy, & Devanna, 1984). This is explained by Hesketh and Fleetwood (2006) with the configuration mode of the Rubik's cube[4] or with the metaphor of "a Russian doll in which the outer doll of enhanced organizational performance is contingent on the 'fitting together' of the inner dolls of different HR practices" (p. 680). From this point of view, as Legge (2005) maintains, organizational performance is not improved by "best practice" HRM, but from knowledge about how to combine and implement HR policies and practices to suit the organization's characteristic contingencies. However, in other empirical studies the link between HRM and performance at an individual and organizational level appears to be rather conclusive (Edgar & Geare, 2005; Guest, 1999; Ramsay, Scholarios, & Harley, 2000). For example, Guest (1999) demonstrates survey results from an employee perspective which shows how HR practices and high involvement relations result in employees reporting a more positive psychological contract and in turn, greater satisfaction, job security, and motivation, as well as lower levels of pressure at work. Building on insights from labour process scholars examining the underlying continuities and constraints of high performance work systems within the capitalist employment relationship, Ramsay, Scholarios, and Harley (2000) also reveal a positive association between the investment in human resources, superior performance, and mutual gains. Although the latter study points to the difference between rhetoric and reality and brings the agency and subjectivity of employees back into analysis, it might be argued that promoting the concept of HRM towards this end would be worthwhile in the pursuit of better employee outcomes and improved performance.

Paying attention to employees and not working conditions per se, the management of human resources should lead to high commitment employees – not simply as a means to employer objectives of improved productivity and profits, but because the fulfillment of many employee work-related needs is taken as a goal rather than merely a means to an end (Walton, 1985; Walton & Lawrence, 1985). The route to strategic HRM is also seen through recruitment, reward and retention strategies, team organization, strategic performance management, performance related-pay and incentives, staff training and development, quality and knowledge management, and/or empowerment initiatives (Leary-Joyce, 2004; Peters & Schrage, 1999; Reeves, 2001; Ulrich & Beatty, 2001). The same HR strategies and policies are also promulgated by academics, practitioners, and prescriptive writers on high-performance work systems (Huselid, 1995; Lawler, Ill, & Mohrman, 2003; MacDuffie, 1995); e.g. self-managed teams/teamwork, lean management and employee participation reinforced by enhanced investment in selection, training and skill formation, as well as mutual-gains industrial relations as the interlocking elements of the successful management of the modern organization. This is also apparent in the ideas of the human capital management literature: managers should place an emphasis on people's knowledge, abilities, and skills as a discretionary source of sustained competitive advantage in place of command and centralized control. A more recent attempt of prescribed HR practices (Ellinger, Ellinger, Yang, & Howton, 2002) relates learning concepts to improved organizational outcomes which means that the conclusions are nearly always the same. For such commentators, the social and economic advantages and implications of a set of universalistic or of contingent HR practices are immense and such emphases are applicable to all re-organizations in the world, both to those in the private and public sector, and to those within the service and production industries.

The extent of the functionalist and contingent frames of reference underpinning mainstream HRM was considerable because "it reminded managers what they were supposed to be doing" (Colville, Waterman, & Weick, 1999, p. 131). This is said to take place chiefly with HR managers who are constantly searching for more effective ways to manage employees to gain maximum organi-

zational performance, while employees are keen to enhance the benefits (feelings of satisfaction, competence, self-esteem, accomplishment and inspiring autonomous work patterns) from the employment relationship. The same perspective holds that the senior management of an organization has "a directive role in developing the collective consciousness" by changing artifacts and espoused values, and that the well-motivated and resourceful employees are both reflective and active in organizational adaption and growth (Legge, 1995, p. 186). Given this epistemological perspective, it is not surprising that Fiske and Taylor (1991) and Klein, Conn, Smith, and Sorra (2001) can claim that the role of key organizational decision-makers, such as senior managers, in developing a consensus and agreement among principal HR messages is critical to developing a strong HR system and subsequent organizational performance.

What is to be concluded from such complex HR ideas? They are taken seriously – not only by commercial management consultants, chief executive officers, and management writers, but also by management academics – as management theories. Accordingly, HRM is theorized as having diverged along two paths: according to Walton (1985), one based on imposing "control" and the other based on eliciting "commitment". This distinction is similar to that made by Truss, Gratton, Hope-Hailey, McGovern, and Stiles (1997) when they refer to the "hard" (the Michigan School) and "soft" (the Harvard Model) strategies and policies, respectively. However, as documented by Storey (2001), both models are contemporarily used by managers because those who subscribe to the above schools of thought are fundamentally driven by the objective of achieving both the control and consent of employed people. In contrast to the perspective that organizational change towards improved performance is emergent and fuzzy, the practitioners and prescriptive writers appear not to comprehend that there is a fundamental economic objective at the core of contemporary HR practices. In addition, as Legge (2005, p. 227) notes, they also neglect the various stakeholders to, and societal, historical, cultural, institutional, and even financial influences on, organizational directions. Similarly, as Marchington and Zagelmeyer (2005) claim, in order to achieve a more realistic assessment of how HRM actually works in practice, it is essential to ask employees themselves what they think and how they perceive HR practices in their day-to-day working lives as these perceptions are ultimately crucial to the success of any HRM system.

This is not to suggest that HR techniques never contribute to positive employee outcomes, nor that they might in some cases generate performance gains via employees. As discussed, the examples noted by magnet hospital researchers[5] enable the potential reader to attribute causes and processes other than HRM to both success and failure. That is, the success of these institutions lies largely in a variety of combined elements and conditions (e.g. the beneficial broader context of an organization; the creative, ingenious, and imaginable power of human actions and their interactions) to change the social and economic structures and processes, rather than in any particular HR style or approach. The purpose of referencing here is not to defend the attributes and practices of magnet hospitals but to illustrate that one part of the HRM idea is, both practically and theoretically, strongly related to social commitment and shared understanding within work-based relationships that require an acceptance and endorsement of values to enhance performance. The other part is used to signify a set of organizational practices and/or human assets (e.g. the recruitment, reward and retention strategies and/or the skills, attitudes and knowledge of people) which embody where the organization is now and where it wants to be in the future. This latter usage does not require that employees are tied into the local values of particular organizations and may provide an answer (e.g. through long-term commitment, reciprocal obligations and/or joint regulation) to the perennial question

of what accounts for qualitative and calculative business success. This should be borne in mind and will be discussed further in subsequent sections[6].

THE DISCIPLINED WORKER THESIS: THE POST-STRUCTURAL PERSPECTIVE

So far the concept of HRM as a means to becoming a model of organizational effectiveness and success has been introduced. However, diverse and contradictory considerations exist in respect of HRM as a concept and its style. In other words, not all intellectual HRM researchers follow the same lines of thought. Recent decades have seen a resurgence of interest in the potential contribution of HRM to critical management and organizational studies. This view goes back to a broader base and trend in cultural theory in which Ray (1986) distinguishes between different types of managerial control in history. She refers to the regulative and integrative sociology of Emile Durkheim and notes that the organization is "the appropriate site for moral order" (p. 287). She then argues that the attempted management of an organization's culture is simply an addition to "bureaucratic" and "normative" forms of control which organizations have tried to implement (Etzioni, 1978, p. 271). However, the tendency, Ray (1986) goes on to explain, is to subjugate the individual to the collective because human subjects are viewed as "emotional, symbol-loving, and needing to belong to a superior entity" (p. 295). In the long term, she argues, this new form of ideological control could be cheaper, avoid resentment, and build employee commitment to the organization and its goals.

By promoting this form of devotion, the management of human subjects was suddenly not just another managerial strategy but the supreme form of managerial and individualized control. What is new about it is, according to Willmott (1993, p. 523) "the *systematising* and *legitimising* of a mode of control that purposefully seeks to shape and regulate the practical consciousness and arguably, the unconscious strivings, of employees." Here the task of managers is no longer restricted to bureaucratic and normative forms of control but determines and manufactures how employees should think and feel about what they do in their day-to-day practice at work. Or, as Willmott (1993, p. 520) goes on to argue, employees are concurrently required "to recognise and *take responsibility for* the relationship between the security of their employment and their contribution to the competitiveness of the goods and services that they produce." In this way, the productive person is systematically invited, and legitimately induced, to become "tied to his [sic] own identity by a conscience or self-knowledge" (Foucault, 1982, p. 781).

Here is the basic departure of concepts like HRM from humanistic management theories towards the "disciplined worker thesis" even though both share the understanding that "self-determination" is the basis both of "labour power" and of the characteristic nature of "human action" (Willmott, 1993, p. 525). The realization of this mutual understanding makes it clear that an organization's performance can not only be optimized by exploiting this, but also by respecting it. Unlike the Human Relations discourse which holds that the needs of the individual and the organization are fully integrated, and, indeed share the same identity (e.g. Maslow, 1954; McGregor, 1960), the management of human resources encourages the development of a mechanism of control which harnesses the forces of personal independence and self-determination for the purpose of realizing the desired values and performance. Reviewing this kind of analysis, Sayer (2007, p. 25) reminds the reader that these researchers "emphasise 'subjectification' and disciplinary power and hence the ways in which organizations, through both discursive and material means, 'construct' and discipline workers and inculcate appropriate behaviours."

The post-structural power within corporations is best illustrated by Willmott (1993) who demonstrates that there is something alarming about the effective mechanisms that no one owns. Initially, he follows the standpoint of ethnomethodological and social action researchers in order to make a powerful critique of "soft" HRM policies and practices as they create "monocultures in which conditions for the development of value-rational action, where individuals struggle to assess the meaning and worth of a range of competing value-standpoints, is systematically eroded" (p. 518). Here, Willmott (1993) seeks to replace the rhetoric of control and coercion by that of "surveillance", "leadership", and "seduction" (Calás & Smircich, 1991). In this seductive search of organizational effectiveness and success, modern organizations construct what Casey (1995, p. 5) labels "designer employees" through the production of self strategies and discursive practices. Similar conflict-free themes emerge throughout post-structural analyses which present "a new form of 'manufactured morality' that makes up humanity in different ways" (Bolton & Houlihan, 2007, p. 6). That is, the familiar theme of managerial intervention into people's soul and the construction of self-disciplining, productive selves also emerges from the critique of contemporary information technologies and somewhat different elements of totalitarian technique, particularly just-in-time, corporate culture, teamwork, total quality management, and other management practices (Ezzy, 1997; Knights, 1997; Sewell, 2005; Sewell & Wilkinson, 1992; Sosteric, 1996).

However, there are now some sincere disagreements about the likely feasibility of these arguments in which "an image of emotionally anorexic social actors" (Bolton & Houlihan, 2007, p. 7) is produced to directly lead to a veritable "asphyxiation by society" (Archer, 2000, p. 18) that downplays the varying responses available to employed people. Writers like Thompson and Findlay (1999) have also argued that many of those studies mentioned previously simply infer local effects on employee subjectivity from processes of re-structuring without even presenting their "subjective inputs or responses to the transformation of work" (p. 169). This response to post-structural analyses can be further elucidated by reference to Thompson and Ackroyd's (1995) framework of organizational misbehavior. They note that "no actual accounts of resistance can normally be found in such studies" (p. 624) because post-structural research usually neglects active agency and resistance, and replaces a concern with the employed subject with a concern with identity needs to the extent that "the labour process is just part of the scenery" (p. 627). Further, Thompson and Findlay (1999, p. 173) argue that even where qualitative data is collected in organizational studies[7], they are often simply linked to the "respondent's concerns with identity" such as individual needs that are seen as different and incoherent with traditional fields of management and work. For an illustrative account see Brown and Crawford (2003) where mental health team members point to a lack of management direction from senior colleagues, even though some of them participate in the managerial process themselves. Consequently, the nature and significance of this collective engagement often remains unexamined in the post-structural research literature, which means that the employed subjects simply disappear from view.

MANAGING PEOPLE: THE LABOUR PROCESS PERSPECTIVE

The above review of the post-structural literature illustrates how the current widespread use of the construct of HRM can be problematic because "*labour* as a subject has gone missing" (Thompson & Findlay 1999, p. 174). Efforts to put the human subject back into the analysis of organizations have been made after the first stage of labour process theory (Bravermanm, 1974). According to Smith and Thompson (1998) the subject was

re-/inserted in three main ways (p. 560): First, as a source of opposition to capital which has created the well-known "control-resistance paradigm" (Edwards, 1979; Friedman, 1977; Littler, 1982). Second, the subject was re-/inserted as a resource of creativity and productivity, without which modern management could not successfully transform "labour power into profitable labour" (Cressey & MacInnes 1980). Third, labour as a subject was introduced as a source of consent and integration which has created an approach that puts an emphasis on the relative autonomy of the labour process in the context of specific structural pressures to accumulate and reproduce capital (Burawoy, 1979; Thompson, 1990[8]).

Though many of the subsequent post-structural and theoretical HRM debates are critical of their Marxist categories and realist epistemology (O'Doherty & Willmott, 2001a; Storey, 1985), some researchers have been attracted by this sort of framework for analysis that focuses on managerial attempts to engineer human subjects and their performance and demonstrate how these concepts make "a strong contribution both to the understanding of work and employment trends and to the new forms of labour politics that are generated from them" (Thompson & Newsome, 2004, p. 156). Adopting a structuralist viewpoint that moves beyond the dualism of paradigmatic closure, they investigate in detail which conflicts between different interest groups are acted out at a local level while taking the various levels of influence offered by the historical, organizational context, the national as well as international trends, and the forces of global capitalism into account. In other words, the labour process analyses not only serve to highlight how organizational reality is constructed through the wider context of, and consent over, the labour process but also to show how managerial control over workplace relations is a *Contested Terrain* (Edwards, 1979). It is worth stressing again, that contemporary labour process analysts deserted the post-structural perspective and seek to analyze human subjects in the workplace as "knowledgeable agents" who draw on "symbolic resources" in their relations of "contestation and cooperation" (Thompson & Findlay, 1999, p. 176). However, according to Thompson (2009, p. 105), labour process analysts explicitly criticize and reject "conceptions inspired by 'negative' labour process theory, as such studies reply on an oppositional (and 'dualistic') conceptualization of resistance as the outcome of structural relations of antagonism between capital and labour."

Particularly available are detailed analyses of blue-collar, white-collar, and managerial workers, among whom the trend of HRM as management strategy is supposedly most pronounced (Delbridge, 1998; Graham 1995; Rhinehart, Huxley & Robertson, 1997; Sandberg 1995). These rich, qualitative and rarely quantitative analyses from across sectors, corporations and nation-states have shown how, especially when combined with participatory and skill-enhancing schemes, HRM within an organization can discourage employees, or encourage their resistance, by strengthening managerial control and increasing effort intensification in the name of enhanced organizational performance and the more effective management of human resources. For example, Graham's research (1995) of day-to-day life *On the Line at Subaru-Isuzu* unwrapped the all-embracing dimensions of management control under the new lean regime, demonstrating a pervasive "invisible iron cage" of control over employees (p. 98). The above studies also demonstrate that employed people are resistant to many forms of attempted change, but that they can also be amazingly dynamic and active. For example, almost all studies indicate that managers do not actually have to achieve commitment and shared understanding among their employees to successfully implement their change initiatives. In the light of research, this seems pessimistic because the new armories of managerial control and remuneration measures are sufficient to change employee behavior. Such pessimism is based upon the deployment of two

models of HRM - the normative and strategic dimensions of HRM - that were outlined earlier. It is therefore important to pay attention to illustrating the disparity between the HRM rhetoric and the day-to-day practices and to add an understanding of how people experience and respond to that disparity within "distinct institutional patterning of work within a given country" (Thompson & Newsome, 2004, p. 152).

There is another reason that the focus on value internalisation may hinder an understanding of the relationships between contemporary HRM initiatives and subjectivity. As the research of Burawoy (1979), Cressey and MacInnes (1980), and Ramsay, Scholarios, and Harley (2000) indicate, the participation of people in work practices can generate creativity and active consent to existing structures and strategies rather than their commitment and shared understanding. That is to say, they construct alternative accounts which hypothesize that while HRM entails increased employee discretion, this can also be understood in terms of management ceding control in so far as it is necessary to acquire the consent of employees and to tap into their creative as well as knowledgeable capacities (Harley, 2005). It is therefore quite plausible to claim that innovative HR policies and practices can work if there is "a combination of localised consent to the specific change process and support mechanisms in the sphere of reward systems, decision-making and industrial relations which prompt and reward 'appropriate' behaviour" (Thompson & Findlay, 1999, p. 179).However, as Thompson (2007, p. 87) notes, "there is also a need to recognise that external conditions are making it ever more difficult for that investment to be either a corporate priority or sustainable, or both." That is, the problem is not only "divergent interests, but the diminished capacity of management to produce sustainable mutual gains from them" (ibid, p. 95). Such themes are present in contemporary labour process analyses as they highlight that co-operation and the generation of consent can be systematically built into the labour process within a changing context and the comprehensive results are a continuum of possible and overlapping employee responses, from "resistance, to accommodation on temporary common objectives, to compliance with the greater power of capital, and consent to production practices" (Thompson & Bannon, 1985, p. 99). Does the prevalence of accommodation, behavioural compliance, and consent without commitment and shared understanding matter? Perhaps this underestimates the distinctiveness of the labour process in the healthcare sector where the traditions of professional autonomy and an ethic of service are shared by the occupational groups employed there.

THE HEALTH CARE SECTOR: MANAGEMENT CONTROL AND PROFESSIONAL AUTONOMY

The healthcare sector is a critical case for labour process analysis because of its historically necessary legitimizing role within all capitalist societies (Habermas 1976a, 1976b; Offe, 1976a, 1976b). According to Cousins (1987), healthcare organizations operate and are embedded in an environment with its own mode of "rationality" and complexity (p. 50). This trend is reflected in the imperfect coordination of healthcare systems and on account of their deficient capacity for perception and planning, their continued growth and cost – although at different rates (OECD Health Data, 2009). Although the state as legislator or the market as enabler[9] is the main force acting to restructure the healthcare sector, it cannot always be the "direct agent" (Thompson & McHugh 1995, p. 88). Healthcare organizations in capitalist societies and forms of administration and organization in socialist and post-communist ones such as those in China, North Korea, Vietnam, Nicaragua, Cuba, and the former U.S.S.R. also show evidence of executive authority, hierarchical control, and work fragmentation. For Salaman (1979, p. 22)

bureaucracy is not a feature of capitalism only, but is "a key feature of the modern world dominated by rationality." This shows that the dynamics of bureaucratization are partly independent of capitalist and other class-divided form of work organization, and that the analytical framework needs conceptions that enable potential researchers to focus on that particular problem. This is where Max Weber (1984) enters the scene, for he has defined a series of features that are a necessary part of explaining these complex processes. For example, he anticipated that state socialist systems would be more bureaucratic than capitalist ones because of the absence of countervailing power structures between the socialist state and competitive markets. In such an economy, "the power of bureaucratised management" would continue and advance, as would the autocracy or "dictatorship of the official" (Sayer, 1991, pp. 145-146).

Both public and private sector organizations operate on the basis of a hierarchy of offices in a pyramid of authority, and in most cases, formal control and co-ordination procedures are important to define people's responsibilities, rights, and duties as well as to govern the conduct of their work. As Littler and Salaman (1982) have identified, a Weberian lineage is central to an understanding of the employment relationship and the career system of economically powerful groups in particular. More generally, calculable rules and set-down organizational procedures are prevalent in the analysis of "those structural conditions which surround the appointment, promotion and dismissal of individuals" (Littler, 1982, p. 37). Such an analysis is important to the explication of the labour processes within a particular context, such as healthcare since these various aspects of organizations are based upon consensual rules and emphasize "the continuity in social relations" in, and beyond, private sector organizations in modern or capitalist society (Thompson & McHugh 1995, p. 378). Hence, the introduction of a more powerful general management and administrative infrastructure can itself be a "disciplining force" (Thompson & McHugh, 1995, p. 88). This has been recognized by influential managerial thinkers who have demonstrated how HR managers seek to engineer people's consent within particular milieus in order to operate more successfully; whether through formal-rational means or ideological rhetorics. Hence, Thompson and Newsome (2004, p. 154) could argue that labour process analysis is not merely making a critique of the limits of HRM but trying to connect workplace practices to a changing big picture, because "the domains of workplace relations, employment policy, and governance increasingly operate according to contradictory dynamics."

Nevertheless, despite the legitimacy and interests arising from bureaucratic and normative systems, it is in the healthcare sector that the professional provider groups have developed a particular distinctive role and high social status. Without clear parameters to assess their complex activities, it has been the medical, nursing, and other emerging professionals, to a greater and lesser degree, who have been responsible for determining and controlling the priorities of healthcare. To some extent, as Dent (1993) notes within the British National Health Service, the relation between the state and healthcare professionals would appear to parallel Friedman's concept (1977, p. 6) of "responsible autonomy." On the surface, there are a number of corresponding similarities between the responsible autonomy of employees and healthcare professionals. However, the central role of the former is different in that its extent and nature is determined by managerial strategies within a context of prevailing labour market conditions and employee resistance. By contrast, the autonomy of the latter, i.e. the autonomy of healthcare professionals, derives from their occupational strategies and technical competence that historically predates the emergence of capitalist labour markets and different forms of organizational control. Moreover, professional autonomy characterizes the outcome of negotiations between organized occupational groups and the state and

not directly the outcome of class conflict at the workplace.

Yet professionalism is not unaffected by the principles of the state and certain professional groups have been promoted by the state to unequivocally meet the requirements of the state within capitalist society. For example, Dent (1993, p. 247) argues that the concept of responsible autonomy, though inaccurate in terms of describing the actual relations, has long been "the preferred strategy of the British state towards the medical profession." It has been the ability of the medical profession to protect their occupational interests, maintaining socio-economic privileges and a monopoly of theoretically grounded knowledge. Hence, the medical profession has been able to exercise power in the production of certain bodies of knowledge and in definitions of satisfactory types of diagnostic processes and therapy. It is this enormous power over both state policy and the personal affairs of individuals that underpins what Freidson (1994) has conceptualized as "professional dominance" (p. 31). He distinguishes between the well-established professions (such as law, medicine, and architecture) and the technical professions - those with more education and complex skills than most workers (e.g. teaching, social work, and nursing). Freidson's influential distinction of professions, however, misses the significance that the autonomy and dominance of the division of healthcare labour are by no means the only ways of ordering expertise. For example, Johnson (1972) has argued that accounts which focus on the qualities of professions have never been able to agree to a list of "traits" or "attributes" that are typical of all professions in all circumstances (Etzioni, 1969). Similarly, the proposition that professions serve central social needs is also problematic because the alleged intrinsically altruistic service of professionals has often been the base of exaggerated claims about their ethical and progressive role. As Johnson (1972) demonstrates in his critique of such a functionalist approach, this falls into "the error of accepting the professionals' own definition of themselves" (p. 25) and he described this deficiency as a conceptual "straight-jacket" (p. 89).

Instead of regarding professionalism as an inherent characteristic of a few selected occupations, according to Becker (1970), Bucher and Strauss (1960), and Hughes (1958), it is best regarded as a form of occupational strategy and development, whereby ideologically powerful groups attempt to gain recognition as professions in order to reap the rewards of the older classic professions. The analytical scope moves here to the indispensable process of occupational groups attempting collectively to control and upgrade their purpose and standing. Consequently, the professionalization of medicine, nursing, and other emerging professionals is considered primarily as a self-seeking strategy and development by these groups of people. The purpose of it is self-government, quality control, and, with the support of the state, the legal monopoly over recruitment, training and certification. Nonetheless, this perspective neglects that the occupational groups of health care are powerful groups in society and their power and practices are based upon particular roles and functions carried out with professional autonomy and control. Their demands for autonomy, according to Armstrong (1986, p. 25) "may express not so much a desire for independence, but an ambition to be numbered amongst the controllers rather than the controlled." As a result, radical Weberians and orthodox Marxists have not followed a phenomenological or hermeneutic direction (Hanlon, 2007; Johnson, 1972; Muzio, Ackroyd & Chanlat, 2008), rather they developed their arguments and reached the conclusion that professionals are "not so much public-spirited altruists serving the common good, as powerful groups in society in pursuit of their own, and more abstract 'capitalist', interests" (Crompton, 1990, p. 154).

Nevertheless, despite the assaults from these theoretical movements, the dependence of the patient clientele on professional expertise and the impossibility of their acquiring such special-

ist knowledge explain why, in respect of these healthcare groups "*noblesse oblige*, not *caveat emptor*, is the rule, though far from being the behavioral fact" (Merton, 1982, p. 117). In other words, given the nature of professional expertise and the vulnerability of the patient clientele with respect to expert service, interactions between professionals and their dependants could not function in the absence of some kind of ethic of service. Indeed, according to Crompton (1990, p. 155), a degree of "moral" regulation among professionals is not incompatible with "the practice of strategies of exclusion and closure in order to gain an occupational advantage, or an emphasis on the pursuit of capitalist interests over those of other clients." In addition to the principles of professional autonomy and occupational strategy, the division of healthcare labour also has a capacity to generate norms relating to its use and disposition which are accurately conceptualized in Merton's definition (1982) of *Institutionalised Altruism*. The work of healthcare professionals is distinguishable, therefore, from that of most other workers in contemporary capitalist society; i.e. they are to some degree controlled through their commitment to professional objectives that emphasize the importance and value of a particular activity, condition, or practice and to some considerable extent they regulate their own work behavior. However, it is important to note that this commitment is not only associated with an ethical code of service to protect the patient clientele, but also with monopolistic closure and privileged societal positions. Such conditions, as Larson (1980, p. 141) argues, lead to the creation and control of "a protected, or institutional market" for professional services and "a project of collective occupational and social ascension."

Despite all this, the form of autonomy carried out by highly skilled, knowledge-based professionals does not distract from established powers and functions of healthcare sector management. As Muzio, Ackroyd and Chanlat (2008) have maintained the regulation of 'organizational professions', and thus expert labour, is common to all societies and facilitates the embedding of professions in positions of power within structures of organizations. It is because of this incorporation that healthcare professionals in the current context are not only historically but also institutionally bound, and this represents a shift away from the sociology of the professions in the direction of the employment of these groups by governments or private medical providers. It is this employment relationship that unites professionals in a healthcare organization and enables them to have a meaningful collaboration such as patient-centered practices with other professionals and seniority-led careers in the controlling and manipulating of this organization.

This perspective on professional groups and organisations in the healthcare sector has attracted considerable support and attention; i.e. it has been recognised by labour process analysts and critical researchers (Beil-Hildebrand, 2004; 2006; Bolton, 2002; 2004; Cooke, 2006; Hanlon, 2007; Kirkpatrick, Ackroyd & Walker, 2005; Muzio et al., 2008) who have shown how healthcare professionals are ineffectively subject to managerial priorities and authority, because they retain, as well as share, considerable degrees of autonomy and control in their day-to-day work to serve their patient clientele and occupational interests. At the labour process level, they followed Larson (1980) and Derber's definition (1983a; 1983b) of proletarianisation and found some evidence that the healthcare professionals' labour process is "analogous to, but not identical with" the labour process experienced by other workers (Dent, 1993, p. 252). It is not the Tayloristic routinisation, fragmentation, and mechanisation[10] of the healthcare labour process as some commentators have tried to make us believe (Adams, Lugsden, Chase, Arber & Bond, 2000; Walby & Greenwell, 1994) but the "transformation of professionalisation strategies into generalised credentialism" and legal licence that leads to a general loss of the self-employing status that may come to be interpreted subjec-

tively as "proletarianisation" (Larson, 1980, pp. 144-145). Here, Cousins (1987) is entirely correct to suggest professional groups in healthcare organisations are exposed to different structural conditions and experience subordination in "their inability to define the ends and social purposes to which their work is put" (p. 97). In this context Derber (1983a, p. 332) suggests proletarianisation[11] may be the basis for a highly sophisticated "[i]deological cooptation", whereby healthcare professionals' moral concerns for the patient clientele can be accommodated in a form of patient-centred practice that serves occupational as well as bureaucratic ends. In return for their on-going cooptation with corporate objectives, they retain their professional autonomy and self-direction that may contribute to "management interests more than it threatens these interests" (Cousins, 1987, p. 98). As a consequence, healthcare professionals enjoy a benign employment relationship with their employing organisations and for this reason the employment relationship which supports and underwrites the provision of healthcare services takes characteristic forms. Hence, it has been well established by this scholarly work that healthcare professionals maintain and dominate the labour process as long as they willingly fulfil their purposeful duties in ways consistent with management priorities and practices. But the recognition that healthcare management cannot directly control and dominate the performance of professionals leads to the question of how they actually achieve control, direction, and legitimacy of healthcare professionals' relatively unconstrained conduct.

HEALTHCARE PROFESSIONALS AND HUMAN RESOURCE MANAGEMENT

Because healthcare professionals provide complex, discretionary services to the public and use specialised knowledge and power for socio-economic gain and monopoly control, they may pose real dilemmas for the stability and further developments of healthcare sectors and organisations. According to Bertilsson (1990), with regard to the occupational status and power that the traditional professions used to have, modern societies have closed the gap: "Professions are today held accountable either by means of state control or by means of organisations of customers or clients, in particular by powerful insurance organisations in pursuit of malpractice" (pp. 129-130). This has important implications and the outcome taken as a whole, offers compelling insights into the variety of management strategies, such as the kind of centralized, bureaucratic control exemplified by Weber (1946). When there is pressure to contain cost and to use human resources more effectively, as Ackroyd and Bolton (1999, p. 374) have described it, healthcare management has the power to control "the supply of the other things necessary to the provision of health care, including crucially, the number of patients", the broad policy questions, the type of cases and clients, the supply of healthcare professionals, etc. As a consequence, they can change the parameters by appropriate impersonal mechanisms of control within which healthcare professionals exercise autonomy in their work. For example, the key strategic objectives of healthcare managers are secured by increasing the numbers of patients with which healthcare professionals are challenged. What is important to note here is that management can reduce the amount of "time" available to treat the patient clientele and by doing so they establish "key conditions" within which professional groups have to work (ibid, p. 374). In this way, healthcare professionals are induced to work harder unless they willingly neglect "their own ideas and standards about what is appropriate to adequate hospital care" (ibid, p. 374). That is to say, healthcare professionals are not protected from the "tyranny of the clock" and management can greatly increase the usefulness and effectiveness of healthcare professionals by increasing the throughput of patients (Larson, 1977, p. 235).

However, as Ackroyd and Bolton (1999, p. 383) stress, this self-control necessitates higher levels of personal skills, flexibility, and commitment from healthcare professionals in so far as they "remain if it is to be successful." From the point of view of the professional or managerial organizational member, this contradiction is a potential source of conflict because it depends on a particular social, political, and historical context for its meaning and healthcare management may be inclined to choose alternative strategies of control within which commitment and shared understanding can be retained and reconciled to new corporate objectives.

Central to the design of more efficient, flexible, and innovative healthcare services is the use of various forms of patient-centered, decentralized, HR-based management. Here, bureaucratic controls are relaxed or removed in favor of alternative HR programs that, for example, seek to increase commitment and use various participatory and skill-enhancing schemes to improve healthcare performance. New forms of control, including soft HR practices, are welcomed as long as it is anticipated that they will enable healthcare management to ensure that they will monitor and shape what healthcare professionals actually do. This requires management to convince healthcare professionals, through practical or ideological schemes, to provide healthcare work from which the patient clientele as well as the healthcare organization will gain and benefit. In other words, healthcare management needs to rely on its professionals as an ideological and practical resource to identify and solve serious problems and to give a homogenous performance on every occasion. While the patient-centered services for the clientele may improve, the implications for managers and professionals may be very different because the former wants more than mere compliance from the latter.

Unlike many other perspectives, it is at this shifting frontier of control that the entrepreneurial HR dynamics of healthcare management collide with "the interconnectedness of social [and professional] ties and, hence, people's abilities in manoeuvring, manipulating or simply enduring various life situations" that are inescapable features of healthcare organizations (Bolton & Houlihan, 2007, p. 7). These features include the implications of changing practices for sustaining the traditions of professional autonomy and control and for adopting newer principles based on increased employee discretion and "responsible autonomy" (Friedman, 1977, p. 6). This is not to say that such features always stand in opposition to corporate objectives since they can often have the unanticipated and unintended consequence of working in the healthcare organization's favor. For example, professionals may create a much stronger sense of team- and patient-orientation in advance of management development and improve the quality of their performance. Considered in this way, active management is just a more complex form of negotiation and intervention than constant and intimate conflict between healthcare management and professionals. Nevertheless, spaces for resistance and misbehavior do occur in healthcare organizations, just as in other areas of organizational life, and may drive healthcare managers to implement additional forms of control. For example, healthcare professionals may genuinely empathize with the patient clientele but may show "organisational misbehavior" and "irresponsible autonomy" towards management actions (Ackroyd & Thompson, 1999, p. 164). However, there has been a shift in managerial strategies towards normative controls and the limited gains in employee discretion are outweighed by "work intensification and stress resulting chiefly from increased levels of responsibility"[12] (Harley, 2005, p. 42). The existence and relevance of this interplay and conflict for understanding healthcare organizations is ignored when the management of human resources is being used in an ad hoc way and linked to the notions of organizational effectiveness and success. Indeed, the reluctance of healthcare management practitioners and prescriptive writers to acknowledge the broader and

social context in which HRM is enacted – i.e. the structure and agency of management and professional autonomy and control in which mechanisms of organizational effectiveness and success are embedded – was illustrated above. It's not only the followers of the labour process perspective who have expressed such a view; it is also found, in a somewhat different guise, in the "moral economy" approach proposed by Sayer (2007) who sums up the associated research program which requires hermeneutic, structural and agential information:

To think critically about HRM is, or should be, to address the relationship between the qualities of people – indeed, what it is to be human – and the qualities of organisations. To do this we need to avoid reducing people to mere products of discourses and the organisations in which they work – hence depicting them as 'cultural dopes', 'blank slates' or beings who can be socially constructed in any way imaginable. We also cannot afford to ignore the special character of organisations as hierarchical and instrumental institutions pursuing highly specific goals. We also need to take account of the embedding of both employees and organisations in a wider field of social relations among equals and unequals. (Sayer, 2007, p. 21)

The 'greatest task' of healthcare management academics and practitioners is therefore to conduct or ask for credible accounts of how healthcare managers and healthcare professionals make sense of, and act upon, the concept of HRM within healthcare organizations to manage human subjects in different organizational, sectoral, and national contexts.

CONCLUSION

This chapter has tried to set out both the significance of, and the limits to, attempts to achieve an HRM-related change with respect to human resources and organizational performance. The academic literature on managing human resources is polarized since there are clearly two perspectives according to which HRM is treated in relation to social disorder and organizational change. What the potential reader is also presented with in this review are post-structural treatments of the management of human resources that either equate it with the systems of discourse and practices or simply assume that modern techniques, in alliance with disciplinary power, will lead to a change in human subjects. Whatever is the case, its meaning and significance within the social science domain were resuscitated at the expense of HRM being treated as an expedient mechanism of managerial effectiveness within the labour process. In Thompson and Findlay's cogent expression (1999), the empirical and theoretical work should be centered on macro-contextual milieus and on how human subjects within organizations "are attempting to reconstruct the reciprocal but contested nature of the psychological contract in contemporary social, economic and political conditions" (p. 183). That is likely to be more complex in the healthcare sector where the traditions of professional autonomy and an ethic of service are shared by the employed occupational groups. Although the nature of work in the healthcare sector is less predictable, this chapter argues for an approach to a construction of professional autonomy and control that is influenced by broader external and internal forces, as well as lived experience. This justifies ontologically and analytically, a constant interplay between social structures and human action – i.e. the healthcare professional as object and subject, as a commodity and a living person – than that articulated in the managerial and post-structural HRM claims. Against this ontological and methodological background, there is a need for recognition of attempts by distinct healthcare sectors, as well as their management, to design and impose new HR initiatives (or theories) and redraw the boundaries around arenas where healthcare professionals have traditionally exercised their professional autonomy in healthcare

organizations. However, there is also a need to recognize the different reactions to these attempts and to understand in greater detail the different performances and associated motivations which make up a healthcare organization's day-to-day life. Such a view seeks to penetrate below the surface appearances of healthcare organizations to consider their broader context, social structure, and the basic processes that are held to constitute healthcare organizing. It appears, therefore, that the extended labour process perspective is an integrated theoretical framework that can be usefully applied to a more critical and longitudinal analysis of HRM within healthcare organizations and the labour process of healthcare services. Bolstered by an expanded scope of analysis and a meta-theoretical perspective that contribute to the long-established case study orientation, Hesketh and Fleetwood (2006) outline recommendations; i.e. they ask on a more abstract level how this might work in the case of HRM:

If we understand these tendencies [the tendencies generated when healthcare professionals and managers engage with HR practices and social structures] we can make tendential predictions. We might, for example, be able to understand the tendencies generated by the exercise of human labour power to activate workers' powers for creative, imaginative, ingenious, self motivated and self directed action, as well as the countertendencies generated by the alienation, exploitation and commodification of human labour power. We might therefore be able to assess the efficacy of tendencies and countertendencies, and make a tendential prediction about the likelihood of specific bundles of HR practices increasing organisational performance. This process involves what we refer to as reflexive performance. (Hesketh & Fleetwood, 2006, p. 692)

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ENDNOTES

1 The debate about the distinction between personnel and human resource management is conceptually complex. Huczynski and Buchanan (2006) use the term personnel management to explain the nature and background of the management function as administrative tool, that is concerned with human relationships and the maintenance of those relationships; e.g. methods of recruitment, selection, training and education, methods and standards of remuneration. They use the term human resource management (HRM) for a managerial perspective which argues the need to establish an integrated range of policies to support organization strategy. The main purpose is to encourage high commitment, flexibility and high performance among employees. The concept of HRM has a theoretical dimension that there is a causal chain linking people policies, with employee behaviors, to successful organizational outcomes (pp. 654-691).

2 In 1982 the American Nurses' Association sponsored the original magnet hospital study, which resulted in the designation of 41 hospitals across the US as magnet hospitals; i.e. hospitals that exemplify excellence in nursing services and had little difficulty in attracting and retaining nursing staff (McClure, Poulin, Sovie & Wandelt, 1983). The attributes and practices are professional nursing services and clinically competent co-workers, collegial and collaborative registered nurse-medical doctor relationships, clinical autonomy and quality, a strong, visible and supportive nursing leadership, control over nursing practice and the practice environment, support for further education, adequate staffing, and an organizational culture in which concern for patient is paramount.

3 Unlike closed-system analysts, who concentrate on the internal working of an organization and move towards states of homogeneity, contingency analysts treat the organization as a system of interdependent parts and recognize that organizations interact and are dependent upon the environment for survival. However, contingency analysts also concentrate on how different "modes" of organizations are required depending on the kind of environment in which they have to exist. For example, Burns and Stalker (1961) examine differences between mechanistic and organic organizations and how this affects their survival in different environments.

4 The Rubik's cube is a 3-D mechanical puzzle and each of the six faces is covered by nine stickers, among six solid colors. For the puzzle to be solved, each face must be a solid color. Within the context of HRM, the configured cube is regarded as improved organizational performances that are dependent upon the combination of different HR practices to suit the organization's environment.

5 As Guest (1992) has noted, this functionalist view fails to take account of the external environment that is independently given, including various forms of "protective legislation, market dominance, access to supplies and possibly an advantageous geographical location" (p. 10). Further, Bolton and Houlihan (2007) remind themselves that "human relations are socially embedded, multi-dimensional and deeply reciprocal" (p. 2).

[6] Parts of this chapter draw on Beil-Hildebrand (2004, 2006).

[7] Foucauldian perspectives are also proven as a means of re-framing the theoretical understandings in the sociology of work. This strand, while recognizing the potential for surveillance, also raises questions of identities and, hence, of resistance and misbehavior. It is part of attempts to theorize subjectivity in the organizational sphere, though influences, such as Giddens (1984), are wider than Foucault (Fleming, 2001, 2005; O'Doherty & Willmott, 2001a, 2001b). Here, the dualistic mode of subjects has not been challenged and these analyses seem to imply that subjects have to be seen as "if the mind is assumed to act independently of the body" (Willmott, 1994, p. 119).

[8] Building on the unique character of labour as an indeterminist commodity, Thompson (1990) examined the major formative theoretical inputs and established a hierarchy of concepts in the analysis of the labour process which retains its emancipator interest: First, the capital-labour relationship is the central focus of analysis, and changes here are the main motor for change in the rest of the economy and society. Second, the capital-labour relationship is highly dynamic; i.e. competing producers have to seek ever greater rates of profit, and hence the labour process will continuously be transformed in pursuit of greater productivity. Third, there is a generalized control imperative; i.e. the means of control are often very complex and forms of control exist outside the labour process. And, fourth, the capital-labour relationship is based on contradictory elements of conflict and co-operation; i.e. although it contains aspects of cooperation and consent, conflict remains an endemic and structural feature of the labour process. In combining these four key elements in labour process analysis, it can be theorized as "a specific set of structures and practices that intersect with practices deriving from other social relations" (p. 22).

[9] Healthcare is typically made available by governments such as in the UK or through private medical providers, such as in the US. The distinction involves the conditions of work, whether the people are employed directly by the state or by private units, and in what way the service process is determined by market forces or by administrative political decree.

[10] A form of job design theory and practice which stresses short, repetitive work cycles; detailed, prescribed task sequences; separation of task conception from task execution; and motivation based on economic rewards. The five principles are: First, a clear division of tasks and responsibilities between managers and employees. Second, the use of scientific methods to determine the best way of doing a job. Third, scientific selection of the person to do the designed job. Fourth, the training of the selected employee to perform the job in the way specified. Fifth, surveillance of employees through the use of hierarchies of authority and close supervision (Huczynski & Buchanan 2006, pp. 413-421).

[11] Murphy (1990) is also concerned with combining post-Marxist and Weberian perspectives to draw analytical conclusions of healthcare professionals' subjectivity. However, he seems more interested than Derber (1983a) in grounding his analysis in the concerns of Weber's closure theory of credentials and the professions. That is, healthcare professionals have not become "proletarianised" but they have become "bureaucratised" (p. 76). In other words, proletarianisation is a "misnomer" (p. 75); it is in fact "the process of formal rationalisation and bureaucratisation" (p. 82) because

the changing nature of professions involves neither "proletarianisation nor loss" (p. 77).

[12] The above labour process and critical studies highlight how increased state control in European welfare states and the growing marketization in the US lead to greater accountability and cost control, eroding the professional autonomy of healthcare professionals. This occurs alongside cynicism from a well educated public who increasingly exert choice over their healthcare provision. Beil-Hildebrand's analysis (2004) concurs that healthcare professionals are increasingly subject to quasi-markets and hierarchies, but retain strong professional cultures which help to maintain control over a body of knowledge and day-to-day work practices.

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Chapter 79
Human Resource Management for the 21st Century Global Economy

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ABSTRACT

The purpose of this chapter is to concentrate on Global Human Resource Management (GHRM) by demonstrating how the functional areas of Human Resource Management, such as talent acquisition, leadership capacity, training/development, and compensation/benefits, need to be fused with a higher level of strategic endeavor through cultural intelligence (CQ), system thinking, and the applications of related system archetypes. Understanding the role cultural intelligence plays in the global business community, knowledge of how systems and subsystems operate, and how variables impact the immediate landscape, as well as overall business performance, are the key drivers for competing successfully in the global marketplace.

INTRODUCTION

Unquestionably one the most critical issues facing globalization of the workforce today is that of talent acquisition – requisite skills, retention, leadership, and continued development of expertise necessary to compete in the complex world of unknowns. The skills and abilities we possess today will diminish in importance and application over time more quickly than ever before, and as M. Goldsmith reminds us in the best-selling book, *What Got You Here Won't Get You There*, a new set of behaviors are therefore essential. How we question the underlying assumptions that our hiring and leadership decisions are based and how we forecast and then prepare for the next iteration of global business demands as well as the evolving expectations of the global marketplace, in a very large part will determine our position in a

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world economy. To that end, the objectives of this chapter are four-fold:

1. To examine how we currently address the issue of talent acquisition
2. To understand the radical changes that have taken place in the global economy and how these changes impact leadership knowledge, skills and abilities
3. To highlight and articulate the crucial role that cultural intelligence (CQ) demands for the entire workforce
4. To examine the role of systems thinking and application of system archetypes to act as the cohesive force that blends all of these variables in such a way as to position our economy in a place of leadership in the global community

BACKGROUND

The role of Human Resource Management (HRM) has somewhat evolved from a "backroom" function to a respectable place in the boardroom – to that of a strategic partner. No longer can organizations compete in a global business economy with the mindset of constraints bound by administrative tasks. The critical business of HRM today is one of partnering with business leaders throughout the enterprise to hire the 'right talent', take an active role in advancing the skill sets of its organization, irrespective of organizational position, retain that talent as well as engage leaders who possess the insight and innovation required in this uncertain, global business world of the 21st century.

To succeed in this seemingly overwhelming task, it is necessary to answer some very basic questions. How will this be accomplished given the level of complexity and change found in our boundary-less world? Who will have the capabilities to create a strategic HRM plan that incorporates the needs of a global organization? What tools will he/she use to craft and insure this strategy?

CAPABILITY 1: TALENT ACQUISITION, DEVELOPMENT, AND PROMOTION

Fifty years ago, the late P. Drucker coined the term "Knowledge Workers" to denote a class of business leaders whose value was based on what they knew. Knowledge Workers are required today more than in the past as business has become more complex due to technological advances and other factors; however, all employees need expertise that will enable them to function successfully in a global workplace. Knowledge and the ability to identify cultural differences and similarities as well the ability to respond appropriately is a necessary commodity that extends from the front line to the board room.

A study conducted by McKinsey & Company identified a new concept that has been taking precedence over an older model. Knowledge and talent marketplaces are becoming the seedbeds for global talent – a place where networks of professionals foster a rich exchange of ideas; a place where resources and systems are identified and developed. The call for inspired leadership has never been louder. The global economy requires individuals who possess business savvy, cultural intelligence, and strategic thinking.

A recent report issued by Development Directions International (DDI) found that, of the companies surveyed, the top priority of global businesses today is leadership development. Closely following leadership development was recruiting and retaining top talent. To begin this complex HR staffing journey, one needs to understand how to source the right talent, the right skill sets, and the right fit for the organization's culture – locally, nationally, and globally. However, this is no easy task. We need to ask ourselves what mechanisms are in place in those enterprises that are leading the world in a positive direction. Of particular note, even though we know that talent acquisition is a key factor, our rate of success has changed little over the past decade. In 1997, a study by McK-

insey resulted in identifying a critical shortage of executives with global expertise, and unfortunate though it is, the 2008 McKinsey Report, *The War on Talent*, stated the problem was still acute and may have, in fact, escalated in importance.

In 2002, Drucker re-emphasized the growing need for Knowledge Workers. With the retirement of the so-called "Baby Boomer" generation, this foreshadowing has become a stark reality. Even though identified to be a top priority of Chief Executive Officers (CEOs), sourcing talent remains to be an issue because of the one lack of a solid success rate. Not only is the talent shortfall evident at the higher ranks, but it also exists throughout all levels of any given organization.

Given this scenario, the fundamental questions then become: "What shift in our organizational mindsets need to change for us to move from failing hiring practices to successful talent acquisition? What assumptions regarding cultural dimensions need to be challenged? How will lack of insight regarding cultural differences become a barrier for successful hiring? How do we equip our workforce to function successfully on a global scale?" These are but a few of the questions global business demands and which thought- leaders need to be asking themselves today.

As our Knowledge Workers retire, especially in Europe and North America, emerging markets are producing a burgeoning supply of young workers. The opening statement in a paper written for Massachusetts Institute of Technology (MIT), *Navigating the World of Work*, Kochan, Ferguson, His, and Hammond state, "You will be some of the best-prepared young people in the world. You bring to work a world-class scientific, mathematical and technical education, and you will now complement that with knowledge of the economic and social context of work and organizations. This is exactly the mix of technical and behavioral skills that employers look for in new recruits… With the advantages of your education come high expectations and considerable responsibilities. In short, as graduates of MIT, you are expected to be a *leader* in the economies of the future." (2010).

However, not to be dismissed is the fact that in developing economies, a serious talent shortfall has developed despite the global economic maladies since 2007. How we prepare and contend with this huge challenge will play out critically in the global business environment. Additionally, failure to perceive the role of HRM as a strategic partner is a significant drawback. The Saratoga Institute reported that less than two-thirds of all HR Directors report directly to the CEO (2005 – 2006). In fact, some research points to the fact that the impact of HRM is declining and has not traditionally been perceived in a strategic role. Only when HR representation at the senior level is commonplace will the needs of an organization be fully addressed.

The initial challenge of sourcing for top talent will not be easily solved. Mantras of "Our people are our most important asset" need to be a core part of business strategy, not a catch-all slogan as is common in many organizations. Concentrating on high potential employees to the exclusion of the remaining workforce is shortsighted at best. These challenges are difficult enough without the addition of cultural differences in value systems and mores; differences in the perception of time and distance; differences in how life is viewed (doing vs. being). A corporate culture of inclusion builds solidarity and loyalty. Success working within a changing cultural landscape requires insight, skill, and behavior that is conducive to smooth working relationships. The creation of opportunities for all levels of employees to work on diverse teams provides exposure to divergent opinions and produces a broadening of experience and cultural intelligence. Engaging employees who can transcend siloed positions and cultural mindsets toward a holistic system of roles, responsibilities, and accountabilities is crucial.

Best Practices in Talent Acquisition

To source the best candidate for any position, successful companies have identified some of the critical components that indicate practices, processes and procedures that work well. Of particular note is the result of McKinsey's report of talent as a strategic priority (2006). This study indentified finding the right talent for the needs of the organization to be "the single more important managerial preoccupation for the rest of the decade." In November, 2007, a subsequent study by McKinsey found that "nearly half of the respondents expect intensifying competition for talent – and the increasing global nature of that competition – to have a major effect on their companies over the next five years. No other global trend was considered nearly as significant." We are in the fifth year since that study was conducted, but many organizations continue to view talent acquisition as a short term issue, and not part of the overall strategic business plan. What accounts for this lack of strategic vision is a short-term mindset, minimal collaboration and talent sharing among business units, ineffective line management and confusion about the role of HR professionals. (McKinsey, 2008).

However, several key points have been identified as being important in competing in the global war for talent:

1. Development of productive "B" players (frontline staff, technical specialists, contractors, joint-venture partners) alongside the development and promotion of "A" players. Employee development in a global context can be accomplished in many ways: diverse job assignments, work on a cross-functional and/or cross-cultural team, shadowing of high performers in the organization, formal education, performance management.
2. Attracting more diversity in the workplace through altering the organizations branding strategy. Targeting populations to include Generations "X" and "Y" (both of which have a unique set of characteristics), women, older workers, and those from culturally diverse backgrounds, as well as opening the corporate door to those recent college graduates who, although do not have experience, do possess current business knowledge of global trends.
3. Elevating and broadening the role of Human Resources to successfully identify the staffing needs on all levels of the organization, not only the "A" players. Additionally, HR professionals themselves need to acquire solid business acumen skills. Exposure to line employees as well as "A" players through job shadowing will serve to enhance the HR Director's skill set and foster a mindset that presents a strategic stance in promoting and supporting a strong people-centered culture.

In the Harvard Business Review article, *Winning the Race for Talent in Emerging Markets*, it is stated, "All three of us have spent decades studying talent management and leadership development, but this war for talent is like nothing we've ever seen before." (Ready, Hill, & Conger, 2009). Very succinctly, they identify four factors that differentiate successful global businesses from less successful global businesses. These factors are brand identity, opportunity, purpose, and culture.

Brand is particularly inviting because it has the power to open the door to personal advancement and promotion. Opportunity encompasses challenging work assignments, ongoing training and development, competitive pay, and an accelerated career track to senior positions. Purpose translates to playing a part in the strategic direction of the company to maximize its impact on the global economy and be viewed in terms of "global citizenship". Culture refers to recognition for individual accomplishments as well as strong team affiliations and a message that each employee feels they are critical to the success of the business. Ready, Hill, and Conger use the

word "talent-centric" in describing this attribute of the company's culture.

They conclude their report by saying, "Most companies continue to believe that a big salary and name brands will suffice to meet their needs, but a local company that creates genuine opportunities and exhibits desirable cultural conditions will often win out over a Western multinational that offers higher pay." (Ready, Hill, & Conger, 2009).

Capability 2: Global Leadership

"To distinguish leadership from management, one can argue that leaders create and change cultures, while managers and administrators live within them." (Schein, 2010).

For decades, we have been preoccupied with the importance of leadership as the fundamental contributor to business success. PriceWaterhouseCooper's Saratoga's Institute of 2005 – 2006 found that three in 10 leaders do not possess the key qualities necessary for effective leadership today. In the five years since that study was completed, we no longer speak of leadership in effective terms. Leadership today, in order to be effective, must be strategic, creative, intuitive, and possess emotional and cultural intelligence. If, as a leader, one does not demonstrate these elements of leadership, results are only marginally effective.

In the 2010 IBM report, *Capitalizing on Complexity – Insights from the Global Chief Executive Officer Study,* nine qualities were identified as significant for today's global leader. In order of importance, they include:

- Creativity
- Integrity
- Global thinking
- Influence
- Openness
- Dedication
- Sustainability
- Humility
- Fairness

The positioning of creativity at the top of the list not only implies but demands that beliefs of the past can no longer be applied to current global business scenarios. Original and creative solutions must replace traditional thinking. Many CEO's have described creativity as it relates to leadership as the ability to create "disruptive innovation and continuous re-invention." (IBM, 2010). As uncomfortable as it seems, examining the current states of affairs through the lenses of complexity and change, will be a key skill for the global leader. The ability to re-focus and reinvent on a continual basis has taken on a pivotal role in corporate success. This elevated role of leadership, imbued with a higher level of thinking, must evolve into the norm for economic sustainability throughout the next decade and beyond. Corporations will need the ability to tolerate disruption in order to adjust and compete with a current business environment.

This is no simple matter. New leaders will be asked to respond immediately without time to deliberate and research. This means insight, tolerance for disruption, and the ability to collaborate instantly with essential business colleagues and partners will become a necessary norm. S. Sumi, President and CEO of Tokio Marine Holdings, Inc. states, "The management environment is rapidly becoming more complex. In these uncertain times, the need for effective and swift decision making is more important than ever." The use of business analytics will aid global leaders with the ability to make quick, informed business decisions. The windows of opportunity and tolerance for a margin of error in the 21st century global economy are both very small. Workable business models need to undergo continual scrutiny in order to keep abreast of complexity and change.

In the words of I. Tyler, CEO of Balfour Beatty, PLC, "The day of the business tycoon is gone. Managers are appointed; leaders are elected. It's not a question of people following you – they need to be a part of you". The command and control style of management that pervaded past decades is no longer productive. Leaders must use skills

of persuasion, coaching, recognizing and rewarding the behavior endorsed by the newer global organizational culture. The rise in alternative channels of communication will aid in defining this new evolving culture. Experimentation in social networking and digital media are currently being piloted to assess the effectiveness of communicating in a new way.

CEO and President of Virgin America Airlines, D. Cush, states, "We need to build a multigenerational communication strategy to weave our diverse workforce together." In the same IBM study, three recommendations are offered: 1) Embrace ambiguity – this can be done by reaching across functional silos, rewarding breakthrough thinking, and taking calculated risks. 2) Disrupt legacy business models – pilot radical innovations and question industry practices, continually examine and fine tune your business model, learn from the best practices other companies. 3) Rise above traditional management styles – develop and strengthen your ability to influence, develop the ability to coach and mentor others and employ a wide range of communication vehicles. As reported in the IBM study, there are several self reflective questions to ask in order to help assess your level of leading creatively. These questions do not have simple, straight-forward answers but are questions that will impact your business now and in the future. Each executive leadership team needs to consider:

- How will you develop the critical capabilities to enhance creativity among your leadership team?
- In what ways can you explore, reward and globally integrate diverse and unconventional points of view?
- What is your approach to challenge every element of your business model to get the most from currently untapped opportunities?
- How will you leverage new communication styles, technologies and tools, both to lead a new generation of talent and encourage breakthrough thinking?

A case study by Axiata Group reports positive results from implementing answers to some of these questions. Axiata, a large Asian telecommunication company, employs 25,000 and has 120,000 service subscribers. The vision for the Axiata group was to "be a regional champion by 2015, by piecing together the best throughout the region in affordable connectivity, innovative technology and developing talent, and uniting them toward a single goal and greater purpose: advancing Asia."

The journey began with the exit from retirement of J. Ibrahim in March, 2006. CEO Ibrahim was named "Malaysia's CEO of the Year" in 2009. The first item on the agenda for Ibrahim was to create one team from all groups to develop a shared vision for Axiata. From a shared vision come shared purpose, accountability, and success. Key stakeholders were invited to a leadership summit held in Tokyo. A traditional approach to creating this shared vision would have been many discussions on organizational issues. However, Ibrahim took a much different approach by encouraging each participant to create a futuristic view of Axiata via creation of a Press Release. This collaborative approach for building a common vision delivered astonishing results. Axiata reported tripling net profits from 2008 – 2009. This exercise of creating a futuristic press release opened up a dialogue so that its leaders could create and agree on a shared vision. This simple vehicle provided the opportunity to share differing viewpoints and resolve conflict through a creative medium: the Press Release.

Top leaders are charged with the responsibility of creating and continually re-evaluating the organizations business operating model. What many businesses sorely need is a new organizational model, one that involves streamlining cumbersome structures, discarding inefficient processes and relationships (committees and nonproductive

teams) and on the positive side, developing marketplaces that foster talent, knowledge, diverse relationships and the creation of an empowering, collaborative organizational culture.

In their essay, *The 21st Century Organization*, Bryce and Joyce coined the term "dynamic management". "What we call dynamic management can help: a combination of disciplined processes, decision-making protocols, rolling budgets, and calendar-management procedures makes it possible for companies to manage the portfolio of initiatives as part of an integrated senior-management approach to running the entire enterprise."

One of the higher level positions on the Human Resource Management team is that of a change agent. Essentially, it would be exceptional for a company to report that every employee is a change agent. Although we know this is not true given the organizational structures and business models that pervade the business world today, change agents are a critical part of the 21st Century Global Human Resource Management team. The title is a familiar one, but the role certainly is not. Change agents are leaders who cut across the organization and its business units without regard to traditional hierarchies. Their function is extremely important. Since organizations are continually being asked to 'reorganize' or re-invent themselves, the change agent takes on paramount importance. A change agent can be looked upon to perform in several capacities: Subject Matter Experts (SME's), coaches, or communication consultants. In fact, a change agent team would require the skills of all the aforementioned roles. This team should have direct reporting responsibility to senior staff. A centralized change agent team can foster the development of new ideas and propose a set of solutions to organizational issues that transgresses the smaller system and subsystems. The skills a change agent must possess are many but most importantly, a change agent must possess excellent interpersonal skills since the most important aspect of the change agent role is to lead through a murky world of complexity and change. This is the individual who is comfortable with ambiguity, conflict and challenge. This is the individual who has the wherewithal to challenge assumptions that maintain outdated mindsets and restrict progress. A combination of academic credentialing and broad based business experience can ensure an excellent fit for this important role.

A rather nebulous trait of a change agent is that of charisma. What more important position than that of CEO requires charisma! Warren Bennis states, "The most dangerous leadership myth asserts that people simply either have certain charismatic qualities or not. That's nonsense; in fact, the opposite is true. Leaders are made rather than born." The true value of a charismatic leader is that they have the power to engage employees on a personal level. They inspire loyalty and pride in accomplishment.

To better understand the quality of charisma it is helpful to examine the performance of business leaders who are respected globally for their contribution to society and to the stellar success of their businesses. One has only to look at Steve Jobs, the founder of Apple Inc., J. Welch, the former chairman and CEO of General Electric, J. Bezos, founder of Amazon.com, M. Whitman, former president and CEO of eBay, to name a few. There is little doubt that the successes of the companies they founded and managed in a large part depended on their ability to engage their workforce, and one of the key skills of a charismatic leader is that of engagement.

In order to compete in a global business environment, organizations need high performance at every level of the organization. Talent management and succession planning are known to be critical performance drivers in robust organizations. As reported in the Society of Human Resource Management (SHRM) work titled, *Developing Leadership Talent: A guide to Succession Planning and Leadership Development*, formal succession plans were likely to include:

- Identifying employees with potential to fill future leadership vacancies
- Taking into account the organization's long term goals and objectives
- Identifying potential leadership talent gaps
- Integrating succession planning into the organization's strategic planning process
- Emphasizing the role of diversity in the global marketplace
- Promoting the visibility of women in leadership positions

Being able to forecast leadership needs in the next one to four years seems to be a strong indicator separating the more successfully competitive organizations from others. Forecasting beyond four years is extremely difficult. This research prompted a discussion regarding the identification of leadership competencies and although the questions were highly controversial, this report states that "The solutions to adaptive challenges lie not in technical answers but with the people themselves."

What vehicles are used to develop leaders? Experts estimate that 80% of leadership development comes from learning and leadership development initiatives; 10% comes from classroom education and training and the remaining 10% comes from coaching and mentoring. Given these statistics, providing opportunity for leadership in a cross-cultural context that is job related is invaluable if these skills and learnings are then applied back to the job as well as the transmission of this knowledge forward to the larger organization. This significantly reduces the impact of time and distance on developing leadership abilities. Traditionally, the measurement of success for developmental opportunities has been found in the impact on the organization's bottom line. Along with this measurement we need to take into account learning and application of learning back on the job. Research indicates that executive coaching provides about six times the return on investment compared to the cost of coaching. This is a startling finding because traditionally, most leadership initiatives take place in a classroom setting with little to no follow-up or follow-through after the event.

The creation and implementation of stretch goals also plays an important part in fashioning cross-cultural leadership opportunities. The Center for Creative Leadership (CCL) has proposed a model that can be used as a guiding force for crafting a leadership development opportunity. The ACS model includes the elements of Assessment, Challenge and Support. Assessment provides a current snapshot of leadership abilities at a given point in time. Challenge often takes the form of a 'stretch goal' both in thinking and acting. Challenges provide a 'sandbox' environment for experimentation with new ways of accomplishing goals (getting the work done) as well as encouraging risk-taking in an unfamiliar territory. Support, which underlies the success of this model, calls for positive reinforcement for new learnings and ways of thinking. Upon completion of this stretch assignment, return to the former way of thinking and doing things is counterproductive and will not impact the bottom line in a positive manner. As is stated in the CCL study, "…sending a changed person into an unsupportive interpersonal environment is one way that organizations waste their resource investments in development."

The Kirkpatrick scale of measurement can be a useful tool in assessing the success of a 'stretch' assignment. Outcomes of a 'stretch' assignment can be evaluated on four separate levels: reactions, learning, transfer and results. The most significant measure is results which can be evaluated through gains in productivity, customer satisfaction, employee morale (employee satisfaction) and profitability. To be sure, some of these indicators will not apply for all 'stretch' assignments.

The CCL study also states that the more variety in assessing the results, the more powerful the results. Reliance on one indicator is short-sighted. Lastly, these 'stretch' assignments should take place in an organizational context. Using the "Best Practices" of other organizations may not fit with

the existing global organizational culture. When considering the 21st Century Global Business Environment, given the choice of methods - education, assessment, coaching or experiential learning - that of experiential learning is the favored potent approach for leadership development. In a separate study, Fast Company (2007) took a broad view and divided leadership into two distinct categories: High-Potential Employees and Emerging Leaders (see Figure 1). When line leaders were asked to identify the characteristics for a senior leader the results of this study identified five characteristics of High-Potential Employees and Emerging Leaders. One of the managers interviewed remarked that an effective senior manager needs to have a 'big picture' mindset and be able to consider many complex dimensions of an issue simultaneously.

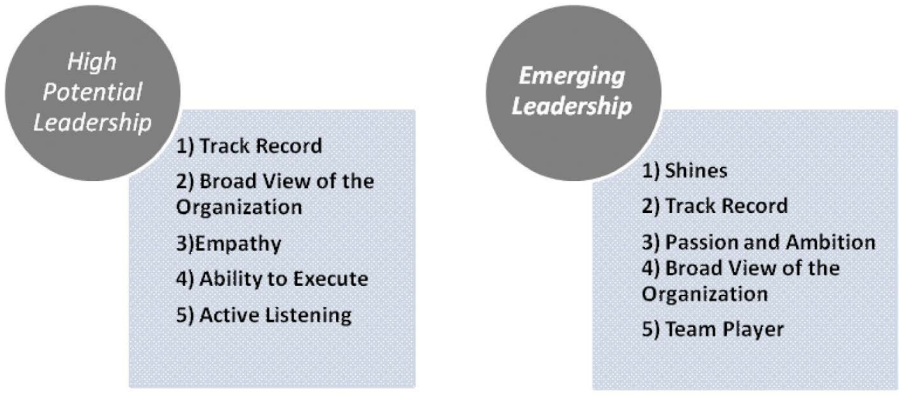
High-Potential Leadership defines Track Record as results achieved; Broad View denotes being able to consider a variety of issues and viewpoints when making decisions; Empathy is defined as the ability to build relationships as one achieves results; Ability to Execute denotes the ability to manage large organizational change initiatives successfully; Active Listening refers to being engaged and present in conversation to build mutual understanding.

Emerging Leaders define Shines as the ability to stand out and above (influence); Track Record is defined as ability to achieve results; Passion and Ambition refers to engagement with the job and people; Broad View of the organization is defined as being able to consider a variety of issues and viewpoints when making decisions; Team Player denotes the quality of being able to subordinate personal aspirations and works in a coordinated effort in striving for a common goal. Of particular interest is that these qualities all contain some dimension of relationship building and the ability to influence. When asked to identify Emerging Leaders; questions such as: Has the person performed well in 'stretch' assignments? Does the individual perform well in ambiguous situations? Is the individual able to influence peers to a positive view? Does this person possess a sense of urgency? Does this person have passion for continual learning?

Another issue considered for high-potential and emerging leaders is that of opportunity. What types of development opportunities/activities seem to provide the best results and are considered to be most meaningful? Line leaders ranked action learning first, cross functional job rotation second and 360 degree feedback third. The first two are experiential in nature whereas the third is the result of an assessment process.

The SHRM (Society of Human Resource Management) study identifies seven key recommendations for leadership development:

Figure 1. Characteristics of two types of leadership



1. The goal of leadership development is to promote leadership effectiveness.
2. Leadership development is driven by organizational strategy within that particular organizational context.
3. Leadership development contains a strong performance goal orientation.
4. The meaningfulness of any experience can be made more powerful when adding greater levels of ACS (Assessment, Challenge, and Support).
5. Individual development is strongly influenced by a motivation to learn.
6. Tailor the development opportunity to the organization's goals and strategies.
7. Explore external as well as internal avenues for leadership development (corporate universities, training seminars, shadowing, coaching, and mentoring).

Capability 3: Cultural Intelligence (CQ)

In 2003, the concept of cultural intelligence was introduced to the business world by two researchers, S. Ang and C. Earley in their book, *Cultural Intelligence: Individual Interactions across Cultures*. Additionally, Earley and Mosakowski published an article in the *Harvard Business Review* (October, 2004) listing cultural intelligence a business core capability. Cultural Intelligence (CQ) can be defined as "an outsider's seemingly natural ability to interpret someone's unfamiliar and ambiguous gestures the way that person's compatriots would". The key phrase here is "seemingly natural ability". An assessment developed by Earley and Mosakowski can be used to gather baseline data on Cultural Intelligence.

This self-assessment is separated into three categories: Cognitive CQ, Physical CQ, and Emotional/Motivational CQ. Each of these categories contains important questions regarding an individual's strengths and areas of development. The results of this assessment generate a profile

Figure 2. Four capabilities of cultural intelligence



for an individual that provides direction to increase cultural intelligence. There are four CQ capabilities that indicate a person's strength as well as needs. These are: CQ Drive, CQ Knowledge, CQ Strategy and CQ Action (see Figure 2).

A study reported by D. Livermore for *Forbes.com* indicated that leaders with high CQ understand how to proceed in a culturally ambiguous situation more successfully than those leaders who have a low CQ. CEO's with a high CQ have learned how to adapt to diverse markets without surrendering their brand identities. Human Resource managers with high CQ understand how to accommodate differing religious and ethnic requests. Business leaders with low CQ do not see the relationship between CQ and the bottom line. Additionally," those business leaders that have high CQ are more consistently effective and enjoy greater personal satisfaction and less burnout in all kinds of multicultural situations."

Capability 4: System Thinking / System Archetypes

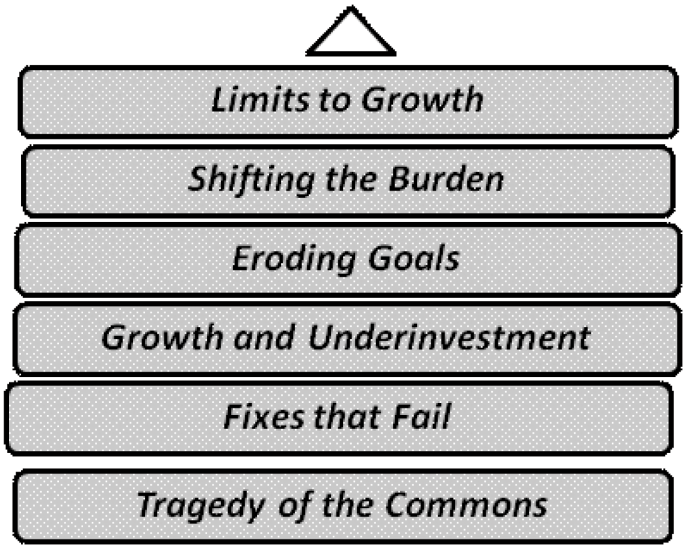
The author's purpose for this chapter is to bring current and relevant information on crucial aspects of 21st Century Global Human Resource Manage-

ment, all of which are of utmost importance today. However, a powerful tool for dealing with the complexity of a global business environment has been overlooked in many organizations.

Systems Thinking can be defined as "a worldview based on the perspective of the systems sciences, which seeks to understand interconnectedness, complexity and wholeness of components of systems in specific relationship to each other." (wordIQ.com). Another component of systems thinking is monitoring behavior over time. System thinking is in stark contrast with traditional analytical problem solving techniques. An essential component of systems thinking is that of feedback, feedback loops (balancing and reinforcing) over time. This model can be applied to every organizational issue whether it be merger and acquisition, leadership development, staffing, problem solving, and so on. The system thinking model has been in existence for fifty plus years. This model has been used in high performing organizations with great success. When considering the complexity of a global environment it makes sense to employ every tool that can be used to clarify complex and ambiguous scenarios. System thinking should be one of the highly chosen tools. This begs the question, When is it appropriate to consider the use of system thinking to understand complex scenarios? Employing systems thinking requires us to think in new ways. In the article, *Prying Management Away from the Old* by T. Babbitt states that systems thinking as a discipline would provide revolutionary change to the ways we think about how work is done and how we need to manage workers. The functional structure of the past no longer fits the complexity of today's global business environment. Too often the worker is held accountable for what is out of his control when in actuality it is a faulty organizational structure/ system that is the culprit. Babbitt states that, "A systems thinker understands that organizational design flaws are rooted in management thinking and the assumptions on which the design are based." What is most likely to change are the assumptions, not the fundamental thinking that underscores adherence to a faulty system.

Some indications that system thinking can provide great insights into organizational issues can be found in the understanding of system archetypes (see Figure 3).

Figure 3. Common systems archetypes



The more commonly applied systems archetypes are: 1) Limits to growth; 2) Shifting the Burden; 3) Eroding Goals; 4) Escalation; 5) Success to the Successful; 6) Tragedy of the commons; 7) Fixes that fail; 8) Growth and underinvestment. Use of these archetypes forces one to identify the root cause of organizational dilemmas, for instance, why is the desired state (the outcome) not occurring? (Limits to Growth). An example of the Shifting the Burden archetype occurs when solutions to issues are attempted to be solved with simple explanations. The true source of the issue is never identified, hence resulting in shifting the burden to a lesser factor, one that has little to no bearing on the problem. The Eroding Goals archetype is a type of shifting the burden archetype where long term strategies are overlooked or abandoned in lieu of an immediate fix. With the Escalation archetype an adversarial game between two players declares that there can only be one winner. This often dissolves into destructive behavior. Success to the Successful can be identified when one of the two players becomes more successful than the other which prompts more resources to be funneled to the successful party. This in turn deprives the second party of necessary resources, thereby continuing to reduce the success rate of the 'underdog'. Fixes that Fail is one of the most common archetypes put into action. This occurs when an organizational problem is solved quickly and has a beneficial effect only to find that the fix did not solve the underlying issue.

L. Bryan of McKinsey Consulting states in *Dynamic Management: Better Decisions in Uncertain Times*, "…progressive strategists have been undertaking noble experiments (such as shorter financial-planning cycles) while dropping the pretense that they can make reasonable assumptions about the future. My sense, though, is that achieving truly dynamic management will prove elusive for most organizations until they can figure out how to get their senior leadership (the top 150 managers, for example) working together in a fundamentally different way." Ways to encourage managers to think in different ways would be to promote the use of systems thinking to make actual decisions. Having the knowledge of and being aware of system archetypes before engaging in a strategic planning session would allow managers to begin the process with a new prospective, one that avoids being trapped in 'decision by assumption'.

A perfect application for systems thinking can be found at Millipore, an international supplier of products and services to the pharmaceutical industry, biotechnology companies, and life sciences research. Millipore employs approximately 6,000 people and reports consolidated sales of $1.6 billion USD. Wrestling with expansion through merger and acquisition, the central challenge for Millipore was to integrate and centralize the handling of products and services through a Shared Service Center (SSC). Prior to 2005, Millipore had a decentralized structure. Having a centralized structure with a single point of contact which would significantly improve service and operations was very attractive to management at Millipore. In 1998, Millipore decided to open a Shared Service Center near Strasbourg. After ten years management at Millipore attests that the SSC (Shared Service Center model) was more successful than they had imagined. The single point of contact concept, it was felt by Millipore management, provided the company with a strong competitive advantage. D. Kauffer of Millipore remarked that the SSC concept enabled them to "react more quickly to turbulent economic conditions." He also states that the future lies in the globalization of more of our processes. This trend of opening up Shared Service Centers is thought to provide opportunities for career development for talented employees and consequently provides a definite attractor for rich talent.

LaFarge is a world leader in construction materials. This company employs 54,000 people and has annual sales of $19 billion. As was illustrated in Millipore, LaFarge also had a decentralized business model largely due to the fact that its

products (cement, etc.) needed to be manufactured and sold locally. Spokesperson, M. Soule, relates that management made the decision to open its first Shared Service Center in 2000 in Toronto, followed by Detroit, and in 2008 four additional centers were opened in France, England, Russia, and China. The decision to move to a SSC was one of shared vision and dynamic leadership which resulted in immediate benefits, largely pertaining to economies of scale. Leadership in the center was equally important in that the goal was to create an organizational performance culture. Soule' also stated there is a need in the centers for "not only talented experts mastering highly computerized processes, but also for team leaders who know how to motivate and challenge people, in order to avoid a certain level of monotony and repetition of tasks." Clearly, Shared Service Centers represent a newer way of doing business, a new way of thinking that incorporates the four elements that is the focus of this chapter. Taken as a whole, these individual elements - talent acquisition, leadership, cultural intelligence and systems thinking - provide a powerful framework for achieving sustainability and success in the 21st Century Global Economy. Human Resource Management will experience a significant increase in importance, involvement and challenge in providing avenues for these four crucial elements to become standard fare in this continually evolving, complex, boundaryless world of business.

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Chapter 80
Key Capabilities, Components, and Evolutionary Trends in Corporate E-Learning Systems

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ABSTRACT

The chapter examines the development of online learning systems in corporations, corporate utilization of reusable learning modules, and the various forms of assessment and knowledge certification used to ensure and improve the quality of the learning outcomes. Corporations continue to embrace e-learning, at a dramatic rate. This is partly driven by a desire for cost reduction and partly to ensure that all staff to have the required skills and competencies for their jobs. Organizations are increasingly linking the e-learning/e-training systems with other modules of their human resource management systems and this chapter includes a case example to illustrate such linkages. Universities have demonstrated progress in e-learning but remain in a position to learn much from e-learning developments in the corporate world. In sum, the chapter provides an overview of corporate experiences with e-learning/e-training and how these might be transferred to the academic world; it also sounds a note of warning for the universities should they fail to observe the ongoing development of corporate e-learning systems.

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INTRODUCTION

Multiple sectors such as universities, corporations, organizations, and governments throughout the world are rapidly expanding their utilization of online tools to take advantage of faster, affordable Internet access and state-of-art technology. Universities are offering more online classes to supplement, enhance, or replace their traditional ace-to-face classes and this increases student accessibility to university courses, more flexibility for instructional delivery, and a wider range of options for student-faculty interactivity (Yeh & Hsu, 2008). Corporations are reaping similar benefits from e-learning/e-training systems and have also benefitted from being to keep their employees' skills up to date. Consulting groups expect continued increases in corporate online learning (or e-learning) expenditures. For example, in 2002, Cortona projected that corporations would spend $50 billion on e-learning/e-training systems by 2010, rising from $5 billion in 2001 (Source: eMarketer) and in 2007 Global Industry Analysis Inc. (GIA) expected e-learning/e-training expenditures to exceed $52.6 billion by 2010 (Source: Global Industry Analysis Inc.). Although caution must be exercised in using these figures due to some variation in markets covered and in type of expenditure included, it is clear that corporate attention to e-learning/e-training will continue.

This chapter looks at recent developments in e-learning/e-training in the corporate environment and examines them from an academic perspective. The authors believe that the education environment (and in particular the management education environment) is going to get much more crowded and competitive. Corporate educational offerings can be viewed as a substitute for more formal training, including university-based training, and corporations have arguably moved more quickly than the universities in fully embracing online education. The authors believe there are both lessons and warnings for the academic learning community.

The chapter begins by reviewing the development of the online learning platforms and how these integrate with other human resource management systems. The chapter continues by examining the factors driving and constraining the development of corporate e-learning/e-training systems and uses a case example for illustration. The chapter then turns to what has become a fundamental element of corporate e-learning/e-training – the reusable learning objects. Assessment (a crucial factor in all learning systems) is examined next and this is followed by a brief discussion of implementation issues. The chapter concludes by discussing some implications for more traditional educational environments.

DEVELOPMENT OF THE ONLINE LEARNING PLATFORM

Technology and the changing workplace provide opportunities to approach employees' learning and skill base development in new ways. E-learning/e-training technologies allow employees to take online course on an "as needed" basis at times that best suit them. E-learning/e-training can also be timed to suit workplace skill enhancement requirements. The ubiquitous nature of the Internet, multimedia and communications technologies allow learning and training to be delivered in new formats at a lower cost.

E-learning/e-training systems are increasingly important components of Human Resource Information Systems (HRIS) (also called HR modules, HRIT systems, HRMS) which support human resource management processes in organizations such as HR planning, recruiting and selection, training and development, performance management, and compensation and benefits (Bentley, 2007). E-learning/e-training solutions can be acquired by organizations as stand-alone HRIS applications, as components of integrated performance management solutions, or as components of integrated human capital management (HCM)

systems linking learning management systems (LMS) with Talent Management Systems (TMS). Most e-learning/e-training solution vendors offer clients the option of implementing e-learning/e-training solutions in-house (self-hosting) or gaining access to customizable e-learning/e-training applications via a Web browser (i.e. as a hosted, application service provider – Application Service Provider(ASP) or Web services solution). The trend is toward hosted, ASP e-learning/e-training solutions such as that illustrated in Figure 1. Figure 1 illustrates that online training and development management is a key component in integrated Web-based TMS.

According to an Expertus's study conducted in 2006 with a sample of 249 organizations, more than one Learning Management System (LMS) is used by many companies (25% of their sample) and most (75%) of these organizations plan to consolidate their systems in the near future (Bentley, 2007). Jon Ciampi, Vice-President of Marketing at SumTotal, points out that another corporate tendency is to integrate their LMS with talent management, succession planning, and performance management systems (Bentley, 2007).

Figure 1. Strategic talent management (source StepStone Solutions)



Learning Management Systems vs. Course Management Systems

Many LMS products, such as Blackboard, WebCT, and Webboard are commercially available and Moodle, one of the biggest open source solutions for e-learning/e-training software and platforms, provides comparable functionality to that supported by commercial counterparts (Dean, 2008; Scher, 2007). The terms Learning Management Systems (LMSs), Learning Content Management Systems (LCMSs) and Course Management Systems (CMSs) are often used interchangeably (Yueh & Hsu, 2008) and the difference among them has been not clear. However, Carliner (2005) makes a distinction between CMSs and LMSs by pointing out that learning and training are different activities. LMSs (e.g., Webboard, WebCT, Blackboard) are platforms that can support focused corporate training for immediate application but CMSs (e.g., NetDimensions EKP, Saba, and SumTotal) are platforms designed to support long-term learning and development in courses such as those at universities (Carliner, 2005). Brown at el. (2007) note that Human Resource Development (HSD) practices in corporate environments are different from other types of training because they emphasize lifelong learning, hence CMSs may be best suited to support HSD processes.

Although distinctions can be made between LMSs and CMSs, this remainder of this chapter discusses patterns and trends that characterize both of these technologies.

Employee Performance Management Systems (EPMs)

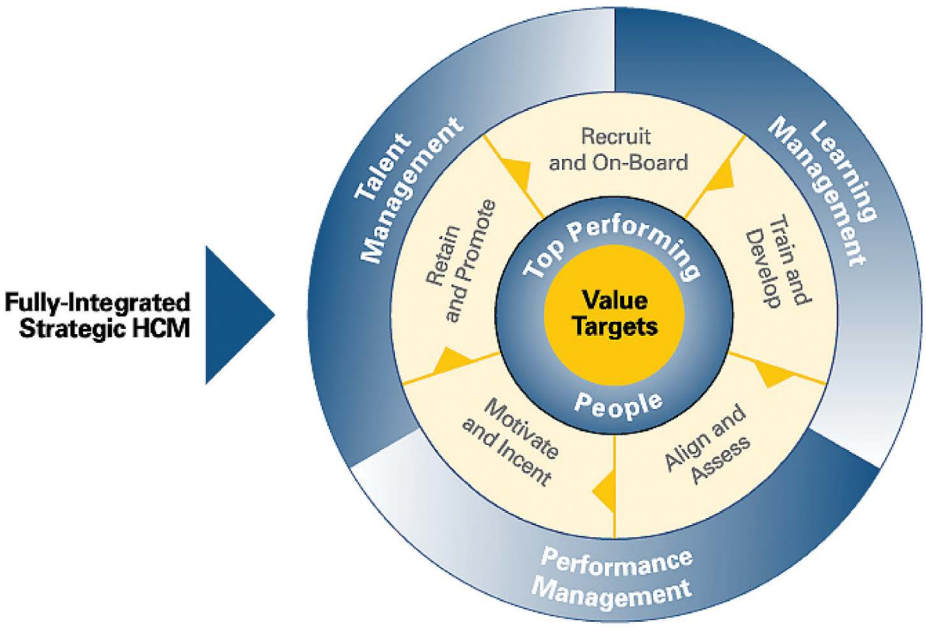
Multiple vendors offer integrated Employee Performance Management (EPM) solutions such as that illustrated in Figure 1. Some claim to offer best-of-breed solutions with robust capabilities while others offer performance management (PM) modules as part of a comprehensive integrated package. According to McMillan (2004),

the investment of hundreds of millions of dollars in research and venture capital over the last half decade has led to the development of a number of scalable Web-based performance management solutions that lend themselves to companywide deployment. McMillan notes that usable, accurate competency management systems are the cornerstones of EPM solutions because these enable the organization to articulate, target, and measure the skills and behaviors that are vital to organizational success. Since some competencies supersede any organization, many EPM solutions provide access to competency libraries and related resources (such as the Lominger Leadership Architect® Competency Library – www.lominger.com) and/or the ability to define organizational-specific role-based competencies. The identification of critical competencies has implications for hiring, training and development, performance appraisal, succession planning, talent management, and compensation processes and applications. Because e-learning/e-training has the potential to play a pivotal role in the acquisition and development of individual competencies, a LMS is a key component of the EPM solutions offered by many vendors (McGraw, 2001).

Human Capital Management Systems (HCMS)

In today's business environment, companies increasingly view their human resources as critical factors in their efforts to gain competitive advantage. This has led to the realization that human capital management activities are critical to achieving high levels of corporate sustainability and corresponding interest in Human Capital Management Systems (Wirtenberg, et al. 2008). As noted by Israelite and Seymour (2006), Human Capital Management (HCM) focuses on the holistic management and optimization of an organization's workforce by striving to add value to organizations via improving the organization's human capital over time. Israelite and Seymour are advocates for fully-integrated strategic human capital management systems that integrate learn-

Figure 2. Integrated strategic HCM system (source Israealite & Seymour [2006])



ing management, performance management, and talent management (see Figure 2).

Integrated HCM systems are designed to enable organizations to identify employees with high potential for success for inclusion in succession planning, comprehensive competency assessments, the development of personalized training and development programs, and tracking of individual development progress. By combining learning management, performance management and talent management, integrated HCM systems are capable of improving the overall quality of the organization's workforce. HCM leverages e-learning/e-training systems to provide personalized training and development processes and when learning management processes are coupled with individualized incentives that appropriately channel employee behavior toward key organizational goals, the organization benefits from enhanced productivity and effectiveness. When employees know that they are performing competently and will be appropriately compensated for doing so, they are likely more satisfied with the organization (and their jobs) and are less prone to turnover. In addition, by rewarding, retaining, and continuing to hone its talent, the organization positions itself to be able to attract more high-caliber employees.

Learning Management Systems

E-learning/e-training solutions are the centerpiece of Learning Management Systems (LMS). Schmidt (2003) outlines numerous reasons why corporations are attracted to LMSs including the ability to reduce training costs, personalize training curricula, make training delivery location independent, and provide expanded training opportunities beyond the expertise of in-house trainers.

LMSs enable employees to access training sessions at their convenience via their PCs whether they are at work, at home, in the field or even in another country. Through LMSs, organizations can significantly reduce a number of costs associated with traditional training processes, such as trainer fees, training facilities costs and travel costs for both trainers and trainees. For example, CompUSA, after adopting an LMS in 1998, dramatically reduced training costs, from over $50 per unit to less than $1 per unit (Margolis, 2007).

LMSs also enable organizations to offer more training options. Reusable, off-the-shelf e-learning/e-training modules, including those available from competency libraries, make it possible for organizations to extend training offerings beyond the expertise of in-house trainers. In addition, LMSs enable companies to track the individual employee's learning/training progress by capturing each employee's log-ins, the amount of spent training, and which training modules are completed. They also provide customized guidance to employees for developing the talents and skills required to be successful in their positions. For example, when logging into the LMS, an accountant will not see engineering courses as choices on the screen. Individual skill or competency levels can also be accommodated. For instance, more seasoned employees may be channeled to intermediate-level course modules or advanced-level reviews that help them retain and grow their individual skills sets. The end-result of personalization is typically less-frequent and more appropriate training sessions for individual employees; this enables opportunity costs from training-related productivity losses to be reduced.

Most traditional training delivery approaches, typically classroom-based, are not easily customized. As a result, they typically require trainers to generalize the training that is provided, which means that issues specific to the individual trainee are often overlooked. Additional customization provided by most LMSs includes the ability to match the format of training content to the individual employee's learning style. For example, visually-oriented trainees can be provided with training that includes high levels of video content.

LMSs enable managers to track employee training progress and many can be aligned with

incentive programs to encourage employees to complete training. LMS notification systems and Web-based reminders can be used to inform employees and managers of post-training course salary upgrades.

According to Schmidt(2003), the shelf-life of learning/training content is an important consideration when selecting a LMS. Firms that specialize in continually evolving technologies or services are likely to need an LMS that can easily support learning/training content changes; this is less likely to be an issue in firms in less volatile industries. Other important selection considerations are costs, return on investment (ROI), and ongoing support issues.

The ability to share and cross-reference data with other HRIS components can also be an important consideration. For example, an employee title change should ideally trigger automatic updates to the individual's training and development plan. The ability for managers to access and review employees' knowledge sets and training levels are supported by many LMS; this helps managers monitor whether an employee is qualified to keep a certification. Numerous companies are leveraging such information to assign employees to projects that utilize knowledge they have recently acquired via LMS trainings. Thus, this LMS capability makes it possible for organizations to provide "just-in-time" training – i.e. employees acquire the training they need exactly when they need it.

Some LMS products are used as customer service enhancement tools to provide remote workers, business partners, suppliers, and customers with Web-based walk-throughs of new product or service features. Because many LMS products support multiple languages, such "training" can be provided globally. While most organizations do not completely replace traditional training programs with LMSs, LMS training is increasingly being used to supplement/blend classroom-oriented training with e-training (Schmidt, 2003; Lansari, et al, 2007). Those parts of the curriculum that are best shared with live groups are maintained while those which can be easily accommodated via e-training are conducted online.

Drivers of Corporate Interest in E-Learning Systems

The foregoing descriptions of Employee Performance Management Systems (EPMSs), integrated Human Capital Management Systems (HCMSs) and Learning Management Systems (LMSs) provide support for Galagan's (2000) observation that the "bottom line" is a primary driver of corporate online learning. Skills and knowledge acquisition is expensive, and this is why LMS are more common in large organizations than smaller ones (Brown et al., 2006). Removing staff from the workplace, hiring teaching/training personnel, using physical resources such as rooms and equipment, and the maintenance of course material all contribute to sizable corporate training expense. The ability to significantly reduce, if not eliminate, training-related travel costs and irrelevant or unnecessary training sessions also drives corporate interest in e-learning/e-training systems. LMS's ability to offer highly personalized to employees is also attractive. For example, Jane Doe could receive tailored training that only includes those pieces of traditional training courses that are relevant to her position and pieces (or entire courses) that are not position-relevant can be omitted from Jane's training.

A secondary, but related, corporate interest driver is improved productivity (Bullock, 2001). EPMs, HCMs, and LMSs highlight skill deficiencies in individuals and across the organization's workforce as a whole. The provision of the required knowledge and skills as an extension of the HRMSs is a logical next step. E-learning/e-training technology allows both the individual and the organization to take advantage of either synchronous or asynchronous learning to support learning services "24/7/365". The ability to deliver customizable content allows the organization to enhance individual productivity in a manner

that best fits their individual circumstances and current skill or knowledge levels. The ability to provide course content in multiple languages is also attractive to some corporations.

Compliance with widely accepted e-learning/e-training standards is valued by many corporations. The American Society for Training & Development recommends LMS compliance to SCORM and AICC standards (Watson & Watson, 2007). Many LMSs comply with the Sharable Content Object Reference Model (SCORM) which is a set of technical standards that enable Web-based learning systems to find, import, share, reuse, and export content. This gives instructional designers, managers, and writers a specification whereby educational courses can be distributed in a "plug-and-play" manner. Compliance with standards developed by the Aviation Industry Computer Based Training Committee (AICC) enables e-learning/e-training programs to pass information to one another. For example, a simulation program could integrate with a quizzing program to receive results. McGraw (2001) notes that as a general rule, the technical architecture for e-learning/e-training is an open architecture, and must include standards for integrating existing elements, such as legacy learning technologies, enterprise applications, online learning, and emerging tools.

The ability to monitor and assess learning outcomes also attracts corporate interest in LMS. Performance management pages dedicated to assessment and feedback are built into most online learning systems – partly to reinforce the learning and partly to ensure a satisfactory standard is achieved before the learner moves to the next level. Such assessment and feedback can (and is) modified to report achievements to management and can be used for bonuses, performance reviews, promotions, and other incentives. Most LMS products used in corporations support gap analysis. Skill or competency deficiencies and centers or areas of excellence are identified via gap analysis or by the use of intelligent agents, and the systems recommend appropriate managerial action.

Other factors that influence corporate interest in particular LMS solutions include the ability for individuals to "sign up" for courses and skill acquisition that they view as being valuable, the ability to map learning outcomes to HR metrics, the ability to monitor/assess employee and workforce knowledge of compliance requirements (e.g. Occupational Health and Safety requirements), ease of use, and vendor reputation.

Corporate Satisfaction with E-Learning Systems

Due in part to the rapidly evolving nature and expansion of online learning, there is little definitive research relating to corporate satisfaction with, or the efficacy of, e-learning/e-training technology. However, there is some evidence that this method of learning is not necessarily the learning/training solution that employees prefer (Mowbray & Dick, 2003) and employee satisfaction with e-learning/e-training solutions may be related to the personal benefits derived from the system, and not the benefits that accrue to the organization (Dunstan & Dick, 2004). This presents particular problems for the champions of e-learning/e-training in corporations – full buy-in may only be possible when they are successful in selling the idea of online learning to the "students" who will be using it.

It is possible that the research on satisfaction and efficacy may be misdirected. In the light of anticipated increases in corporate e-learning/e-training expenditures over the next few years and the expected bottom line impacts of online learning, perhaps instead of asking "How good is online learning compared with a more traditional approach?", researchers should be asking "Is it good enough?" or "What is online training's ROI?"

Depending upon the goals of the e-learning/e-training program, a more efficient and accessible program may be acceptable, even if the learning it imparts is inferior to that for more traditional

face-to-face methods. The key here is whether satisfactory learning outcomes can be achieved. In some instances, learning that is sub-optimal may be sufficient and, due to cost savings, may be the most reasonable approach from a purely business perspective.

ONLINE LEARNING AND THE GALLUP ORGANIZATION

The Gallup organization has over 40 offices in 27 countries, with its corporate headquarters in Washington, D.C., and its operations headquarters in Omaha, Nebraska. The Gallup organization employs approximately 2,000 world leading scientists in management, economics, psychology, and sociology to identify and monitor behavior and economic indicators for the last 70 years. The Gallup Poll, one of the company's four divisions -- Gallup Poll, Gallup Consulting, Gallup University, and Gallup Press -- is one of this organization's best known products/services. The Gallup organization collects data on employees and customers of its clients, mostly Fortune 500 companies; this data is subsequently fed back to client organizations for managerial decision making and assessment that helps its clients improve customer relationships and maximize employee productivity.

Gallup is both a provider and consumer of e-learning solutions and thus provides a very good mechanism for illustrating and reinforcing the key points in the previous sections. As a provider, Gallup sells online learning content to other organizations as part of its management consulting activities. Gallup University enrolls approximately 50,000 students a year. In 2008 almost all of its students were involved in some form of distance learning. While Gallup University offers some face-to-face classes, including MBA courses, most students take online courses (see Figure 3). Gallup Online is Gallup's external metrics and e-learning/e-training system. It is designed for high-volume use and adheres to industry-standard e-learning protocols. The e-learning supplied via Gallup Online is designed to help clients understand, evaluate, and take action on data that Gallup collects and aggregates.

As a consumer, it subscribes to instruction provided by third party vendors, however, most of the e-learning materials used to train Gallup's new employees are developed in-house. Gallup's e-learning/e-training content is available for use by other organizations. Gallup is also able to leverage the e-learning/e-training content that it has developed for clients to create generic courses or learning modules on topics such as leadership and the characteristics/behaviors of effective managers. In short, some of Gallup's e-learning/e-training modules are both reusable and have commercial value. Furthermore, purposeful packaging of learning modules by Gallup and other e-learning/e-training content providers has the potential to reshape online education delivered by public, private, and for-profit universities.

Gallup's LMS

Gallup's proprietary, internal e-learning/e-training system is an exceptional example of a learning management system. Gallup's LMS is based upon a *learning object* model; this means that the number and sequence of learning events that a new employee is required to complete is determined by the individual's role at Gallup. While all new employees receive online instruction on core topics such as benefits, submitting travel expenses, and understanding one's role at a Gallup citizen, the remainder of their initial training is customized to their job. For example, a new manager of client interviewing would receive instruction on the outbound phone system, while a newly hired consultant could receive training on how to communicate effectively with clients.

All e-learning/e-training modules are accessed via a single system. This system also enables employees (and their managers) to track training

Figure 3. Gallup University



progress. The system enables individual learning modules to be updated as needed and managers can modify the number and sequence of learning modules for individual employees to support just-in-time training.

Figure 4 illustrates the login page for Gallup's internal e-learning/e-training system. When users log in, they are presented with a personalized program of instruction that is based upon their job requirements. For example, a new associate might be required to gather (or "scavenge") information about various company activities. The "user interface" for the Scavenger Hunt system (shown in Figure 5) includes "stamps on a passport" indicating that the learner has completed all required events for a particular section tracking on each learner's progress.

This administration component of the e-leaning system was designed for use by Gallup's managers. It allows them to add new material to the system and to create custom learning programs for their direct reports. The system includes an efficient mechanism for tracking learners and controlling what they see and do. Gallup makes extensive use of the Learning Object model, which

Figure 4. Gallup's internal e-learning/e-training system



Figure 5. The scavenger hunt system



employs Reusable Learning Objects (RLO) that can be selected, combined, and sequenced to meet the learning needs of an individual employee.

REUSABLE LEARNING OBJECTS

One of the main distinctions between corporate e-learning systems and comparable systems used in academic settings is the extent to which they have embraced reusable learning objects (RLOs). RLOs use in much more common by corporations than by colleges and universities and corporate utilization of RLOs provide likely insights into the evolution of academic e-learning systems.

In the quest to gain ever-greater efficiency and effectiveness from their learning systems, corporations are taking a page from the object-oriented programming playbook and building libraries of focused, concise learning modules that can be deployed in various combinations to form a custom curriculum that is tailored to the individual employee. These modules, often called learning objects (LOs), are typically designed so that they can be redeployed in other contexts, in much the same way a Java object created for one application can be reused in other applications. A learning object may contain almost anything that is required by application in technology-supported learning such as instructional media, including text, images, audio, video and interactive components (IEEE, 2001; Muzio, 2002).

Lorents et al., (2008) categorizes LOs essential qualities into two groups, the object's content related qualities and its additional and technical qualities. The first group is related to the degree to which LOs are reusable, self-contained, and pedagogically neutral; the second group is related to the degree to which LOs are accessible, compatible, and interoperable. Churchill (2007) proposed six categories of learning objects that is useful as a framework for designers of digital resources. The six categories are presentation, practice, simulation, conceptual models, information, and contextual representation objects. Two or more categories can be combined due

to common characteristics and some categories are more likely to be used for direct instruction while others are more likely to be used to support traditional pedagogical approaches.

When learning objects support exterior form changes but do not require functions of various technologies to be changed they are known as Reusable Learning Objects (RLOs). RLOs provide learning object developers with 'plug and play' flexibility (Burge, 2008). RLOs hold considerable promise for both corporate and university learning systems. However, there are also a number of potential pitfalls.

RLO Overview

Perhaps because of their still-evolving nature (Rossano et al., 2006), the term "Reusable Learning Object" seems to have almost as many definitions as advocates; a number of authors have pointed out the plethora of definitions (Koppi et al., 2005). Fortunately, many of these definitions share some common elements. Learning objects are relatively small, self-contained modules of learning content that are focused towards satisfying a specific, well-defined learning objective (Wu et al., 2006). Reusable Learning Objects (RLOs), as the name implies, are designed so that they can be used in learning environments other than the one for which they were originally created. In other words, a reusable learning object may be "recontextualized" (Muzio, 2002).

Driscoll (2004) points out that RLOs have three main characteristics. First, they are *flexible*. Because (ideally) they are designed to be standalone, they are independent of any particular context. Consider, for example, an RLO designed to teach non-discriminatory interviewing techniques may be used in combination with other RLOs to form an online course on recruiting. This same RLO may be used independently as a review for a manager who needs to refresh her/his interview skills. Similarly, this same object may be used as part of a diversity course for new employees. The developers of the International Virtual Medical School (IVIMEDS) note that the use of RLOs enables adaptive learning that takes into account variations in physicians' expertise, backgrounds and educational needs (Harden, 2006).

Second, because RLOs are tagged with a common set of metadata labels, they are *manageable* – in many instances developers can attach high-level information to each learning object (metadata). These capabilities have enabled many organizations to adopt Learning Content Management Systems (LCMSs) that allows project members to contribute, collaborate, and interact with one another during the development of a training project (Nguyen & Hanzel, 2007). In its simplest form, a LCMS may be a database that catalogs the RLOs according to these tags. For example, a project at the Virtual Orthopeadic European University uses Microsoft SQL Server to build and maintain a repository of learning objects for a medical learning system (Wu, 2006).

Third, RLOs should be *interoperable*. RLOs should be independent of any particular instructional technology or LCMS. The key to achieving this interoperability is to follow an industry-standard format when developing the learning objects. There are several such standards, including IMS (from the IMS Global Learning Consortium), IEEE Learning Technology Standards Committee (LTSC), the Sharable Content Object Reference Model (SCORM) and Aviation Industry Computer Based Training Committee (AICC) standards.

When properly designed, individual RLOs can be recombined to form new curricula. For example, Cisco Systems Learning Solution Partners combine RLOs provided by Cisco to construct new courses; the same object may be reused in multiple courses. The strategy of recombining existing objects is particularly attractive for learning content providers. Providers who successfully employ a reuse strategy are able to use a given object in learning content that is customized for a number of different clients. It is not the objects themselves, but rather the *combination* of objects

that is customized for a particular client (or individual learner).

The concept of learning objects has its genesis in the concept of object oriented programming (OOP). Those familiar with OOP may recall that improved reusability was one of the main benefits touted by its proponents. The same can be said about the RLO concept. Ideally, a learning object created for one course can be repurposed in another course. As is the case with OOP, creating reusable objects is often considerably more difficult and requires greater effort than creating a less flexible object (Parrish, 2004).

In fact, it is critical to consider reuse from the earliest stages of design; reuse does not simply happen, it must be planned for. For example, considering reuse may lead to a finer level of granularity than if the object is designed without consideration to reusability. Parrish (2004) recommends a number of tactics for taking an object oriented approach to instructional design. First, divide content into coherent, discrete units. To those familiar with computer programming, this is reminiscent of the concept of cohesion. Everything in the object (whether a learning object or computer code) should be directed at one objective. In programming, this objective is a function, in instructional design it is a learning objective. Designing cohesive learning objects makes the second reusability tactic easier, embedding metadata that provides an accurate description of the learning object. One obvious benefit of properly using metadata is that it facilitates searching. It also allows for better curriculum management through learning management systems. Parrish's third recommendation is perhaps the most questionable. Parrish recommends designing the learning object to be relatively "context-free." While this may well facilitate flexibility, many educational theorists would argue that learning is never context free, so it may be a mistake to design context-free learning objects.

Advantages of Reusable Learning Objects

When properly designed, RLOs promise a number of advantages. First, just as reusable code makes computer programming more efficient, RLOs make the development of courses be more efficient. Ideally, new courses can be constructed from existing RLOs by recombining existing RLOs in new ways to create new courses. Of course, this ideal is rarely met. It is more likely that a newly-created course will be a combination of existing and newly-created learning objects. Even in these cases, reusing some learning objects may decrease development time significantly. It is challenging to create Learning Objects and it is even more difficult to apply standards to existing Learning Objects. While instructional designers can easily implement a LMS with effective use of standards, it is often the case that an LO that works well in one LMS is not used in another LMS because developers are not aware of its availability (Watson & Watson, 2007). One solution to this problem is Automatic Metadata Generation (AMG) which enables developers to search LMS object libraries for potentially useful LOs that could be repurposed for new learning applications (HMDB, 2008).

There are other, less obvious benefits to RLOs. RLOs may help increase collaboration among instructors and designers (Parrish, 2004) and RLOs may also help make learning more adaptive to the learning preferences of individual learners. When combined with proper learning management systems, RLOs may as well allow more generative learning, in which the learning management system creates individually-tailored instruction "on-the-fly." In addition, RLOs may improve scalability, allowing instruction to be provided to larger audiences without a proportionate increase in costs (Parrish, 2004).

The fast proliferation of open source LMS tools and the Internet has the potential to take RLO use and availability to a new level. Lakhan and Jhunjhunwala (2008) have provided overview

descriptions of the most widely used open source LMS tools including Moodle, Bodington, Claroline, Dokeos,.LRN, ATutor, OLAT, and Sakai. The increasing popularity of open source LMS tools translates into the available of numerous free RLOs.

RLOs and On-Demand Learning

Perhaps one of the most promising benefits of RLOs is the ability to facilitate "on-demand" learning and communication media are increasingly following an on-demand model. Prime examples of this are found in broadcasting. One of the fastest growing trends in television is the increasing popularity of digital video recording (DVR) systems, such as TiVO. These systems allow viewers to easily record programs that are later viewed at their convenience. Program schedulers no longer hold complete power over when a particular program is viewed. While video tape recorders have allowed consumers to record programs for many years, the additional capabilities of digital video recorders have brought new vitality to the practice. The growing popularity of these systems is bringing about changes in the television industry. For example, advertisers are very concerned about the DVR's ability to allow consumers to skip commercials. Because of this, advertisers and television producers are seeking new ways to promote products. For example, more emphasis is being given to product placement strategies where advertisers pay to have their products visible in scenes or mentioned by actors during a program.

Another good example of "on-demand" media is the explosive growth of the iPod and similar devices. These audio (and now video) players give consumers the ability to essentially program their own listening experiences rather than relying on radio station programmers. Consumers can easily build custom play-lists to fit their moods, activities, and listening preferences. Once again, this ability has existed for many years through the use of tapes and compact discs. The new devices, however, make the process much easier.

Podcasting is the newest example of how emerging technologies are facilitating an on-demand lifestyle. A consumer can listen to a podcast whenever and wherever s/he pleases (once the podcast is downloaded). It does not matter when the broadcaster (or podcaster) wants the consumer to listen; now the consumer is in control.

RLOs may help facilitate on-demand learning, just as MP3 files facilitate on-demand listening. Lectures, exercises, even simulated laboratory experiments (and other learning objects) can be accessed at a time that is convenient and productive for the learner. When the original lecture occurred is relatively unimportant. The learner can access the lecture through a learning management system at any time. The instructor still maintains control by specifying the sequence in which objects should be accessed, but the learner controls the time and place of access. When done properly, this may result in a win-win situation.

Corporate Use of Reusable Learning Objects

Learning objects are being used by a number of organizations, both for internal training purposes and for providing training to third parties. One example comes from the United States Internal Revenue Service (IRS), which uses a SCORM-compliant strategy to deliver e-learning/e-training in its "Link & Learn" system, which provides Web-based training to volunteers who help taxpayers throughout the U.S.

The International Virtual Medical School (IVIMEDS) uses RLOs to help achieve its goal of providing excellent medical education to a variety of health professionals including practicing physicians. As Harden (2005) points out IVIMEDS' RLO repository enables wide-spread sharing, recombination and repurposing of RLOs. This allows the application of the RLO based courses

to be deployed across a variety of learning situations and contexts.

Verizon, a provider of wired and wireless communications, uses a SCORM-compliant LMS to deliver training to its 80,000+ field-service employees. Verizon managers estimate that reusing existing content has the potential to cut course development costs by as much as 50% (Howard, 2004). Cisco Systems is also using RLOs to facilitate the development and delivery of e-learning/e-training courses. Cisco Learning Solution Partners take advantage of Cisco's RLOs by recombining the objects to offer new courses. This strategy also allows Cisco to provide its employees and customers with personalized, on-demand e-learning/e-training (Maddocks, 2002).

Perhaps one of the best examples of a corporation leveraging the capabilities of e-learning/e-training comes from the Gallup Organization, which we discussed in an earlier section. Gallup does an excellent job of not only using e-learning/e-training resources and capabilities to manage its own associates' personal development; it also makes extensive use of RLOs in the revenue-generating e-learning/e-training it provides to clients.

Certainly, organizations must be able to determine whether their e-learning/e-training systems are bringing about the intended benefits. One critical aspect of this is assessing whether the intended learning goals are met. Assessing the outcomes e-learning/e-training is another dimension on which corporations are out in front of universities.

Assessment

Assessment is widely-viewed as a crucial part of most learning activities including those associated with e-learning and e-training systems. From a knowledge certification point of view, assessment provides some degree of assurance that the learner has achieved a certain level of knowledge at a point in time. From a student or learner perspective it provides feedback on performance to date (and perhaps indicates readiness of the learner to take a formal certification) and assessment serves to provide a learner with a way to reinforce learning activities by integrating into the learning process tests of knowledge retention and understanding. In addition, at a higher level, the assessment, when related to learning outcomes, provides a means by which achievements against the curriculum can be determined, with this in turn being considered against the desired body of knowledge.

Hall (2002) has suggested that promoting metacognition (understanding at a deep level) depends on the alignment of the learning objectives with the teaching process and the assessment criteria. In other words online education is about much more than using the technology as simply a delivery medium. Online education provides the opportunity to develop an embedded approach and to significantly change assessment procedures and to relate them more directly to practice. To date, corporations have been quicker than universities to capitalize on this opportunity.

Knowledge Certification

Assessment is built into education partly as a means of advising external parties as to the degree of competence a learner has reached. Interested external parties could include potential or existing employers, academic institutions, professional societies and accreditation bodies. As such, the role of assessment in validating and providing a statement of certification of the achievement of a certain level of knowledge needs to be objective, but aligned to the desired curriculum.

Cleveland and Bailey (1994) argue that assessment research needs to move beyond the use of grades to measure student learning in the online environment. Hay, Peltier and Drago (2004) suggest that assessment for management education should encompass the learner's ability to reflect upon their actions. Online education that uses discussion boards and interaction with peers can provide an opportunity for reflective consideration

of various scenarios and outcomes; students' responses and arguments developed in this way can be an important assessment component.

Knowledge certification also can be measured by how well one can transfer the knowledge acquired into the workplace. Iverson, Colky and Cyboran (2005) examined the influence of the user characteristics of self-efficacy, motivation, goal orientation and metacognition on outcomes, including the intention to transfer knowledge to the workplace (the desire to use newly learned knowledge and skills on the job). Their results indicated that those who were most likely to transfer the knowledge were those who were most motivated to learn. The implication of this study is that the intention/desire to apply the learning in the workplace provides a form of knowledge certification.

Feedback to the Learner

Dumont [1996] also argues that one of the current benefits of online learning is that student interactions are usually recorded as part of the learning process which facilitates assessment and feedback. Receiving feedback reflects a learner-centered orientation within the organization that promotes students' further learning (An and Reigeluth, 2008). Making it easy to provide feedback incents organizations to use the capabilities of the technology to build suitable skills in students and to respond to student needs (Clarke, 1996).

In a study of Web Based Learning in Malaysia Poon (2004) found that instructors and students considered mutual assessment and feedback as vital. The opportunity to browse the work of classmates was seen as beneficial because it allowed the students to better understand what they had done well or not so well, and how it compared with the work of others. Most also felt that the quality of their work was improved when they were able to compare it with the work of their peers.

It is highly desirable for instructors to engage the students in discussion sessions in order to provide prompt feedback to the students' enquiries since two-way communication greatly enhances assimilation and refines the quality of e-learning/e-training. However, considerable time is needed for the monitoring and advising on the progress of the asynchronous discussions (Poon 2004).

Clearly technologies associated with online learning offer significant advantages in the area of feedback and assessment -- however these are not without cost. There are high demands on the instructors' time and the students can suffer from information overload. In addition special attention is required to deal with the ready availability of completed work in an electronic form as it raises the temptation of plagiarism. Controls to prevent this should be introduced and monitored.

Learning Reinforcement

Both small and large companies agree that e-learning/e-training courses may be more likely to be successful when undertaken in a dedicated learning center that motivates learners to be responsible for their own learning (Brown et al., 2006). Conceptual understanding is enhanced by the provision of opportunities for formative as well as summative learning (Hall 2002). An obvious example of this is to relate course material to practical examples in this way learners can appreciate both the significance and the practical application of the material. In an online environment this can be achieved by short quizzes and/or discussions relating to case studies or scenarios – choosing the right approach or solution, for example. Summative assessment can be built on the formative work undertaken as part of the learning process, so that the learner can see the basis for the unit assessment. Such a process also allows the learner to work at his or her own pace and provides opportunities for him to re-visit sections or modules that he understands less well.

Alignment of Learning to Desired Outcomes

Almost all organized learning has a set of desired learning outcomes as a goal. This is translated in a curriculum and further refined into course objectives aimed at ensuring the learners are provided with the required body of knowledge. Ideally this body of knowledge is periodically assessed in relation to the desired learning outcomes.

An example that illustrates this deals with learning about immunization practices and procedures, described by Lancaster et al. (2005). In this investigation, many possible immunization interventions were listed and learners were asked to choose the 'best' four. The feedback received by learners provided a rating of the effectiveness (or ineffectiveness) of each intervention, based on an extensive review of evidence from the literature. Lancaster et al. (2005) go on to suggest that future enhancements might include allowing a learner to work a cycle of implementing an immunization intervention and following up with another online assessment.

This example demonstrates how the work of professionals can be assessed as they progress through the learning cycle. If the professionals are found to be doing the wrong thing in practice, the learning modules can be re-used to ensure that the required body of knowledge is being imparted to the learners. This suggests the need for a close relationship between the learning and practice – the closer that connection, the sooner, and more efficaciously that learning is put into practice, the quicker that needed modifications to current practices can be made. This becomes especially important in online learning in the corporate environment – online learning is often specifically targeted at a "mission-critical skills" required in the corporation (Trierweiler, 2005). The ability to quickly assess the value of the learning and to take action to modify the learning to better to suit the required skill set can be critically important.

Implementation Issues and Strategies

Universities and the general public can learn much about e-learning/e-training from the corporate world. One of the first lessons is that the business drivers for implementing e-learning/e-training should be clear. E-learning/e-training should be viewed by managers/administrators as a means for adding value to the organization either directly (e.g. via workforce enhancement) or indirectly (e.g. via training/development cost reduction). Proponents should be able to crystallize the rationale for investing in e-learning/e-training systems in a compelling business case that identifies measurable organization value via traditional financial justification approaches, such as ROI and Internal Rate of Return (IRR), or a balanced scorecard approach. If a compelling business case for e-learning/e-training cannot be made in a university setting (i.e. if the business drivers are not clear), investing in e-learning/e-training may be less desirable than directing monies toward alternatives whose ability to add value is more apparent. A problem with these measurable approaches is that intangible factors, that often are important goals of e-learning, can be ignored; also, such measurements may cause organization to only focus on short-term results (Grant & Danziger, 2005).

A closely related issue for universities is whether the school should be an e-learning/e-training provider or consumer (or both). Numerous universities are e-learning/e-training providers, but not in the same way as Lominger or the Gallup Organization. Both public and private universities have embraced courseware development and management products such as Blackboard and WebCT to provide supplemental online support for traditional courses as well as to deliver complete courses online. Such courseware has spawned online private universities such as Kaplan University, the University of Phoenix, and Walden University that provide a wide range of

degrees and certificate programs. Unfortunately, despite the prevalence of courseware development/management software, the courseware developed by both traditional and online universities limits access to the online training and education modules to enrolled students. In contrast, the reusable e-learning/e-training modules developed by Lominger, The Gallup Organization, and similar providers can be sold and used by trainees in any organization that recognizes their potential to add value, including direct competitors. As a result, many of the e-learning/e-training modules created by corporate e-learning/e-training providers have become world-class benchmarks that continue to attract clients that recognize the futility of trying to develop superior substitutes.

Consider the possibilities if colleges and universities were able to set aside intellectual property issues and "not invented here" biases (that have led to multifold duplication of online course content within higher education) and were free to consume each other's online content. What if any university could provide interested students with the best online Political Science, Calculus, or Macro Economics course that had been developed by another university? There are obvious benefits for university students in this scenario. One of the less obvious benefits for universities is the ability to direct their resources to the things they do best – perhaps to developing e-learning/e-training modules for an academic discipline whose quality would be unsurpassed in the higher education marketplace.

Numerous obstacles (including intellectual property issues) would have to be overcome for universities to evolve to an e-learning/e-training mindset similar to the one that pervades today's corporations. "Buy" rather than "build" can arguably be said to describe the corporate e-learning/e-training landscape just as it defines today's typical corporate attitude toward software acquisition. Universities, however, may be characterized as remaining mired in a "build rather than buy" mentality that results in the seemingly endless production of proprietary e-learning/e-training modules whose value beyond the confines of each university's virtual presence is unknown.

An approach that has the potential to alter a university's perspective on being an e-learning/e-training provider is to have it become a consumer of corporate e-learning/e-training products for its internal non-academic training and development. Bringing world-class corporate e-learning/e-training capabilities to the university's non-academic staff as part of HR training and development initiatives could eventually capture the interest and attention of the academic side of the institution. This may help move the institution toward an enlightened attitude toward e-learning/e-training; one that is more consistent with the views of corporate e-learning/e-training consumers and providers.

The corporate world's utilization of Reusable Learning Objects (RLOs) should provide further food for thought for universities and other educational institutions including secondary schools. The building and refining libraries of SCORM and AICC-compliant e-learning/e-training modules has the potential to facilitate continuous improvement in course content. RLO libraries would enable educators to search for and use modules which best illustrate course concepts – ones that could be used to either augment or supplement traditional in-class instruction (or both). The use of RLOs could conceivably become a standard part of the instructional training of secondary school teachers and university professors. The development, customization and enhancement of RLOs are also likely to become increasingly desirable skills for educators. RLO libraries have the potential to improve the education experiences of students by helping to ensure that courses include e-learning/e-training modules that are likely to have the greatest impact on learners. Developing such libraries may move teachers toward being critical evaluators and selectors of learning modules via attentive selection the content of their courses this may be more likely

to demonstrate continuous improvement. In short, RLOs may revolutionize instructional design and delivery and are likely to do so as long as iPods and competing technologies remain popular.

Educators at all levels can also learn much from corporations in the area of personalization. The ability to create personalized, portable music libraries was one of the first attractions of mobile MP3 players. Thanks to RLOs, it is now also possible to create personalized learning libraries. Some universities, including Duke University, have been on the forefront in leveraging iPods and mobile devices for learning purposes. In addition, some publishers of higher education textbooks, including Wiley, are using podcasts to supplement their print materials and online courseware. While these efforts are worthwhile and indicative that some educators and educational content providers "get it", they fall well short of the level of personalization observed in typical corporate learning management systems. As noted previously, corporate LMSs enable companies to track individual learning/training progress and to provide customized guidance for developing position/job-requisite talents and skills. Individual skill or competency levels can also be accommodated and seasoned employees can be channeled to more advanced modules design for skill maintenance or growth. The level of personalization possible in corporate LMSs extends increasingly to the ability to support on-demand learning/training. The granularity of personalization of university-level e-learning/e-training is much coarser than that for corporate e-learning/e-training; in general, the same content is provided to all regardless of position or skill or competency level. In addition, there is little or no segmentation of review/refresher e-learning/e-training content for advanced learners that is distinct from that provided for first-time learners.

Universities and other educational institutions might also gain insights in promoting personal learning and skill development from studying the learning management capabilities of corporate LMS. Corporate e-learning/e-training systems typically provide managers with the ability to access and review individual employees' knowledge sets and training levels. This information can be used to ensure that individual employees qualify for promotions or bonus, or whether they have the knowledge/skill levels needed for particular projects. The ability to monitor learning progress, to align learning/training to institutional goals and to reinforce learning/training outcomes could be effectively leveraged by university and secondary school educators. In the future, student tracking systems modeled on corporate e-learning/e-training management capabilities could be used for knowledge certification and assessment. As assessment gains momentum in secondary and higher education, educators and educational administrators would be wise to see what is possible by systematically studying the assessment and learning management capabilities of corporate e-learning/e-training systems.

FUTURE TRENDS

To meet the needs of today's learners, Industrial age instructional approaches must give way to Information age approaches (Watson & Watson, 2007). Twenty-First Centrury Learners typically needed a customized pace and personalized sequencing of instruction that is more learner-centered. A continuing weakness of many corporate learning tools is that they operate like a distributor or a publisher that delivers too much information to all learners regardless of each individual's level (Karrer, 2008). Support for learner-centered approaches is essential for today's and future LMS technologies; tracking and assessing each individual's learning continues to be important as well as providing sequence recommendations to instructors.

Collaborative software and social networking capabilities that enable learners to interact and share data will increase in importance in the years

ahead because they support social constructivist learning approach (Dalsgarrd, 2006). Social constructivism advocates conceive learning as a problem-based, self-directed and collaborative process that is consistent with the personalization and individualization of learning. Dalsgarrd believes that LMSs are best used for administrative purposes and that to improve e-learning, social software tools should be added including collaborative tools such as wikis and blogs to support exchange and networking among learners (Dalsgarrd, 2006).

The use of wikis and blogs are a fairly new concept to higher education although they have been around more than a decade. Wikis and blogs are experiencing increasing use as university teaching tools. Online learning educators/trainers have started paying attention to various usages of wiki applications because they provide both collaborative convenience environments (Parker & Chao, 2007). Blogs and wikis are often compared to each other because both of them are easy publishing tools for the public. The main differences are the number of authors (single vs. multiple), time order (chronological or non-chronological), and the organization of information (by time or by topics) and so on. Although blogs are more suitable to distributing information as a publishing tool, wikis are better suited when multiple authors intend to modify and enhance the knowledge in a collaborative environment (Parker & Chao, 2007). According to Frydenberg [2008] wikis have already become a tool that complement and sometimes replace the use of LMSs and CMSs to disseminate information in today's Web 2.0 world. Moodle (open source LMS software) and Blackboard include built-in wikis as plug-ins from third party providers in their most recent versions (Frydenberg, 2008). In the future, more wikis and blogs will be integrated within LMSs to support educators who seek constructivism, or problem-based or learner-centered approaches that maximize LMSs potential. Inviting students to build a course assignment through a wiki will give them ownership of the class and ideally students will learn more when they have to gather their thoughts to actually write something to share with other students.

Learners of all ages will be exposed to use of LMSs and LMS use by younger people will increase in the future. Not only companies and universities use LMSs or CMSs, but more high schools will offer online classes as the younger people become more familiar with computer and Internet usage. According to Shein (2008), 4,500 high school students in Gwinnett County, Georgia took at least one class online in 2007; this is a harbinger of what the future is likely to hold.

CONCLUSION

As might be expected, learning in the corporate environment is much more job specific than in the university system. Corporations also have been driven more by a "bottom line" approach and thus have been quicker to use technology to turn "learning" into e-learning/e-training. Universities have not been completely left out with many courses offered online or at least in a "web-enhanced" mode. Nevertheless, the authors believe that there are lessons for the universities in what the corporate organizations are doing.

Corporate online learning platforms are developed with a focus on short to medium term organizational needs and the way the learning can be delivered and linked back into the systems that require that learning. As such they are a ready means of ensuring that the educational offerings match the needs of the organization and the students. A similar level of emphasis on assessment and feedback might also be beneficial for academic institutions. Another important aspect of corporate systems is their functionality of combining in-house developed material with that from other organizations in a manner that is transparent to the user. Similar integration capabilities might be especially valuable for university business schools.

Corporate LMS are aimed at providing "convenient" learning – at a time and place of the student's choice – often incorporating the expertise of instructors from other organizations. This can also reduce costs – eventually borne by the student or the employing organisation. Customization is a key too – it enables the learning to be individually tailored to the student. Similar capabilities in university LMS may be beneficial and could potentially be used by universities to keep alumni up to date with new cccupationally-relevant developments – a potential lifelong "value added" element.

The focus on the reuse of modules in the corporate environment should also translate into academia – many courses have common elements that should be relatively easily transferred, rather than re-written or worse still, re-developed. However as noted earlier, this transferability does not just happen – it needs to be planned for from the earliest stages of module development.

There also would seem to be lessons for universities in the area of assessment – in particular the practical application of knowledge, motivation to learn in a non-traditional way, comparison and discussion of work with one's peers, feedback and improvement and the availability of tests and simulations to aid in learning reinforcement. Most importantly too, the online systems linked to workplace practices provide feedback on the efficacy of the learning system itself – another useful tool for academia.

Graduate courses provide universities with an increasingly large slice of their revenue; these graduate courses are often aimed directly at business employees and working adults. Business is already moving to incorporate the essential knowledge and skills elements required of their staff into the existing e-learning/e-training systems; the learning platforms and the technology now existing and emerging soon will increase the interest of business in taking a larger slice of the education pie. Universities are well advised to consider how corporations are leveraging e-learning/e-training. Doing so may help traditional educational institutions significantly improve their online education and counter the growing competition from the business world.

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KEY TERMS AND DEFINITIONS

Blog: a Web site, usually maintained by an individual, with regular entries of commentary, descriptions of events, or other material such as graphics or video.

Constructivism: Philosophy of learning founded on the premise that, by reflecting on our experiences, we construct our own understanding of the world we live in.

E-Learning, Online Learning: The use of computing and/or communications technologies to provide learning in the form of courses, training or skills acquisition.

Learning Management Systems: Computer systems that allow learners to access educational content and management the ability to monitor performance in, and use of, such learning.

Learning Objects: Focused, concise learning modules that can be deployed in various combinations to provide a body of knowledge.

Podcasting: The method of distributing multimedia files over the Internet so they can be played on mobile devices.

Knowledge Certification: Some evidence that a certain level of knowledge has been acquired.

Learning Outcomes: The desired objectives of providing the knowledge in the form of a course.

Social Software: Encompasses a range of software systems that allow users to interact and share data.

Wiki: A collection of web pages designed to enable anyone who accesses it to contribute or modify content, using a simplified markup language.

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Chapter 81
Expanding the Boundaries of Healthcare Human Resources Planning

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ABSTRACT

Human resources are central to healthcare services, yet leveraging these resources to meet strategic operations and operational outcomes can present challenges to leaders and human resources professionals because of the complex and dynamic nature of healthcare delivery. Although the traditional roles of human resources management are necessary in supporting an organization in meeting its goals, economic, strategic, and cultural considerations are becoming increasingly important to human resources management and workforce planning in healthcare settings. This chapter presents several features of these different lenses to assist human resources managers in developing a holistic view of human resources planning in health care.

INTRODUCTION

"Healthcare is transitioning from a stable, comfortable, and complacent past to a confusing present and unpredictable future" (Begun & Heatwole, 1999, p. 342).

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Although this statement was made ten years ago it is reflective of the healthcare industry of the 21st century. Today, change is not occurring in small incremental steps, but in quantum leaps. The delivery of health care, reimbursement, technology, quality measurements, malpractice claims and awards have led to dramatic and fundamental changes within the healthcare industry over the past two decades. Coupled with the shortage of

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healthcare professionals, an aging population, a large workforce on the brink of retirement, the rise in consumerism, and an increase in the uninsured in some countries due to rising unemployment, these changes underscore the importance that human resources professionals must place on development of their strategic capabilities. These changes also underscore the importance of the difficulties faced by organizations as they strive to achieve optimum performance in healthcare human resources planning (HHRP).

The World Health Organization (2006) reports that there are over 59 million healthcare workers worldwide, yet this supply of workers remains insufficient to address the healthcare needs of the global population. With nearly 4 million more healthcare workers required to meet the demand for health services (World Health Organization, 2007), the global economy is experiencing the effect of a shortage. Although the gap between the supply and demand of healthcare workers is most pressing in the world's underdeveloped and most challenged nations - those lacking a robust infrastructure, a stable financial system, or impoverished by war - industrialized nations also face substantial challenges in meeting the healthcare needs of their populations because of existing or pending imbalances and shortages in the healthcare workforce. For example, it is predicted that the United States will be short of nearly 200,000 physicians over the next decade (Helwick, 2007; Phillips, Dodoo, & Green, 2005) and will lack up to 260,000 registered nurses by 2025 (Buerhaus, as cited in American Association of Colleges in Nursing, 2009). Canada has reported a pending shortage of 78,000 nurses by 2011 (Biddiscombe, 2009) and 6,000 physicians by 2010 (Kondro, 2007). Pacific and Asian nations, such as New Zealand, Australia, and others in the region are also reporting substantial shortages (Henderson & Tulloch, 2008).

As organizations, hospitals, communities, states, and nations search for solutions to address workforce shortages and other workforce-related outcomes, these entities must consider the linkages between healthcare human resources planning (HHRP), human resources management (HRM), and other fields of study that support the development of practical and workable solutions. Certain fields of study, such as strategic management and economics, have direct relevance to HHRP because they provide direction for planning and methodologies to inform the decision-making process. The concepts and ideas found within these disciplines can provide HR professionals with a set of tools and methods to successfully integrate and extend the traditional tools of HRM in healthcare settings.

Extending HRM in healthcare settings also requires an awareness of the unique role that culture plays in determining the healthcare needs of a particular population. Cultural considerations drive the type and quantities of care demanded by a population, which in turn influences the types and quantities of healthcare providers needed to support a particular population. To the extent that the quality of the interaction between the patient and provider depends upon cultural aspects of both parties, cultural aspects of the healthcare encounter are key considerations in developing HR strategies for the healthcare workplace: HHRP must recognize that the effectiveness of any healthcare encounter will be influenced by the cultural beliefs, perceptions, and values of both patient and provider. Cultural considerations present unique challenges to the HR professional, particularly in determining how best to create a workforce that aligns and recognizes the ways in which culture influences healthcare outcomes.

Determining the correct quantities and types of healthcare workers needed to provide effective healthcare services for a particular population will require HR professionals to look beyond the traditional functions associated with human resources management. Healthcare human resources planners who explicitly incorporate basic economic relationships, organizational strategies, and cultural considerations have the potential to

make planning a process that makes a substantial difference in helping healthcare organizations and other institutions reach established goals and objectives.

HEALTHCARE HUMAN RESOURCES PLANNING

Healthcare human resources planning is a process that results in estimates of the quantity and types of healthcare professionals needed for a particular community or population at a particular time (Birch, as cited in Birch et al., 2007). Although this process is clearly interdependent with other organizational processes, the historical and contemporary approaches to HHRP underscore a process fraught with difficulties and clearly in need of strengthening. The HHRP process has become synonymous with the generation of "estimates," a rather narrow conceptualization considering the significance that these estimates hold for strategic development and HRM functions. Although the HHRP process is crucial for nations, institutions, and healthcare organizations, the process has not been one of urgency.

[Human resources for health] HRH planning continues to have a low priority in most countries. Either it is not addressed at all in a systematic manner, or the plans that are formulated are divorced from the development of the overall health system. The result is acute shortages of services and staff in some geographic areas, and costly surpluses in others. The unrealized expectations of workers trained in excess of a country's ability to absorb them or fully to utilize their skills have caused them to migrate or, at the very least, led to serious loss of morale and motivation. The failure to give sufficient priority to HRH issues is not limited to developing countries (Kolehmainen-Aitken, 1993, p. 12).

The literature on HHRP presents several methods for organizations to consider when developing plans to provide care for a population of interest, which include population-based approaches, needs-based approaches, training output evaluation, demand assessment, and benchmarking (Rickets, 2005). Other researchers have proposed similar methodological categorizations (Kolehmainen-Aitken, 1993; O'Brien-Pallas et al., 2001). The evolution of these methods reflects ongoing changes and dynamics that have occurred in the healthcare industry, particularly related to understanding the relationships between healthcare outcomes and the types and numbers of health professionals involved in care.

Population-Based Workforce Planning

Population-based workforce planning models are based upon simple ratios of the numbers of providers to the size of a particular population of interest. The clear advantage to using such a ratio lies in its simplicity of calculation (Klarman, 1969); however, these types of unadjusted measures are lacking in a number of dimensions. These unadjusted ratios tell us nothing about the meaning and applicability across specific populations, and they also provide no direction for HR activities that could potentially alleviate shortages or surpluses in actual values observed for a particular population (for example, the variation of distribution of providers within an urban-rural population in a state/nation). Because medical need does not explicitly factor into population based estimates, it is difficult—without direct examination of how the ratios were determined to be optimal—to state how a specified number of providers per population translates into health outcomes, such as mortality and morbidity. The range of physician to patient ratios is most telling. In the United States, physician to patient ratios have ranged from 1: 500 to 1: 5,000 (Rickets, 2005)

with physician specialties and organizational settings (e.g., HMO, fee-for-service) serving as drivers of the variation in provider to patient ratios (Hart, Wagner, Pirzada, Nelson & Rosenblatt, 1997; Henderson, 2002). As Rickets indicates, the variability in these ratios reflects different perceptions about productivity, varying perceptions of the healthcare needs for the population of interest, and miscalculations. Because simple population-based models represent some of the most simplistic ways to determine healthcare workforce needs, these may only be relevant for broad discussions about workforce planning in healthcare. More sophisticated methods involving collaboration with healthcare providers, analysis of empirical evidence about ratios and health outcomes, and recognition of how other factors, such as technology, contribute to health would provide planners with a more effective means of determining the specific quantities and types of healthcare providers needed for a particular population.

Needs-Based Planning Models

The needs-based planning model in health care is a logical extension of the simple population-based approach. Needs-based methods are used to estimate the numbers of providers required for a population of a given size based upon a professionally-determined definition of need (Odrich, 1985). Calculation of estimates requires knowledge of the characteristics of the work effort involved, as well as the time-based resources to treat the population of interest. Determining these ratios is a straightforward endeavor (Folland, Goodman, & Stano, 2001, p 337; Klarman, 1969). The required time for a direct or indirect healthcare provider to provide care for a condition that affects a proportion of the population can be used to determine an estimate of the numbers and types of providers required for the care.

Consider the following example:

On a recurring basis, say annually, an illness affects approximately 15% of a population of 1 million. The provision of care for this illness has been shown to take approximately one hour of a primary care physician's time. The available work hours for the physicians are defined as the number of workdays per year, less vacation days, multiplied by the number of working hours per day. Thus, on an annual basis, based on an 8-hour work day and 260 days of work per year, 81. 5 physicians would be needed to treat that illness. These calculations, based on Folland, Goodman and Stano's work (2001), provides an example of the approach (See Table 1.).

Achieving an optimal ratio of providers to patients can be fraught with difficulties. Planners must make all terms and concepts clear if the ratios are to be useful in the decision-making process. Institutions must provide definitions of what constitutes a provider (full-time or other), what constitutes a particular type of provider (primary care versus specialty care; physician versus nurse or nurse practitioner) and what constitutes a unit of work time, and so forth. These

Table 1. Determining physician requirements from population, prevalence, and work-related factors

Modeling Factors	Estimates and Calculations
Size of the population	1,000,000
Prevalence	1,000,000 X 15% = 150,000
Time to treat	1 hour
Total time requirement for treatment	150,000 X 1(hour) = 150,000
Treatment hours available	
Days of work/year	260 (52 weeks X 5 days/ week)
Vacation days/year	30
Work-hours/day	8
Total hours	(260 - 30) X 8 = 1840
Total number of physicians needed	150,000/1840 = 81.5

types of activities fall not only within the technical domain of an organization's human resources management team, but also within the reach of HHRP.

The HHRP planner must clearly articulate the assumptions behind any model that is developed to estimate planning needs. These assumptions must also be relevant and realistic given the state of knowledge about the relationships between desired health states and the means to achieve these. Early models, particularly the well-known Lee-Jones model of manpower planning, made these assumptions known (see Klarman, 1969). However, these assumptions have been severely criticized on a number of fronts, particularly in the health economics literature. For example, the idea that a single professional group is the only group to provide the particular healthcare treatment denies the possibility that other professional groups are capable of providing the treatment for the identified medical condition (Folland et al., 2001). In the health economics literature (or generally, the economics literature), the concept of substitutability between productive inputs is one that is commonly explored and one that HHRP must consider in addressing the treatment needs of a population. In the planning process, the HHRP and healthcare HRM must also consider prices, costs, demand, and whether the group of experts chosen to develop the needs-based solution is the best group to do so (Folland et al.). At a minimum, including these concerns in the planning process will prevent the planner from encountering controversies that plagued early works. These include the assumptions that:

- physicians are the only type of input used to produce health and health outcomes
- the impact of technology plays no role or is unconsidered in planning
- a single, unique solution exists to treat the illness under consideration
- the group determining the optimal ratio is the best group to determine the ratios
- prices and costs of productive inputs can be ignored and that quantities demanded will be paid for (Folland et al., 2001).

The concept of productivity encompasses a number of critically important ideas and relationships that are central to understanding the linkages between workers and outputs that are central to addressing the key questions we face in healthcare human resources planning. Although the literature provides a wide range of definitions for the term, productivity can be thought of simply as the process by which inputs are transformed into outputs (Mahoney, 1988). The idea is central to HHRP because estimates of human resources requirements or needs depend upon the productive capacity of these resources.

Because changes in productive capacity influence output, organizations have incentives to develop and implement cost-effective means of positively influencing capacity. The requirements-production relationship is directly related to the human resources management function in organizations. Increasing productive capacity depends upon a wide range of functions assumed by the technical administration of human resources functions in an organization. For example, human resources or employee services departments are typically charged with administering and developing a number of policies, plans, and procedures designed to improve individual and group-level performance. These technical functions include employee orientation, training, salary and benefits studies, recruitment, selection, unionization, team building, job design and redesign. Dussault and Dubois (2003) note that the typical personnel administrative tasks associated with human resources management in healthcare settings are not only isolating, but also fail to address the broad range of workforce issues present in healthcare settings.

Utilization Methods

Demand-based methods of evaluating healthcare human resources requirements follow generic models for demand found in economics. For example, these models evaluate the quantities and types of healthcare services demanded given prices, the size of the market (or supported population), and other factors. In practice, utilization serves as a "surrogate for demand" (Odrich, 1985). As Kolehmainen-Aitken (1993, p. 22) points out, the use of "this method requires moderately detailed data on the utilization of services and the characteristics of the population to be served, [which complicates] its use in many developing countries." Although the types of estimates generated through use of these methods may produce accurate economic-based figures, they may neglect political or socioeconomic realities, which may in turn lead to a failure to provide equitable healthcare services (Kolehmainen-Aitken, 1993).

Another utilization-based method is what is called the service-targets method (Kolehmainen-Aitken, 1993). With these methods, HHRP is concerned with examining the number of full-time equivalent providers, staff, or other healthcare professionals needed to meet established "service production targets," particularly those related to health prevention and screening (Kolehmainen-Aitken, 1993, p. 22). Other production targets may include those that are related to alleviating wait times in healthcare facilities. In these types of cases, the expertise of the healthcare HR professional may be called on to assist in the evaluation of the numbers of healthcare workers required to meet wait-time targets.

Key Drivers, Transitions and Variation in Health Human Resources Planning

The estimates behind healthcare human resources planning can be generated through empirical estimation of the following model, which is identified as the general healthcare workforce planning model. Simply stated, the number and types of healthcare professions needed to fulfill performance objectives of a particular organization, or for a particular geographic or politically defined boundary, either in the current period or in the future, depends upon the size and characteristics of the supported population. The numbers and types of professions needed in a particular period also depend upon the productive capacity of the healthcare professional and the capacity of, and relationships with, other productive inputs, such as support staff, technology, and infrastructure. The functional relationship between the quantities of healthcare workers needed in period t and the drivers of these quantities at t can be denoted as follows:

$$Q_t = f(S_t, C_t, T_t, R_t)$$

Where:

Q = quantity of health professionals required
S = size of the supported population
C = characteristics of the supported population
T = enabling technology and infrastructure
R = relationships with and quantities of other productive inputs

Understanding temporal and spatial transitions remains one of the key challenges in estimating healthcare human resources requirements for a particular time and population. Inflows and outflows of direct healthcare providers and other professionals will have an impact on the requirements. Researchers and national-level professional bodies have indicated that healthcare provider international migration patterns play a key role in influencing aggregate workforce levels (Aki, Mustafa, Bdair, & Schunemann, 2006; Council on Graduate Medical Education, 2005; Phillips et al., 2007). Understanding these supply-side transitions—and the motivating factors behind these transitions—is critical for developing poli-

cies to ensure that the optimal numbers and types of providers are available in the workforce when needed.

From a demand perspective, transitions in population demographics clearly play a role in the types and quantities of healthcare issues presented to healthcare providers and one of the ways in which solutions may be provided through HHRP is through recognition of the value that training and education provide in addressing healthcare needs for a changing population. The American medical profession, for example, has specifically recognized the need for greater awareness of, not only the growth in population, but also the impact of the aging of the population on the healthcare system (Council on Graduate Medical Education, 2005). Besides the well-established fact that the population is becoming increasingly older, the United States is also seeing an increase in racial and ethnic minorities (Dreaschlin, 2007; Mullan, Frehywot, & Jolley, 2008) and a changing epidemiology of disease (Mullan et al., 2008). In spite of the saliency of these demographic changes, some research indicates that the medical profession has not yet begun to take sufficient steps, particularly in medical education, in order to address the changing demographic characteristics of future populations (Warshaw, Bragg, Brewer, Meganathan, & Ho, 2007).

From a planning perspective, several ways in which planners and institutions estimate workforce requirements have been identified. Yet, variability in methods is just one of the key concerns in healthcare planning. From a practical perspective, healthcare institutions have a genuine concern about the implications of managing variable demand for healthcare services. To the extent that providers are idle and non-productive when insufficient demand for healthcare services is present, organizations, and institutions will incur substantial costs when the HR system cannot readily accommodate the ever-changing demand for services. On the other hand, failing to maintain sufficient numbers and types of professionals to meet the demand for services will have potentially devastating effects on the community members who cannot access necessary health care.

Another key consideration in HHRP relates to the meaning attached to aggregate projections and requirements. If the projection or requirement represents an average, planners must be cognizant of the inherent variability behind the estimated values in order to make sound decisions about policies to obtain optimum requirements. From a spatial perspective, larger-level averages that describe shortages, surpluses, or requirements do not necessarily speak to the corresponding values at local levels. Because intra-regional variation in the supply (and demand) of healthcare human resources is a common and well-established theme in healthcare services (Goodman, 2004), using local estimates is the best strategy when examining the need at a local level. Use of global-level averages can be misleading at best, and reliance upon these through a political process to address HHRP can clearly result in misaligned policies with costly and dysfunctional outcomes. The same applies to temporal projections. Use of an average growth or decline estimates in HHRP will likely obscure temporal variability that will prevent planners from understanding the true needs as they relate to time.

LESSONS AND IMPLICATIONS FOR HEALTH HUMAN RESOURCES PLANNING AND HUMAN RESOURCES MANAGEMENT

The outcomes of earlier work and research in HHRP have pressing lessons for contemporary planning efforts. For planning efforts that result in forecasts of requirements, clearly a great deal of uncertainty exists for future requirements; the likelihood of errors increases with the distance of the forecast horizon. Errors in forecasting may be the result of the particular forecasting models chosen, but they may also be the result of chang-

ing dynamics in the healthcare field that planners have either failed to identify and adjust for, or are simply unknown at the time of forecasting requirements. Early work on state-level healthcare workforce planning in the United States pointed to and cautioned planners to examine and consider the uncertainties and relationships associated with policies, incentives, and rules of practice (Acton & Levine, 1971). Acton and Levine (1971) further conclude that uncertainties about the future state of delivery systems are as important as the uncertainties associated with demand for health services as predictive factors of healthcare workforce needs. Their report suggests that the notion of manpower planning would be better served by changing the concept to one that embodies and considers policy-related questions.

As a discipline, human resources management in healthcare settings has the opportunity to serve as a critical boundary spanner (or as "collaborative agent;" Wranik, 2008, p. 37) between the operational and strategic elements of healthcare institutions and key organizational stakeholders. Although a single typology for how healthcare human resources models function across organizations does not exist (Wranik, 2008), expanding the boundaries of the concept to include strategies found in economics and strategic management would provide the basis for local and large-scale improvements in HHRP. The stated goal of HHRP in the Canadian healthcare system—" to implement a systematic nation-wide approach to planning, so as to facilitate interdisciplinary collaborative care delivery that is responsive to community and patient needs" (Wranik, 2008, p. 36)—clearly echoes this sentiment.

Recent literature on healthcare human resources planning suggests that micro and macro-level approaches would be helpful in understanding the healthcare human resources manager's role (Wranik, 2008). From a micro-level perspective, for instance, healthcare human resources initiatives would fall into four broad categories:

- Enabling the provision of services to the limits of scopes of practice.
- Re-defining the roles of healthcare professionals.
- Collaboration between other disciplines.
- The creation of information systems and supporting technologies (Wranik, 2008, p. 31).

From a macro-level perspective, healthcare human resources initiatives could be classified into initiatives focused on changes in educational approaches and changes in policy and regulation. Wranik's conceptualization (2008) also provides broad categories of HRM-related responses that could ideally fall within an expanded HRM role, and these are consistent with visualizing a role that clearly transcends the technical functions typically associated with human resources management.

Perhaps the most important lesson for HHRP planners and HRM in its support of the planning function is the realization that planning in support of an organization's healthcare related goals is much more complex than the development of mathematical ratios or creation of economic-based utilization models. These are perhaps necessary aspects of the planner's role, but these are insufficient to fully address the complexity that is inherent in the concept of health. Health is a multi-dimensional concept, which translates into multi-dimensional needs (Thunhurst, 1985) for the populations that HHRP consider in the planning process.

Also critical for HHRP and HRM in healthcare settings is that the planning process can, and should be, informed by lessons and approaches taken from other disciplines, such as management, strategy, leadership, operations research, statistics, and economics. Gaining an awareness of these can offer ways of viewing planning efforts that leaders would have otherwise not considered.

The boundaries between strategy, strategic management, strategic initiatives, workforce planning, and human resources management are

not distinct. For example, as we move from larger organizational strategies and plans to the tactical and operational realities of organizational settings, the technical aspects of human resources management are relied upon to provide substance to the strategies. The specific HR functions, such as recruitment, selection, training, and performance appraisal, all contribute to meeting the planning needs of the institution. Other methods, such as increasing educational opportunities, altering methods of healthcare delivery, changing scopes of professional responsibilities, aligning incentive systems, are all potential solutions that can help mitigate current and future worker shortages. These ideas, and countless others, will span the breadth of strategic and human resources management. Between these two, we find the concept of HHRP.

Although HHRP may be novel from an HRM perspective, some nations have taken an aggressive stance and made tremendous strides in large-scale collaborative efforts that have incorporated evidence-based methods with HR planning. The Canadian Nurse Association (2007) reports that several large-scale, research-based studies have been undertaken to build a sold framework for HHRP, which includes a focus on development of standardized population health data and the use of these data in HHR planning.

HUMAN RESOURCES MANAGEMENT AND HEALTH HUMAN RESOURCES PLANNING LINKAGES WITH STRATEGIC MANAGEMENT

Strategic management refers to "formulation, implementation, and monitoring of strategy" (Shortell & Kaluzny, 2000, p. 398). Although the literature does not provide consensus on a definition of strategy, Mintzberg's conceptualization that "strategies are both plans for the future and patterns from the past" (1987, p. 67) clearly embodies the idea that planning has an explicit linkage with an institution's larger strategic efforts. In fact, it resonates with one of Klarman's key ideas about health manpower planning: "… estimates of future requirements must rest on firm knowledge of the present situation and the past" (1969, p. 373).

The view that strategic management is both internally and externally focused underscores the critical role that HHRP can, and should, assume in supporting a healthcare organization's strategy (Shortell & Kaluzny, 2000). Using strategic management ideas and concepts calls for HRM and HHRP to fully gain an appreciation of the internal and external environment in the development of planning estimates. Incorporating strategic management ideas into the HR planning process clearly calls for an expanded role of the HR professional. The theoretical frameworks of industrial organization, resource-based theory, and contingency theory are considered foundations of strategic management (Parnell, 2006), and each of these frameworks offers perspectives with linkages to HHRP. Resource-based theory is focused on the internal resources and the unique characteristics of an organization to create a competitive advantage, whereas contingency theory creates a fit between the organization and its environment (Parnell, 2006). Regardless of the framework, a future-focused orientation is one of the central themes and best practices in strategic management (Zuckerman, 2006) and the pace at which a healthcare organization captures new markets and overcomes learning curves can provide a significant advantage over others that fail to respond to market signals (Shortell & Kaluzny, 2002).

Historically, healthcare organizations have used resource-based and contingency theories to develop their strategic plans. Healthcare organizations tended to be internally focused on linking their resources to strategies that created value and profit. These organizations may also consider the critical role that technology plays in supporting strategic success, particularly through the lens of

achieving excellence in clinical services, through "technological preeminence," or the extent to which the organization can contain costs or maximize profits (Dansky & Ajello, 2005, p.21), each of which can provide direction to healthcare organizations in strategic planning. Healthcare organizations, specifically community hospitals, created a niche within their community that revolved around their services and employees, and in many cases, these facilities created distinctive and idiosyncratic relationships with the supporting communities and populations they served. However, with the radical changes that have occurred throughout the healthcare industry, an evaluation of the industry itself can give human resources professionals a fresh approach to the critical issues it faces in HHRP.

Using an industrial organizational framework is one of several methods to evaluate the role of HHRP in supporting organizational strategies. Industrial organization theory focuses on the impact of the industry environment upon the organization, and how the organization adapts to the forces over which it has limited or no control predicts success and profitability (Parnell, 2006). One of the most useful and insightful models includes Porter's five forces framework.

In Porter's model, the five competitive forces that influence each industry and its structure are: rivalry among existing competitors, the threat of new entrants, the threat of substitute products or service, and the bargaining power of the buyers, and the suppliers (Porter, 2008; Shortell & Kaluzny, 2000). When crafting a future-focused workforce plan, health human resources professionals should analyze the industry as it relates to the five forces. Human resources professionals should look for patterns and trends within the industry during the analysis to understand how the industry has restructured itself and the impact this new structure has on an organization's ability to compete for employees, patients, and physicians.

In the five forces model, healthcare workforce planners must pay particular consideration to potential entrants and substitutes. Porter maintains that the threat of entry can cause an industry to hold down prices or increase investments to discourage new competitors (Porter, 2008). The cost of health care has historically not been a factor in competition between healthcare organizations because of the structure of insurance reimbursement and managed care contracts that are more specific to a patient's employer plan than to individual patients. However, healthcare organizations have strategically tried to obtain a payer mix of predominantly managed care contracts that offer higher reimbursement than Medicare or Medicaid (in the U.S.), and control internal costs to improve profits. With an increasing emphasis on reducing the costs of healthcare delivery, institutions will seek less costly means of producing the goods and services demanded.

The lens of economic analysis provides natural connections with strategic management. For the human resources professional and the healthcare HR planner, a consideration of the key questions that economic inquiry poses offers another way of thinking about the interdependency of planning, strategic management, and the uniqueness of the healthcare landscape. Clewer and Perkins (1998, p. 22) frame these questions as follows:

1. What goods and services will be produced? What mix of goods and services?
2. How will these goods and services be produced? What productive inputs will be used?
3. For whom will these goods and services be produced?

Clearly the first question points to elements of an institutional strategy, whereas question two is directly related to the unique role of HHRP. The last question is instructive as we think about the role and extent to which insurance coverage plays in reimbursing healthcare plans and providers. In determining how goods and services will be produced, HR planners must have an understanding of a population's health care needs in order to begin

determining how healthcare workers specifically contribute to addressing these needs and what factors go into the decision making processes when evaluating two or more types of providers (e.g., physician versus nurse practitioner). The planner would assist in determining the role that technology plays in providing the services that meet the healthcare needs of the population.

Understanding how varying the mix of productive inputs influences health outcomes, and meets goals of the organization can be a daunting task, but clearly one that should be considered in broadening the roles and responsibilities of the healthcare planner. The Canada Public Service Agency's (2007) view of integrating human resources and planning is also consistent with integration of HHRP and strategy. The agency suggests that steps of (a) determination of business goals, (b) environmental scanning, (c) gap analysis, (d) establishment of HR priorities relative to goals, and (e) measurement, assessment, and reporting are all important in integrating HR and planning (Canada Public Service Agency, 2007). A similar conceptualization of strategic human resources management is found in Fottler, Phillips, Blair, and Duran (1990).

HEALTH HUMAN RESOURCES PLANNING AND WORKFORCE PLANNING MODELS

Workforce planning is a tool to recruit, develop and retain the "people" resources required for an organization to realize their strategy. Human resources professionals who can use and integrate the tools of analytics, forecasting, and predictability will give their organization a competitive advantage over their industry rivals. But understanding and utilizing those tools are not enough in the uncertain, ever-evolving industry of health care. Human resources professionals will need to develop their intuitive skills and learn to read patterns and emerging threats within the industry in order to craft creative, responsive workforce plans. Mintzberg (1987, p.74) states "the real challenge in crafting strategy lies in detecting subtle discontinuities that may undermine a business in the future."

The literature offers a number of diverse models for workforce planning, and many of these have sensible links with strategic concepts. As we have emphasized, the starting point for analysis begins with an understanding of the organizational goals facing the planner that are derived from the larger strategies of the organization or institution. Leadership of the organization should have a clear picture of the future, and have it defined both quantitatively and qualitatively to give human resources professionals the framework to begin the workforce planning process (Brooks, 2008, p. 102).

The analysis of workforce requirements to meet the healthcare organization's needs is one step in a chain of activities. Lavelle's (2007) conceptualization includes a progression of activities that includes the following:

- Basic gap analysis
- Workforce analytics
- Modeling and forecasting
- Segmentation (Lavelle, 2007, p. 373).

The basic gap analysis of current skills and future skills needed by an organization is only one step in designing a workforce plan. From an HHRP perspective, gap analysis is a way of thinking about the difference between the types and quantities of workers needed and the number that are available to provide treatment, prevention, or diagnosis for a population of interest. Gap analysis not only considers the present state, but also allows the planner to envision the differences that will exist in future states. Workforce analytics refers to a comprehensive examination of data to analyze replacement possibilities between diverse employment types and skill clusters and then linking that to business data. Modeling and

forecasting begins a more dynamic planning approach utilizing what-if scenarios to evaluate a variety of staffing models. Workforce segmentation segregates staff not just by their skills, but by how critical they are to overall success of an organization (Lavelle, 2007).

Gap analysis provides a comprehensive analysis of the current people resources. Most gap analyses attempt to identify the discrepancy between the demand and the supply of a specific skill set or job classification and the projected needs of the future organization (Lavelle, 2007). A more comprehensive gap analysis should include turnover, retirements, growth or decline of services, population growth, declines or shifts within the community the hospital serves, anticipated strategies of competitors, and future plans of local and state governments (Carissimi, 2008).

The metrics framework, utilized by organizations to develop key performance indicators of success, can be followed to develop a workforce plan. Organizations that use this model will ensure that their workforce plan supports the organization's key performance indicators. These models can provide organizational planners and leadership with effective tools in creating a workforce plan, particularly in industrial settings that provide a stable structure with known competitive threats and less reliance on the "supplier" of specialized skills. The dynamic environment of the healthcare industry, the lack of substitution of skills of the supplier, and the ever increasing demands of the diverse "buyers" can present challenges in execution of the plans and initiatives developed by the healthcare planner.

Two models that offer a deeper, more fluid perspective to gap analysis and the metrics framework are staff segmentation with employment value proposition and strategic cycling. Staff segmentation or differentiation is not a new process; this is what an organization does when grading positions and assigning compensation (Lavelle, 2007). What makes this method dynamic is the addition of the employment value dimension. This model goes beyond gap analysis and adds the dimension of what it will take to compete for the specialized and skilled workforce to attract and retain them in today's healthcare environment. This model allows the human resources professional to look at the various staff segments and ask the same questions but to arrive at answers specific to that job segment. Lavelle (2007, p. 377) states "…a workforce architectural framework can be used to examine the strength, costs, sustainability and compatibilities of different staffing options."

Understanding the value proposition for employees to attract them is directly linked to understanding the employment life cycle. The employment life cycle outlines the progression of the employment relationship, and can be used as a guide for HR interventions that are critical to maintaining a positive relationship and retaining key skills and talent (Lavelle, 2007). Awareness of these stages can provide HR leaders with information that can inform the timing, type and development of workforce interventions. These stages include:

- Joining the organization
- Commitment
- Contribution and growth
- Choosing
- Plateauing
- Sharing and passing of wisdom
- Separation (Lavelle, 2007, p. 377).

Another dynamic process that healthcare organizations can use to develop their workforce plan is the strategic cycling model. This model differs from the more traditional frameworks previously discussed in that it does not rigidly follow a set of steps, but is fluid and flexible and constantly assesses the competitive environment (Begun & Heatwole, 1999). This model, although developed for strategic planning, can serve as a framework for workforce planning as well. Its emphasis on flexibility and inclusion of essential strategic planning activities, such as validation of

an organizational mission, development of a vision statement, establishment of success measures, and analyses of benchmark organizations make it a robust model for the fluid environment of the healthcare industry. The continuously cyclical nature of the model includes sequential movement through each of the planning activities with explicit recognition of the inter-relationships that exist between these activities. The introduction of scenario development and contingency plans in the workforce planning process allows organizations to create alternative workforce plans for various points in an employment life cycle. Table 2 provides a summary of the key elements the strategic cycling model and the other workforce planning perspectives introduced in this section.

The successful use of these activities clearly depends upon a number of important organizational factors such as stage of organizational development, organizational culture, internal capacity, leadership support, and technology. For the healthcare HR planner, examination of healthcare needs and priorities must be considered in the context of workforce planning. In each of the models presented in this section, these needs and priorities could potentially serve as one of the central drivers in development of the fundamental direction pursued by the healthcare organization. Ultimately, use of planning, evaluation, and assessment tools that include the methods of workforce planning can lead to improved healthcare outcomes. Recent work in healthcare planning has focused on the development of frameworks that recognize the interdependencies between these processes, organizational contexts, healthcare goals and outcomes (Dal Poz et al., 2006).

THE UNIQUE ROLE OF CULTURE IN HEALTH HUMAN RESOURCES PLANNING

The rapidly changing racial and ethnic mix of the United States population calls for healthcare systems and providers to meet the needs of patients with varied perspectives, values, cultures, and behaviors about health and well-being. "Failure to understand and manage social and cultural differences may have significant health consequences for minority groups in particular" (Betancourt, Green, & Carrillo, 2002, p. v). Additionally, this failure will trickle through the health care organization, eventually affecting its business health.

Over the past decade the term "culture" has emerged in the forefront of the business and health care world. Additionally, the terms "cultural competence," "cultural diversity," and "cultural sensitivity, " and what are meant by these terms, have become an integral part of many strategic plans aimed at reducing disparities in access to and quality of health care. Cultural issues in health care go beyond the culturally competent provider,

Table 2. Workforce planning frameworks and associated planning activities

Planning Framework	Key Planning Activities
Progression of workforce planning (Lavelle, 2007)	Basic gap analysis, workforce analytics, modeling and forecasting, segmentation
Strategic workforce planning (US GAO, 2008)	Establishment of strategic direction, gap analysis, development of workforce strategies, strategy evaluation and revisions
Metrics framework (Brooks, 2008)	Future state definition, identification of strategic initiatives, prioritization of focus areas, constraint assessment, planning and execution, feedback
Strategic cycling model (Begun & Heatwole, 1999)	Validation of mission and values, development of vision, benchmark analysis and establishment of measures of success, research and analysis of data, development of primary strategy, input from stakeholders and impact assessment, scenario development and contingency planning, prioritization and implementation, evaluation

and their effects can be felt at the budgetary level. "Culture is defined as the shared traditions, beliefs, customs, history, folklore and institutions of a group of people. Culture is shared by people of the same ethnicity, language, nationality, or religion" (The Community Tool Box, 2007, Section 1). Cultural competence in health care "...describes the ability of systems to provide care to patients with diverse values, beliefs, and behaviors, including tailoring delivery to meet the patients' social, cultural and linguistic needs" (Betancourt, Green, & Carrillo, 2002, p. v). Some believe that cultural competency increases access to care and can be a calculated strategy that addresses economies across the health care continuum.

Cultural Competence and Nursing

Cultural competency and culturally competent care is recognized as one of the most important aspects of healthcare delivery in nursing (Maier-Lorentz, 2008; Phillips & Weekes, 2002). A recent U.S. Department of Health and Human Services report (US-DHHS-HRSA, 2001) acknowledges the growing body of knowledge about the theoretical frameworks surrounding cultural competence. Cultural theorists bring scope, substance, and understanding to the concepts of culture and cultural competence. Some of the prominent works in regards to cultural competency include cultural competent/care theories and models such as Leininger's transcultural nursing theory, Purnell's model for cultural competence, and Campinha-Bacote's model of the process of competence in the delivery of healthcare services (HRSA, 2001). These frameworks have been taught in academic settings; however, a review of the literature does not identify where these have been embraced by any organizations as an overarching model. Table 3 provides a brief description of key elements from these frameworks.

Having culturally competent caregivers is an asset to any organization. The performance-related outcomes that an organization experiences will depend upon the extent to which the organization develops and supports cultural competency in the workplace. There are many initiatives that address cultural competence in health such as the *Think Cultural Health* program sponsored by the U.S. Department of Health and Human Services – Office of Minority Health (DHHS-OMH). This particular program is a stepping stone for the development of culturally competent nurses. The OMH also offers a similar program for physicians. Developing culturally competent health care providers remains at the forefront of nursing education and healthcare organizations. To become organizationally culturally competent, Betancourt,

Table 3. Lens of cultural competency in healthcare settings

Framework	Features
Cross, Bazron and Isaacs	Examination of how the process of cultural competence progresses along a continuum from cultural destructiveness to proficiency.
Campinha-Bacote	Includes awareness, knowledge, skill, encounters, and desire as five components of cultural competence.
Carballeira	Live and Learn Model: Live stands for like, inquire, visit, experience; Learn stands for listen, evaluate, acknowledge, recommend and negotiate.
Leininger	Sunrise model: Seven dimensions that include cultural values/life ways; religious, philosophical, and spiritual beliefs; economic factors; educational factors; technological factors; kinship, social ties; political and legal factors.
Davidhizar and Giger	Model of transcultural assessment that examines communication, space, time, social organization, environmental control and biological variations

Note: Descriptions of models taken from *Health Resources and Services Administration study on measuring cultural competence in health care delivery settings (*US-DHHS-HRSA, 2001)

Green and Carillo (2002, p. 17) state that placing the hiring and promotion of minorities as a priority and enabling minority leaders to assume key leadership positions to develop a "a cadre of professionals" are key. Healthcare planners can assist organizations in achieving these goals through use of the workforce planning models previously discussed in this chapter.

Organizations that have developed and implemented initiatives in cultural competency have found several key lessons. For instance, some of the lessons reported by Kaiser Permanente in the United States include the following observations and cautions:

- Marketing has an influence on the ability to develop cultural competency.
- The mandating of cultural competency initiatives may lead to resistance, resentment, and only superficial adherence to such policies.
- Use of multicultural managers should be employed to reflect the diversity of the organization.
- Focusing on the entire organization to improve the service and business is key.
- Implementation of linguistically appropriate patient call-centers can help patients navigate the healthcare system (Betancourt et al., 2002).

The Culturally Competent Organization

Individuals can gain cultural competence through formal training and education, but it takes the support of a culturally competent organization to maintain individual competence. The goal of developing culturally competent individuals and organizations is one of great urgency. Over the years, HRM has become a separate function from a simple office function(s) to high profile divisions in some organizations. The role and importance of HRM in healthcare settings clearly transcends the narrowly-defined technical roles that have long characterized the profession. The recruitment, retention, and motivation of highly diverse individuals are a challenge because of the wide canvass of race, ethnicity, and culture, and required competence and skills. This in itself is a pressing matter that can be addressed by the development of a culturally competent environment.

Having a culturally competent organization and HRM staff is encouraged by Title VI of the Civil Rights Act of 1964 (US). Supporting regulations seek to ensure that no person is subjected to discrimination on the basis of race, color, or national origin under any program or activity that receives federal funding. The Office for Civil Rights (MSH, n.d.) has found that effective programs usually have the following four elements:

- **Assessment:** The recipient/covered entity conducts a thorough assessment of the language needs of the population to be served;
- **Development of Comprehensive Written Policy on Language Access:** The recipient/covered entity develops and implements a comprehensive written policy that will ensure meaningful communication;
- **Training of Staff:** The recipient/covered entity takes steps to ensure that staff members understand the policy and are capable of carrying it out;
- **Vigilant Monitoring:** The recipient/covered entity conducts regular oversight of the language assistance program to ensure that LEP persons meaningfully access the program.

The U.S. Department of Health and Human Services – Office of Minority Health also developed the *Culturally and Linguistically Appropriate Standards (CLAS)* in health care.

The CLAS standards are primarily directed at health care organizations; however, individual providers are also encouraged to use the stan-

dards to make their practices more culturally and linguistically accessible. The principles and activities of culturally and linguistically appropriate services should be integrated throughout an organization and undertaken in partnership with the communities being served (Office of Minority Health [OMH], 2007.).

The 14 standards are organized by themes and include:

- Culturally Competent Care (Standards 1-3), Language Access Services (Standards 4-7), and Organizational Supports for Cultural Competence (Standards 8-14). Within this framework, there are three types of standards of varying stringency: mandates, guidelines, and recommendations as follows:
  - CLAS mandates are current federal requirements for all recipients of federal funds (Standards 4, 5, 6, and 7).
  - CLAS guidelines are activities recommended by OMH for adoption as mandates by Federal, State, and national accrediting agencies (Standards 1, 2, 3, 8, 9, 10, 11, 12, and 13).
  - CLAS recommendations are suggested by OMH for voluntary adoption by health care organizations (Standard 14).

The CLAS standards have direct linkages with HHRP and HRM. Standard 2, for example, calls for healthcare organizations to consider the demographic characteristics of a service area in the recruitment, retention, and promotion strategies in the development of a diverse staff and leadership. Standard 3 calls on healthcare organizations to provide training and education that specifically addresses the cultural and linguistic characteristics of the service delivery area. Linking strategic concepts with cultural competency is also found within the standards: Standard 8 advocates the development and implementation of a strategic plan to ensure that culturally and linguistically appropriate services are provided for supported populations.

Although the literature related to building a business case for the development of cultural competency and diversity-related initiatives shows mixed findings, Dreachslin (2007) indicates that evidence exists, from an economic perspective, that strategic diversity management can have a positive impact in performance outcomes through positive operating margins and growth in an organization's patient base (Carter & Spence, as cited in Dreachslin, 2007).

The populations served by healthcare institutions and nations will continue to become increasingly diverse, and HHRP must be aware of the impact that diversity will have on the types and quantities of workers required to provide quality healthcare services. In today's healthcare environment, nurses, physicians, and administrators are all part of a team that is charged with the mission of healthcare delivery. From a healthcare management perspective, Dreachslin advised:

"If left unmanaged, demographic diversity will interfere with team functioning. Identify a common ground among diverse groups, because similarity can pull different team members together. Invest in professional development so that team members have the tools they need to navigate their differences. Other elements that can improve team and organizational decision making include group-process and conflict-management skills, self-awareness and understanding of cultural style differences, ability to validate alternative points of view, and efforts to surface and manage implicit bias" (Dreachslin, 2007, p. 84).

These recommendations are consistent with the warning that healthcare organizations cannot afford to miss the opportunities to address the changing demographics of the populations they serve (Evans, 2005). Healthcare organizations

and institutions will continue to look to human resources professionals as the rate and complexity of changes continue to increase: Healthcare HRM and HHRP must develop forward-looking strategies to meet the new challenges. Traditional strategic planning uses the past to predict the future; however, healthcare organizations need to incorporate new tools and methods for predicting future trends to ensure operational and strategic success.

SUMMARY

The responsibilities assumed by HR professionals in healthcare settings have never been more important. The rapidly changing social, political, and legal environment creates challenges for HRM in healthcare, yet through use of economic, strategic, and cultural considerations, the HR manager and organizational leader is provided with a robust set of tools to inform policies and decision-making for the ultimate benefit of improving organizational and population health outcomes. Healthcare workforce planning models can provide a basis for generalizing and estimating large-scale needs of an organization and population. The utility of these types of models must be tempered by the fact that strategic considerations must also be considered when estimating organizational workforce requirements. The use of strategic models and perspectives can improve the ability of HR professionals to align organizational goals, population needs, and a variable supply of healthcare workers. Addressing the importance of cultural competency and diversity, through leadership and HR-backed initiatives, while considering and incorporating strategy, and the economic realities of the operating environment is perhaps one of the most important ways to leverage HRM in healthcare settings.

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Chapter 82
Hu Resources Replaces Human Resources in Health Care

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ABSTRACT

Intelligent technologies are exponentially approaching the stage where healthcare professionals must begin to plan for the management of "hu" (human, software, and robotic) resources, replacing management of human resources alone in isolation from other intelligences. The healthcare industry in multiple levels and ways must begin to plan for human resources in health care to extend existing and to develop new conceptual and behavioral skills in order for humans, intelligent software, and robots to optimally partner with each other. The interaction among hu resources will be active and carried out in multiple modes and intellectual and emotional intensities. Healthcare professionals, who shape the social and cultural institutions around intelligence and active knowledge, can optimize the impact and performance of this intelligence partnership.

INTRODUCTION

"Hu" resource management will replace human resource management in health care. A hu is a human or other intelligent entity. Hus are in one of three basic forms: wet, soft, and hard, with the possibility of hybrids of two or more of these forms. A wet hu is an intelligent human being. A soft hu is intelligent software. A hard hu is an intelligent robot, i.e., intelligent software manifest in a physical form (Frenay, 2006). The phrase "hu resources" means that we recognize an essential equivalency among these three forms of intelligence in health care. Understanding this equivalency will allow the healthcare industry to optimize the health care of all wet hus through the services of all hus.

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Consider how pervasive these hu resources are at the moment in new automobiles where we depend on these assisting intelligent technologies to support our safety. Search engine organizations, logistic enterprises, information technology, agriculture, and the military have developed a dependence on such advanced technologies.

"Hu resource management will replace human resource management in health care." This statement of the author would once have appeared to be so outlandish as to be only a metaphor rather than a literal statement. Surely, some will point out, there is a vast difference still (if not half way to forever) between humans and current intelligent machines (Dwivedi, Bali, & Naguib 2002; Rada 2008). Indeed a recent book by Rada (2008) knowledgeably, and with insight, pictures a 2008 world which takes a far less futuristic perspective, even while noting the advances in information technology.

A healthcare organization wishing to return value to its stakeholders in the coming years should consider the strategic failure to optimize intelligence in whatever form. Consider the missed opportunity if human resources departments, managers of healthcare operations, leaders of the industry, and professionals do not understand HR to mean hu resources, instead of just human resources.

This discussion will not focus on human resources departments, but rather on healthcare professionals and managers. It is they who will need to learn to extend their existing skills and behaviors, and to learn new skills and behaviors in order to optimally partner with hu intelligence for the benefit of communities and individuals.

As software becomes embedded in our vehicles and systems, in our bodies and brains, it does so invisibly until the software needs to bring a matter to our attention. Where the software touches our awareness is at the surface of these systems. The surface or obvious human interface of software and robots will distract some until we become habituated. Still the fulcrum upon which we must leverage for an optimal effect on the health care of all is the intelligence of software and robots and how each health care worker can hinder or optimize the development of intelligent hus.

CO-EVOLUTION

More important than the distraction of artificial intelligence is the shift in our relationship with intelligent hus. We will no longer be passive users of artificial intelligence as one would use an essentially static hammer or an electronic medical record system. We are becoming partners, co-evolving soft and hard hus with ourselves. Intelligent systems follow user-driven design and learn and improve with usage. Usage rather than form will determine function.

Machine systems, such as automobiles, that we use today are often mass produced. The basics made available to us at the point of purchase are determined in the factory. We can order a vehicle made from standard parts, choosing among those standard parts. Our vehicle is either a heavy-duty pickup or a small car suitable for just two people around town. Other than deteriorating, most of our vehicles will not evolve as we use them.

Intelligent systems will evolve as we use them. Today's voice recognition system evolves and improves with our use. Intelligent systems will develop functionality by seeking out modules and features to add to themselves as we, and they, need them. The challenge will be as individuals, wet hus, and teams use them within corporate environments. As professionals move from one corporate environment to another, they will want to take their version of a system with them. Also if licensing bodies and corporations seek certified consistency, a professional's intelligent systems will need to learn this and map variations from the original version to its current state.

Consider if the human shaping an intelligent system is not just the healthcare professional, but also the patient. As healthcare systems focus on

an individual and a family or community over the life time of each individual patient, the intelligent system evolves to that user, individual, or network of individuals. These intelligent systems will learn from the systems of healthcare professionals, as patients today learn from their primary physician.

The equivalency of hu resources does not mean that we blindly trust automation by passing responsibility over to systems. I do not trust wolves as the caretaker of my sheep when night comes and I want to leave the windy fields and go home to a warm bed. What I do trust is the interaction, the slow dance, the long term relationship with a wolf, that is now, a dog, who with myself as shepherd, as alpha wolf, and the wolf as sheep dog, will team to care for more sheep than I could alone and will be there to defend the sheep when I cannot be there. Or when I am not there and asleep, the dog will bark and raise the alarm. This wolf is my partner. With this wolf, we will co-evolve, dancing, and transforming through time and evolving over eons.

In the metaphor of the wolf, we partnered with a mature and evolved intelligence. With software, robots, genome technologies, and nanotechnologies, our partners are far less advanced. But still the ability to co-evolve is present.

Consider a scene in the beginning of the movie and book, *2001: A Space Odyssey*, (Clarke, 1968) where the humanoid ape is learning to use a large leg bone as a tool, to extend and increase the power of his arm as a weapon against a hostile environment. We now recognize that fire, physical tools, and language are not just something we were intelligent enough one day to recognize and use. Rather we co-evolved with these companions. We shape them, and their use shapes us. In the movie, the ape, who now walks upright, tosses the thigh bone high into the air. As it tumbles in the air, we visually transfer to the scene of a space station floating in space. The space station is the co-evolved leg bone acting as a force multiplier. The humans of the space station are co-evolved apes who cooperate in tribes (as large as continentally distinct nations). These apes trust technology enough to create artificial environments to take to the Moon and the outer planets (Clarke, 1968). In our world, we send out robots from Earth to the outer planets as our surrogates.

In this sense of partnering, of extending what is human into space, but also in the sense of evolving through time, in this sense, I trust technology. True, one popular suggestion is to replace humans with technology. If the task is to drive a nail into wood, my hand prefers that the point of impact on the nail's head be the hammer's head. Rather than *replace* the human, another proposal or model of technology is to *extend* the human.

Regulators and licensing agencies, educational and professional bodies, and individual professionals will shift into an increasing engagement with soft and hard hus, as they do with all aspects of health care that hold opportunity for improvements in health care and patient outcomes. The difference is that while procedures, best practices, and buildings all are passively improved by healthcare professionals, intelligent systems more actively improve themselves and us.

Consciousness is not required for co-evolution as Pollan (2001) discusses in his book, *The Botany of Desire,* where apples, tulips, potatoes, and marijuana all co-evolve with humans.

"In a coevolutionary bargain like the one of the bee and the apple tree, the two parties act on each other to advance their individual interests but wind up trading favors: food for the bee, transportation for the apple genes. Consciousness needn't enter into it on either side and the traditional distinction between subject and object is meaningless" (Pollan, 2001, xiv).

"Bees and humans alike have their criteria for selection: symmetry and sweetness in the case of the bee; heft and nutritional value in the case of the potato-loving humans. The fact that one of us has evolved to become intermittently aware of its desires makes no difference whatsoever to the

flower or the potato taking part in this arrangement. All those plants care about is what every being cares about on the most basic genetic level: making more copies of itself" (Pollan, 2001, xv).

In this sense, health care workers are co-evolving with intelligent systems now and in the future. Being aware of the potential of co-evolving merely improves both the speed and fruition of the full potential of intelligence.

If the concept of co-evolution is a barrier for you, consider the equally activist theory of Hurwicz's mechanism design in economics (Mechanism Design, Wikipedia, 2009). The assumption still stands that complex institutions are plastic and amenable to shaping into increasingly successful forms.

EQUIVALENCY

That all hus actively improve themselves and each other is one of the features of the equivalency of the intelligence of wet, soft, and hard hus. Intelligence provides a dynamic foundation for equivalence, for interchangeability, among the three forms of hus.

We are long (in terms of scores of thousands of evolutionary centuries) accustomed as humans to using tools and very recently (in evolutionary time scales) complex machines. We use weapons interchangeably with using our hands or feet or teeth. We use material-shaping tools and machines also interchangeably with using parts of our body or the bodies of other humans.

In health care we use electronic medical record systems instead of just using our long term memory. We even use patient monitoring systems in place of having professional medical staff constantly in the room. We use robots in a hospital pharmacy to fill medication prescriptions and supplement human pharmacists.

These simple collectors of data and performers of repetitive tasks are intermediate forms between data and information technology systems of yesterday and the intelligent systems of tomorrow. They, and forms which will arrive soon, differ from past systems in terms of four attributes; surface, independence, knowledge representation, and self-improving.

Surface

Surface is where software and the new intelligences touch our human awareness. The surface of many of these systems will be embedded in complex tools, such as vehicles, communication devices, and diagnostic machinery. When Medtronic and similar medical device companies (Medtronic, Inc., 2009) embed systems in our bodies and brain, then the surface may also become invisible. The computer system's surface becomes increasingly invisible when it becomes increasingly distributed, such as with cloud computing (Microsoft, 2009). Cloud computing dynamically uses Internet resources to virtually provide infrastructure and software as services. The surface becomes invisible when cell phones and computer tablets with wireless cards are mobile and grab on to one and then another transmitter tower's services.

Independence

Humans in health care decreasingly monitor new technology systems when they become boringly consistent. Technology can be more consistent than humans, even when humans work under best practices. The attention of humans wanders as we habituate to consistent input. Technology's attention may be fragile in not catching new, out-of-the-box situations, but technology's attention is at least consistent. So we cease to rigorously monitor these child-like intelligences just as we let thermostats regulate the consumption of energy to maintain the best temperature in our buildings.

Knowledge Representation

More and more of these new systems have increasingly complex and expressive representations of knowledge. These representations in the form of schemas, rules, and semantic and non-semantic structures provide models for systems to reason over the data and information increasingly stored in record management systems. Local efficiency for humans would have been a sufficient reason to switch from paper medical records to electronic records. But the potential for more effective use, for multiple re-use of medical records, adds to the reasons we benefit from electronic medical records interpretable to software through meta-data and other forms of knowledge representation.

Self-Improving

Have you worked with a voice recognition or transcription system that improves in interpreting what you are saying as it works with you and has you actively correct it? Perhaps you notice that your own word processor's spell checker learns new words from you. Search engines and online book search systems automatically learn from you and other users. Database management systems in your IT department's computers continually build more and more efficient indexes as its users ask certain types of queries out of the very large number of possible query types. These are examples of systems which are self-improving. These are systems which improve their efficiency and their effectiveness with use.

More esoteric are artificial intelligence systems, such as those using genetic algorithms, genetic programming, and neural nets to rapidly generate a large number of solutions, keep the best, generate more solutions from these best, and repeat these steps.

The early adoption of intelligent systems will be because they become consistent with routine tasks. But increasingly they will help us with managing complexity and compressing solutions into smaller time frames and using fewer resources. Then they will help us to manage situations so complex that we could not do without these allies.

More aggressively, we use thermostats not only to monitor the temperature of buildings, but also, without humans, to cause changes in the functioning of a building's heating and air conditioning systems. More energy is consumed solely on the orders of the thermostat, a machine.

TIME LINE

We cannot say that new intelligences will arrive February 29 of this or that year. The unfolding of these new intelligences is a process, not a single event.

To understand the time line of the transformation of hu intelligence, we need to consider both a scalar and an exponential time frame. The human transformations needed draw heavily on further evolving current wet hu functions and behavior. Even with extending current habits, it will take years for humans to change. It will take several annual planning, budgetary, and project cycles for large and currently successful enterprises to change direction and adapt to the changes needed to optimize intelligent wet, soft, and hard hu development. That is, the rate of many wet hu changes is scalar: we add a fixed amount of change within set frequencies of time.

Soft and hard hus appear to develop at an exponential rate, following Moore's Law. Gordon Moore, a co-founder of the silicon chip company, Intel, noticed within a decade of first making chips that the number of transistors or electronic switches Intel employees were fitting into their computer chips was doubling every eighteen months for essentially the same manufacturing cost. That is, the rate of productivity or evolution of silicon chips is exponential, where we do not add on a fixed amount of change, but rather we double the old amount to get to the new (Kurzweil, 2005).

Imagine your bank savings account with accelerated compound interest where the principal doubled every year and a half. Other systems related to these silicon computer chips also improve exponentially, although often over a longer time frame. Software developers' productivity doubles every five years. Information workers double their productivity every ten years. Bandwidth, or the capacity of telecommunication systems to move larger and larger electronic content, triples every two years (Kurzweil, 2005).

Industrial competitors ever increasingly create new and improved models of health care devices and systems. Healthcare professionals and patients ever increasingly adapt these new innovations.

Thus we have increasingly sophisticated and intelligent systems involved in buying and selling stock; assembling vehicles; guiding unmanned missiles; exploring Mars; and providing expert humans – pilots, surgeons, and truck drivers – with assistance in handling what would have been overwhelming complexity, quantity, speed, or scale.

An aspect of our exponential timeline that speeds it up even more is the convergence of information related technologies, such as genome and nanotechnology, whose informational capacity are also increasing exponentially, especially in health care (Kurzweil, 2005). When these developments converge, they can speed each other up. A limitation on any new technology is the general absence of enabling technologies. Enabling technologies are parallel to the new technology and are required for its optimal use. When the first photocopiers were available, their enabling technology was paper, standardized to not jam in the copier's rollers (Kurzweil, 2005).

Hu resources management understands the equivalency of a wet hu (human), soft hu (intelligent software), and hard hu (robots). Understanding hu resources creates a complex adaptive system where boundaries shift to create hybrid solutions. The key is not that one form replaces another, but rather that there is a mix of these forms of intelligence when providing health care.

PLAY

Hu systems will distinguish themselves by improving with intense play. Consistent and static use will not be sufficient for the more intelligent hu systems. Hu systems will seek challenges. They will seek to improve how they perform. Play will become more important. The abstractions, the explicit knowledge, the accessible information, and smart displays – visually intelligent – will entice wet, soft, and hard hus to apply their intelligence to healthcare challenges. For wet hus, the partnership of hus will lead to artificially intelligent technologies providing humans with assistance. Time and space will melt away before this partnership enabling asynchronous, global teams focused on small or large facility, clinic or hospital, situations.

Commercial web sites, such as American Well (2009), which started in 2008, provide individuals with real-time, online contact with physicians. A decade of telemedicine has brought specialists to rural areas. Thomas Friedman (2005) in his book, *The World Is Flat*, discusses how work, converted into information, can be performed anywhere in the world at any time of the day or night. Thus X-rays taken in North America in the evening can be read and interpreted by specialists immediately in Asia, rather than waiting until the next day for a medical interpretation. The next step in this conversion of work into information will be intelligent systems that ever-increasingly begin and carry out the diagnosis. Consider our digital cameras that can recognize faces as we are aiming the camera. Turning work into information is an enabling technology, a pre-condition for intelligent systems.

Turning healthcare work into information available in many settings, invites many parties to participate, such as Friedman's Asian interpreter of North American X-rays. Consider the real HR problems that all these non-local human actors create with licensing of practitioners, legal liability, training, and deployment of profession-

als. Consider these challenges as they compound within the interplay of hu and HR.

The coming knowledge technologies will bring more intense play than information technology alone had brought. Knowledge systems require initial knowledge extraction from experts. In addition, rule engines and semantic nets, as well as neural net systems, reason over the explicit knowledge representations, generating intelligent solutions, which as the solutions succeed or fail, provide all the hu actors with information for further improvements.

These cybernetic feedback patterns need not wait for futuristic software agents. Decades-old business rule engines are evolving into business rule management systems with smart authoring interfaces. These systems allow subject matter experts (SMEs) from the business side to author and own business rule systems. These systems are then applied to business processes, again made explicit and represented. This allows business expert authors to develop process improvements with business process management systems. These business process management systems are business systems with IT parallel support for mature quality and guidance on the essence of media's algorithms and heuristics (Hill, 2008).

That is, even today, healthcare professionals, planners, and managers must speed up their metabolism, their hu "play metabolism." Organizations and humans who cannot evolve beyond scalar rates in a world that improves exponentially must begin as soon as possible to change their play metabolism. We will transform from *homo sapiens* into *homo ludens*, the playful human (LABoral Centro de Arte y Creacion Industrial, 2009).

INTERFACE

A driver facilitating these changes is the melting away of the visible and isolating interfaces of hu systems. Computers and cell phones are converging. Wearable computers will soon follow (Zetter, 2009). Soft hus are melding into wet hus and into other soft hu systems. Individual humans with disabilities find solutions with embedded intelligent systems to monitor and intervene with bodily functions and subsystems. As soon as direct wet hu brain interfaces with artificial intelligent systems become standardized, we will have still more efficient surfaces among hus.

We have been through this interface revolution once before and benefited immensely. Long before health care, long before humans – millions of years ago – our single cell ancestors (prokaryotes) embedded within themselves smaller, independent prokaryotes, developing a symbiotic relationship. The larger host shelters and provides the smaller with nutrients. The smaller organism provides adenosine triphosphate (ATP) molecules to the host. A possible explanation is that the smaller organism, which became our mitochondria, supports our aerobic respiration, generating chemical energy by metabolizing sugars, fats, and other fuels with oxygen.

The resulting eukaryotic cells were efficient enough to support evolution into multi-cell organisms and ultimately into humans. The symbiosis benefits us and extends and intensifies what we can do as a life form. The relationship still is of two entities (in that the mitochondria have retained some of their own DNA). Some plant and animal cells have one instance of mitochondria, others have thousands.

So too we may engulf and host software agents with which we will have symbiotic relationships, maintaining over the next millions of years our own identities. We have done this before. We have already had experienced success with becoming part of more complex systems.

Before we have technology systems interfacing directly with our brains, the increasing ubiquity of technology in smart houses and buildings surrounds us with technology. The ever-increasing intelligence of technology creates intelligent bridges that shorten the distance between humans in health care and useful technologies. Smart

systems will both increasingly monitor patients and self-monitor their own performance. Intelligent technologies will increasingly develop self-healing functions, as well as self-improving functions. Neural net and genetic programming systems today are systems that evolve optimal states, that is, they self improve.

WET HU REACTION

Humans appear to have standard reactions to intelligent systems. Humans have a strong psychological propensity to ascribe human characteristics to intelligent systems. While soft and hard hus may one day actually care about humans, humans often treat systems as if they already do care about us, when they obviously cannot yet do so (Billings, 2007).

In the mid-1960s Joseph Weizenbaum of MIT discovered this "ELIZA" effect when he built ELIZA, a computer program which behaved in a way inspired by a non-directional, Rogerian therapist. That is, the program mostly just rephrased into responding questions the substance of whatever the user had keyed into ELIZA (Weizenbaum, 1976).

This was before the natural language processing of today's Ask.com. It was magic! Weizenbaum told people using ELIZA (certainly the graduate students understood) that ELIZA did what it did without intelligence, by just parsing and substituting key words into canned phrases.

After World War II, Alan Turing invented what we now call the Turing Test that has become a high (and so far unreachable) standard for determining if an artificial intelligence system is truly intelligent. The test essentially is that if a user cannot determine whether the responding system is a human or not, then the system has passed the Turing Test (Wikipedia, 2009).

Using ELIZA one can certainly trip up the program and soon realize that ELIZA cannot pass the Turing Test. But for a brief moment, for hours, lay people forget or set aside this knowledge, and luxuriate in having an intelligent companion to whom they can unburden themselves. Consider trying ELIZA yourself. Descendants of ELIZA are available online through several web sites, just google for "ELIZA computer program."

Through this human-machine interaction you may fall into the ELIZA effect, into the illusion that ELIZA is more than what she (it) is. As you can see, my pronouns have tripped me up. Is ELIZA a she? Many stress the illusionary phenomenon and warn us like Weizenbaum (1976) in his book, *Computer Power and Human Reason: From Judgment to Calculation*. Consider exploring the opportunities presented by this effect.

The ELIZA effect is the human tendency to ascribe human level behavior to machine behavior, even when we know that the computer program is just a computer program. The effect is that we anthropomorphize non-humans. While our history is full of lost opportunities where bigoted humans did not consider other humans as human, here we treat technological entities as if they were human.

While the Eliza effect may be the result of a subtle cognitive dissonance between the user's awareness of an application's limitations and their behavior towards the output of the program, the effect may help us improve the efficiency of human-machine interactions.

For health care, for example, the opportunity is that by using social engineering and the insights of human factors, that is, the interaction of humans and machines, we can reduce the friction and wear-and-tear in our increasingly intimate relationship with machine intelligence. While advances in software are necessary for optimizing soft and hard hus in health care, the software advances are no longer sufficient. Wet hus must contribute to the relationship.

Weizenbaum's ELIZA was clever and lucky in that essentially primitive components created a magical effect far greater than the sum of the parts. Healthcare planners and professionals will need to work with the new generation of smart software to cleverly and similarly create a magical

effect far greater than the sum of the parts. The magical effect will often emerge from the new software interacting with enabling technologies and behaviors.

One of the challenges of humans in this mix is not to consider our human tendency to treat intelligent entities as human as a defect. It is a characteristic from which both risk and opportunity arise. From the time of Ovid, the Roman poet, and his story of Pygmalion, the sculptor falling in love with his creation, the statue Galatea, through today's robot pets for the elderly and juveniles; or to ELIZA, humans recognize colleagues in intelligent wet and hard hus (Billings, 2007).

Humans, including healthcare workers, must learn when to override and when to acquiesce, when to demand white box explanations and when to settle for black box responses. This human capacity to interact intelligently with intelligent systems must match the drive for ubiquitous computers and sensors, such as smart houses, coupled with socially and emotionally-aware systems able to appropriately interact with an individual's entire continuum of care.

Health care, of all industries, will proceed quickly with intelligent technology being embedded in human bodies and brains (Medtronic, 2009). As intimate as being embedded in one's body, the intensity of human relationship with intelligent systems will seem greater when we work with increasingly social software systems or anthropomorphic robots.

Consider the impact of Kismet, an expressive anthropomorphic robot that engages people in natural and expressive face-to-face interaction (Massachusetts Institute of Technology, 2009). Kismet perceives a variety of natural social cues from sight and sound, and delivers socially meaningful signals to its target humans through gaze direction, facial expression, body posture, and vocal babbles (Frenay, 2006, 114).

In Korea, Japan, Europe, and North America, specialists in this area are cautionary about the power of the ELIZA effect expressed even more powerfully toward robots. The power of this human reaction is such that several national and international charters have been drafted around "roboethics." The increasing number of social robots being used outside the research lab adds intensity to these charter efforts. Social triggering robots as toys for children (and adults) and as care providers for seniors are leading the way (Billings, 2007).

CONTINUOUS WITH DERIVATIVES

Up to now the information age has been remarkable for the overabundance of information, uncomfortably if not dysfunctionally, overabundant (Dwivedi, Bali, &.Naguib, 2007). Yet going forward, the flow of information will increase. Information will literally flow and change from discrete and frequent quanta of information into a continuous flow. While we ingest food presented to us in discrete amounts, we prosper within a flow of air and oxygen as well as light which we "ingest" in discrete amounts each day.

We do not feel that a flow of air or light is overwhelming. So we will not feel that the change from receiving information in frequent, discrete amounts to continuous will be overwhelming. Partly this will be so because we will develop new ways to manage and make sense of this flow of information. From calculus we will learn to monitor flows of data and information with derivatives, straight lines whose slope will meaningfully tell us about changes in continuous curves, in the flow of information.

Also we will change from having a single focus toward information with implied multiple meanings to multiple foci with multiple levels of meaning granularity (such as, cell to system to ecological community). Much of the information our body takes in is relegated by involuntary systems that do not need our conscious attention. Thus, we can walk and chew gum, as well as multi-process many other marvelous and necessary tasks. Even

my heart "knows" enough to pump faster when my muscles need more oxygen when I exert myself.

At a more subtle level, we will change from diagnosis as model confirming and searching for a best fit model to model improving. We will change to continuous user-driven design (Petroski, 1992). We will change to evaluating by using probabilities. No longer will certainty be the pretended goal.

For instance, an actuarial-based diagnostic system uses several overlapping probabilities that from among many factors, this or that cluster of characteristics suggests a specific diagnosis and implies a specific set of treatments. If we follow the system's recommendations and the positive outcomes are fed back into the system, then the probability of success is strengthened for the next user. If the results are negative, then the probability is weakened for this whole set of factors. If we follow a treatment other than that recommended by the system and the positive outcomes are fed back into the system, then the next user may find one recommendation and an alternative. That an individual with a set of characteristics fits a diagnosis and therefore a treatment, is not a certainty, but a probability, with the risk that this individual has further characteristics which places them outside the diagnosis and treatment recommended.

NEW HABITS

Healthcare workers will need to develop new behavioral patterns in order to optimally work with intelligent technologies and to continually improve them and ourselves. Workers will not merely use intelligent technologies; they will be physically integrated with technology as technology becomes ubiquitous.

Workers are already embedded in discourse communities that are semantically rich and often full of jargon and specialized codes for the concepts of the domain or subject with which the members are involved. A classic example is the discourse community composed of people interested in and communicating with each other about nineteenth century Hong Kong stamps. While the members may be scattered geographically and be diverse in other demographics, they share the language and behavior tools which allow them to learn and teach each other about this subset of world stamps.

Health care is full of discourse communities at all levels, professionals and patients and their continuum of care. Every illness, especially if it has the intensity of cancer, or is chronic, develops socialization mechanisms to initiate members into their role within the discourse community. The knowledge of a discourse community domain can be represented in an ontology or in, for instance, a semantic net expressed in a frame-based system, consisting of nodes and arcs, of attributes and facets, of operations and processes, and of relationships which are themselves full frames (McKesson, 2009).

When experts (Rada, 2008; Yolles, 2008) discuss the fragility of healthcare expert systems, for instance, they are discussing rule-based systems which neither use semantic net technologies nor a well developed ontology. Nor are semantic nets the only knowledge representation technology; but for more information about semantic nets do consider reading the now classic (in Internet years) article by Tim Berners-Lee, James Hendler and Ora Lassila (2001) published in *Scientific American*.

Consider that the intelligent system is not only functioning in the immediate time after the user has carried out some data entry. Besides the intelligence and knowledge involved, most of the data involved is in, and has been entered in, other systems. Berners-Lee's (2001) vision is not of systems that interfere with, for example, a physician while "clinicians must confront patients in intense, intimate, time-pressured, face-to-face, *belly-to-belly*, events" (Rada, 2008, p. 131). We are considering here intelligent systems that are awake for an asynchronous duration extending beyond the professional's initial entry of data.

With these more intelligent systems, health care needs to encourage modes of abstraction for all health care workers at whatever level or role; indeed all healthcare stakeholders must be able to test and improve these intelligent technologies. Usage determines function and form, even if not in the simplicity of Brin's (1995) science fiction world in his book, *The Practice Effect*. Abstraction is an important tool for individuals and discourse community members in improving intelligent technologies. Consider Eric Kandel's (2006, p. 381) comment in his autobiography, *In Search of Memory*, about how his form of abstraction and model building, that of reductionism, has its uses and limits when approaching complex systems.

RISKS

Hus will need to be aware of the limits in our future. Is knowledge processing a P or NP complete problem, (see NP-complete, Wikipedia, 2009; NP standing for standing for nondeterministic polynomial time) that is, which problems when they scale cannot be calculated in a reasonable amount of time? When will systems become overly sensitive to initiation conditions? When will collaborative behavior devolve into chaotic conditions? Will initial soft hu emotional and social awareness be mere facades? Will new complex systems of systems have hidden cliffs discovered during perfect storms?

The use of terms, such as NP complete, has usually been restricted to computational technologies. In a hu resource world, the issue also applies to whether humans are computationally limited. Will soft hu intelligence overwhelm wet hus with an information overload? Is there a limit to the complexity of systems that wet hus can build? The existence of specialists indicates a common acceptance of our limits. Specialists focus on a specific area. The challenge will be for specialists to contribute to general teams without losing the edge of their specialty. A further challenge is when specialists have kept their edge are they are able to communicate with generalists, both to receive information and to provide it.

The underlying challenge for healthcare workers in engaging with intelligence (wet, soft, or hard) is an observation discovered before 1960 by Calvin Northrup Mooers. A native of Minneapolis, Mooers in 1948 at the Massachusetts Institute of Technology coined the terms "information retrieval" and "descriptors." By 1959, Calvin had published Mooer's Law that an information retrieval system will tend NOT to be used whenever it is more painful and troublesome for a customer to have information, than for them not to have it (Austin, 2001). Where an information retrieval system tends not to be used, a more capable information retrieval system may tend to be used even less.

Intuitively, I would consider a system that is more capable to be less troublesome. But Mooers' insight is that intelligent systems are troublesome to users who do not thrive on the challenges and the cost of a continuous flow of new information. If I prefer my internal static model of my world, maintained with minimal effort, new information from the cornucopia of information systems is bothersome, a form of information overload, screaming in my silent sanctuary.

Health care will need to continue to monitor itself for behavior that indicates that its members are avoiding information because new information (not just the technology's interface) is troublesome.

Health care will need to value actors in the healthcare system for what they can learn, not just for what they know. Does the hu tolerate multiple points of view? Is the hu able to participate in mass collaboration and other collective processes? Can the hu understand and model using systems thinking? Can the hu tolerate control in a different place? Will the hu contribute to the evolution of the design of health care? Can the hu (wet, soft, or hard) author systems and provide feedback for improvements?

When healthcare hus are someday mature will we consider them to be wise? Certainly they will be useful and within local options and choices contribute to the rules which govern global impacts no matter what the actor's role and need. The trick is not, access or not to a computer or technology, but to useful tools within the area of access.

LEARN ABOUT CHANGE AND INTELLIGENCE

On top of all this is the challenge to understand emergent behavior using systems thinking. Increasingly, invisible surfaces such as a brain-computer interface coupled with intelligent technologies that are emotionally sophisticated and socially aware will need healthcare "meta" workers, who can abstract outside of immediate tasks conceptual models of their individual situations. The complexity of new medical and bio-genomic knowledge will still require us to reason within reductionism, but we are identifying questions, such as, "how an objective phenomenon, such as electrical signals in the brain, can cause subjective experience, such as pain" for which we will need "a significant change in methodology" (Kendal, 2006, p. 381).

In an environment of constant and accelerating change, driven by the need to reduce the cost of transactions, health care is a complex adaptive system that requires all actors and stakeholders to be wise and follow the serenity prayer where one changes what one can, accepts what cannot be changed, and is wise enough to know the difference (Serenity Prayer, Wikipedia, 2009).

Software developers are increasingly bringing users into the evolving design of software with subject matter expert authoring interfaces and web analytic feedback loops. Also wet hu actors (patients and workers) increasingly vary in their cultural boundaries, with some trading privacy for convenience and functionality. Cultural differences imply something other than simply privacy concerns, but also the way in which illness may be diagnosed or treated, or the way in which consumers and providers interact (Farrall, 2008). New hybrid systems will vary their mix in order to meet personal and cultural preferences. To all this we will add the team and activist roles clustered within the children's story of *Stone Soup* (Brown, 1986): prosumer, socially aware, seeking and creating meaning, within the shadow of competitive advantage dynamics, and made visible with web analytics feedback loops (Tapscott & Williams, 2008).

PRIVACY

A feature of soft hus is their persistence, their obsessive persistence. They can stare unblinking hour after hour at the stars of the universe, where wet hus would need coffee breaks, lunch, and vacations. Soft hus will monitor continuously. Thus, when we are seeking recruits for evolving a new set of responsibilities, roles, and best practice standards, we should consider soft and hard hus. In smart houses, intelligent systems can watch for preventative opportunities and risks. Health care can now work with individuals as pre-patients and post-patients. From cradle to grave – all the time – while individuals sleep or are awake, intelligent systems can apply and evolve early prevention and reduce the cost of learning healthy habits by applying them continuously. These intelligent systems can provide longitudinal raw and interpreted information for specialists and generalists alike, all while preserving the privacy of the individual.

Consider what such flows of information would mean for controlling the complexity of current health care challenges. No longer will workers drop calls, forget tasks, or inadvertently act inconsistently. In the same way semantic net systems monitor actions to look for actions that, in the context of a specific patient, break local hospital best practice rules (McKesson, 2009). Deaths and damage due to these slips will disap-

pear. Instead we will dwell in complexity arising from rules embedded within a variety of hu resources: swarming, cooperative, and problem solving.

Returning to the privacy of all stakeholders, including patients and their continuum of care, each individual, probably in cohorts, will balance privacy with convenience and functionality. As systems become more intelligent and aware without forgetting the details of patients and all the actors' actions against a backdrop of best practice, each individual stakeholder will, in one sense, have less privacy. Where individuals are comfortable in drawing the line between privacy and functionality, or even convenience, will depend certainly on situational factors of how the reduction of privacy is handled, but more so on the individual's sub-culture (Berton, 2006).

The healthcare industry is overseeing the embedding of technology into human bodies, including brain-computer interfaces. We are bypassing eyes for reading and ears for hearing as ways to learn from and to communicate with intelligent technology. In home entertainment, humans through Wii™ use body movement to communicate commands to the computer in virtual spaces. Tivo® dissolves time, Wii™ dissolves space.

Can it be a surprise that Phillip Armour (2009) in an article to software developers discusses new formats for creating software? Armour discusses the ontology of paper, that is, the very use of print on paper or print as expressed in electronic formats and metaphors and surrogates for paper, bring with them a context of meaning for whatever knowledge is communicated within these environments. For example, concepts read as text on paper are always in sequence. Reading is a control sequence activity and allows for only single tasking.

Unlike health care which is such a team process, Armour (2009) urges software developers to use knowledge software to produce more knowledge. Armour reminds us that most of the creative activity in software development occurs alone inside the brain of a software developer. This isolation, this avoidance of using intelligent soft and hard hus as partners, as creative team members, cripples our ability to revolutionize our industries. If we play among all hus in providing and improving health care, then wet hu limitations will be compensated for by our hu partners as wet hus will compensate for their limitations. Few wet hus could win a race with soft hus to sort the contents of large telephone directories in phone number order. Few soft hus could win a race with wet hus to recognize general patterns.

Consider what it will be like to perceive or ingest information from intelligent technology not through readouts on dashboards or on flat screens, but to visualize this information in three-dimensional models. Consider what it will be like to perceive flows of information (raw and interpreted) directly into our brain. When humanoids began using tools to process food, their teeth no longer needed to be huge and costly to maintain. We outsourced processes and functions outside our body. So too here, we will outsource to soft and hard hus the filling of prescriptions in a pharmacy or delicate surgical operations. My guess is that most of this new experience will be accumulated bit by bit, more and more quickly over the next twenty years. But all hus will find in time which scripts are relevant in which situations with differences built in for specific actors.

CONCLUSION

Health care is a complex adaptive system in which the play of intelligence among humans, software, and robots will be both a delight and productive for all hus. The exercise of intelligence by intelligent entities is…I am not sure we have found the correct word yet…suitable, pleasurable. In that sense all hus will focus on play with pleasure.

The play will intensify both the humanity and the intelligence of all hus. For the improved qual-

ity of health care resulting from all this, it will be important for wet hus to continually learn about change and intelligent technologies and tools. Increasingly, we will value, in all healthcare workers and actors, curiosity and passion, probing the smart technologies, looking for the sweet spots.

Above we referred to the ideas of Phillip Armour (writing for software developers) about using (really using) intelligent software to build software and knowledge systems that software could automatically apply. Near the end of his article he reminds us about the relationship of steam engines to the Industrial Revolution. "The Industrial Revolution did not occur when we built steam engines, it occurred when we used steam engines to build steam engines" (Armour, 2009, p. 24).

HR, Human Resources, is today about management of intelligent resources, that is, humans. As software and robots move toward intelligence consider that HR should also manage these resources. Hu Resources would manage wet, soft, and hard hus under two principles:

1. Equivalence: When and where can one form be used for another and where are hybrids and partnerships appropriate? The United States military asks this today.
2. Play: Humans in tomorrow's work environment will need to relearn how to optimally work with these new emerging intelligences through play.

The metaphor for the interaction of wet, soft, and hard hus in health care is not that of the American folk hero, John Henry, competing with a new-fangled steam engine, a steel-driving machine, winning, but at the expense of destroying his heart and dying. The correct metaphor is the millennia-old relationship among John Henry, the wielder of a hammer; his wood and steel hammer; the colleague who holds and turns the steel spikes; and the steel spikes, plus the transportation revolution that needed the rock John Henry smashed and moved, smashed and moved. John Henry melding with steel continued a millennia-long relationship stretching back to the ancient Hittites and their fashioning of iron tools in the Ancient Middle East. So, we wet hus will meld with soft and hard hus to fashion stronger solutions by co-evolving, by covering each partner's weakness with a partner's strength.

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Chapter 83
Emergent Dynamics of Workforce Program Reductions:
A Hybrid Multi-Level Analysis

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ABSTRACT

This paper reports on research that explores designing a hybrid system dynamics/agent modeling (HSDAM) simulation methodology to evaluate potential effects of a new human resources policy in a company. The study measures the effect of changes in the company's pension policies on individual employee retention, promotion and employment longevity. The Delphi method for elicitation of expert views was used, as four expert panels composed of human resource specialists and general managers participated in model design and predicted employee behavior. The model integrates multi-level organizational data inputs from macro-level business data to granular individual-level employee information. Each simulation run used four years of workforce longitudinal data at the start. Initially, the expert panel predictions did not validate simulation results. However, once alteration of a key model parameter recalibrated individual employees as more economically rational, later runs provided strong support for the model and modeling approach. The simulation results confirmed, among several expert panel predictions, that setting a policy that decreased the likelihood of employee willingness to retire due to replacement income concerns could lead to other consequences with potentially adverse strategic implications for the firm.

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INTRODUCTION

System dynamics models often use a top-down design strategy to test the impact of organizational policies on long-term patterns of performance. Hines and House (2001, p. 4) note, "from a system dynamics viewpoint, a company *is* a system of policies. A company's particular collection of policies gives the company its unique identity—an identity that survives employee departures, spatial relocations, and corporate reorganizations. Functional areas such as marketing, finance, and human resource (HR) management promulgate policies that interweave and branch across and throughout the company. Over the past several decades, the potential impact of policies on company performance of HR decisions has been underestimated, creating unintended and undesired consequences.

In one such case, studied here, possible effects of a change in the company's retirement policies and other HR conditions upon employee willingness to continue their employment with the firm worried its management. The analysis prospectively considered the possible effects of making changes in the firm's pension policies. Most HR management research has ignored the importance of employee pension adequacy, and instead focused on conventional workforce motivators to increase employee commitment to continued working. These factors may include addressing importance of working to employees, flexibility of working arrangements, interests outside of work, plus supervision and work environment issues (Shacklock & Brunetto, 2011, p. 252). This paper proposes that such underestimations of the importance of human resources policies, and specifically employee retirement plans, result from three major causes: 1. organizational distance between cause and effect; 2. miscalculation of the effects of aggregating individual decisions; and 3. time delays between cause and effect. Historically, there has been an absence of both strategic and systems thinking in HR management practices. However, there is mounting evidence of a shift in the direction of greater use of more systemic strategic practices.

In recent years, scholars have advocated taking a more strategic approach toward managing people in organizations (e.g., Becker, 2001). However, conceptual and methodological barriers have hindered efforts to do so. There is an increasing agreement among researchers that strategic human resource management (SHRM) necessarily involves three levels of organizational analysis: 1. macro, 2. micro, and 3. meso. Macro analysis concentrates on firm strategy, production and finance and contextual factors, while the micro level focuses on the attributes, needs, and contributions of individual employees. In between these two levels is the meso level, which focuses on the firm's management programs – here those of HR – that translate between the other two levels. Unfortunately, most HR research is limited in scope and tends to ignore the interactions among these multiple levels. Only a few scholars (e.g., Jackson & Schuler, 1999) have sought to bridge these levels, and their research does not offer testable hypotheses. There has been an absence of HR methodologies capable of systematically measuring critical SHRM variables and testing the effects of policies across multiple levels of the firm. A major goal of this research is to begin to redress this gap by proposing that multiple levels of strategic policy analysis be adopted by HR managers.

LITERATURE REVIEW

Levels of Organizational Analysis, and Limits of Current Research

Why does a comprehensive SHRM study necessarily involve all three levels of analysis and why does the methodological gap exist? Bowditch and Buono (2005, p. 236) note, "the main focus of organizational behavior … has been on individuals, small groups and their leaders" due to the

backgrounds in psychology of early researchers and the social context that shaped early research traditions. Within a SHRM context, micro-level theorizing explores individuals' motivations and the effects of their personal abilities. Once sociologists began studying these issues, theoretical analyses were more likely to adopt a "top-down" perspective. As related to SHRM, such macro-level theories examine employers' cost structures and competitiveness in product and service markets. The meso level of analysis is less well examined. House, Rousseau, and Thomas-Hunt (1995) define it as the simultaneous study of at least two levels of analysis involving the linking processes that connect them. A number of researchers now have focused on the bridging structures and processes that compose a firm's HR function and subsystems. These translate between individual employees' characteristics, needs, motivations, and firm-level strategies. The need to adopt a systems perspective to interconnect these variables is clear.

SHRM studies necessarily involve all three organizational levels and should treat them as being interactive elements of a system. SHRM research must take a longitudinal perspective because data and relationships resulting from these interactions emerge over time. Traditional SHRM research methods do not employ such a systemic paradigm. Jackson and Schuler (1999) review SHRM research and conclude "…the available theories are admittedly inadequate. Each deals with pieces of the larger phenomenon and none addresses the whole domain of HRM in context" (1999, pp. 3-9, pp. 17-19).

Taking a More Systemic Approach to SHRM

Over the past decades, a number of scholars have used a "systems approach" to describe phenomena at the micro or meso levels of SHRM research (e.g., Campbell, Dunnette, Lawler, & Weick, 1970; Dreher & Dougherty, 2002). However, they do not meet the methodological challenge of testing and subsequently disconfirming these theories. In summarizing this research, Wright and McMahon (1999, p. 61) note these studies "…have tended to focus on cross-sectional studies that only give a glimpse of the relationships among practices at a particular point in time. [Models] must be expanded to consider the relational feedback from the environment and to discuss the internal HRM adjustments in response to this feedback." Forrester (1961) developed systems dynamics (SD), which employs rigorous modeling of systemic structures that generate intended or unexpected performance patterns over time. Systems researchers, such as Senge (1990) observe that unintended consequences arise through interactions of *system structures* and policies. Such systems may be a firm, a function, a process, a multiple firm enterprise, or even society (Meadows, Meadows, Randers, & Behrens, 1972; Forrester, 1973). There are many tools available for performing such types of systemic analyses. For example, conventional structural systems elements (e.g., feedback, delays, nonlinear relationships) of system dynamics modeling are appropriate for developing models for gaining insight into SHRM policy-driven dynamics. Both material and information delays (Sterman, 2000, pp. 409-412) are found in SHRM problem situations. Time delays occur in the maturation of employee skills, and time passes from decision-making to implementation of policy. Such delays affect the consequent adaptive expectations of firm participants. Social and policy science often ignore feedback processes and their effects they cause (Richardson, 1991; Tesfatsion, 2002). While HR analysis frequently ignores strategic and systemic considerations of interest to organizational executives, SD provides a more balanced perspective.

SD analyses typically concentrate on strategic concerns of top management (Coyle, 1996, p. 15) when modeling a firm or its HR subsystems. SD models often treat individual agents as being fundamentally homogeneous within a "stock". However, individual employees are multi-dimen-

sionally complex, leading to potential behaviors that are difficult to accurately characterize using a SD "stocks and flows" model. Needs may vary from worker to worker in important ways, depending on their combinations of personal and professional characteristics. To account for heterogeneity in data sets, SD software permits the tracing of *aging chains* and simultaneous *co-flows*, as well as the use of *data subscripts*. Repeated use of these techniques quickly becomes cumbersome as the number of individuals' dimensions of interest grows; the SD approach really does not aim to "do" heterogeneous individuals intensively. Labedz and Stalker (2008, p. 5) suggest that "it appears that models which use even a small set of non-randomly-distributed employee attributes will *always* require a supplementary data storage mechanism." An alternative to using the equation-based system dynamics approach for modeling is found in agent-based modeling.

Agent-Based Modeling and Simulation

In organizations, employees may be viewed as being *agents* following a particular set of decision rules or a broader game plan designed to achieve a particular outcome. Individual agent behavior is often seen as being the product of individuals employing multiple interacting decision rules (Holland, 1995, p. 7). Agents interact with each other as well as with their environment. When the collective behaviors of social agents, such as ants, bees, or employees are observed it often becomes possible to recognize various emergent patterns of behavior that may not be representative of any individual or small group. Holland (1998, p. 117) has noted that even though the rules employed by any single agents in a system may be simple, collectively the resulting alignment among their individual behaviors generates emergent patterns that tend toward being complex. This evolutionary process results from non-linear dynamics that are inherently confounding and pose extreme challenges to analysts seeking to indentify causal patterns. Computational agent-based models (ABM) enable the causal patterns and policies that generate this emergent behavior to be more clearly understood. Borachev and Filippov (2004) argue that ABMs are more efficient than other modeling approaches for modeling systems that are defined by active agents, such as people or animals, than are system dynamics models.

Parunak, Savit, and Riolo (1998, p. 1) describe agent-based models as consisting of "a set of agents that encapsulate the behaviors of the various individuals that make up the system, and execution consists of emulating these behaviors." They propose that agent-based modeling competes with equation-based approaches, such as system dynamics. Kirman (1992) argues that reducing agent characteristics to one of uniform sameness is usually unjustified and causes misleading conclusions. In practice, firm-level consequences can emerge from individual effects in ways that evade SD modeling practices because salient individual characteristics, and their combinations, do not always follow normal distributions across employee populations. Further, individual interactions may lead to emergent social activity (e.g., growing interest in union representation) that is unaccounted for by existing structures. Some individual characteristics simply require continuous visibility, to permit managers to identify multiple workforce dimensions of strategic interest. Agent-based modeling focuses more on individuals' interactions, modeling and examining the "global consequences of [their] individual or local interactions…" (Scholl, 2001).

SD permits modeling of the structures, behaviors, and control of systems, especially at an aggregated, macro-organizational level of analysis, e.g., firm level. SD and agent-based modeling are distinct but complementary methodologies (Parunak et al., 1998). Both have supplied partial "solutions" in examining SHRM problems. SD approaches, such as by Petrides and Dangerfield (2004) [generations model, nation-state pension

funding], Bayer, Gann, and Salter (2004) [workload fluctuation], and Hafeez, Aburawi, and Norcliffe (2004) [recruitment to homogeneous "skill pools"], do not model individual actors at all. ABM has been used to simulate other HR issues, including hiring and cessation of employment (Tesfatsion, 2001), organizational withdrawal behavior by employees (Hanisch, 2000), and effects of pay for performance systems (Schwab & Olson, 2000). Each of these models created individual representations defined by limited sets of dimensions (e.g., degree of job experience or of developed competency, focus on a single decision-making criterion) that change state. Although micro-level agent behaviors are important observables, they are *situated behaviors* within the larger, dynamic macro-level context of the firm. They also interact with HR management practices at the meso level of analysis. While such agents naturally exhibit some different state values, they usually do not exhibit different values over a very wide range of variables.

Because both approaches explain dynamic, nonlinear social behavior, albeit from different directions (Scholl, 2001; Rahmandad & Sterman, 2004) and others have called for cross-study and joint research between them. The modeling approach used in this research provides for a more heterogeneous view of individuals while still relying on conventional SD processes. Since both SD and ABM approaches offer unique benefits for capturing emergent dynamics of systems it is worth exploring their potential for working together in combination.

Moving Toward HSDAM for SHRM Analysis

Several scholars have combined agent-based and system dynamics models. Größler, Stotz, and Schieritz (2004) designed a small Vensim model to provide internal decision-making schemata to supply chain agents modeled using the RePast agent software. Their approach provides for a single distinguishing attribute among manufacturers who are modeled as agents. Akkermans' (2001) SD model incorporated supplier and customer agents. These agents differed only in "the degree in which they emphasize the short-term or the long-term performance of their counterparts…" in making contracting decisions over time (Akkermans, 2001, p. 4). Geerlings, Verbraeck, de Groot, and Damen (2001) modeled the manpower planning process in the Royal Netherlands Navy. Their purposes too were somewhat limited. Simply, their model focused on achieving a timely matching of supply (sailors' available competencies) and demand (aggregate competencies needed to crew a vessel). It was not relevant to the modelers' purpose that individuals have any other distinguishing characteristic (e.g., gender) or attribute (e.g., motivation), and none was tracked. The limited expectation for this model was well- served through a flow mechanism: only the ebb and flow of homogeneous sailors were of interest to the client.

As Rahmandad and Sterman (2004) and Sterman (2000) note, the adequacy of any system model (ABM or SD alone, or a combined approach) is contingent on the purpose of the model, the variables of interest, and the levels of precision required. For the current research, a hybrid system dynamics / agent modeling (HSDAM) methodology will serve better than a "pure" SD or ABM one alone. Further, this research continuously observed many heterogeneous characteristics of employees and necessitated the extension of both the scope of HR system models and agent descriptions beyond the ones reported to date. The dynamic complexity of the issues faced by the subject firm in question warrants such an approach. It is typical of the multi-faceted, multi-level SHRM challenges that confront HR leaders. The specific methods used to design such a multi-level SHRM model follow.

METHODS

Sterman (2000, pp. 85-105) identifies five major steps in the SD modeling process: 1. problem articulation and boundary selection, 2. formulation of dynamic hypotheses, 3. formulation of a simulation model, 4. testing, and 5. policy design and evaluation. He advises that modeling is an iterative process, leading to reframing the succession of steps as a set of phases. The methodology used in this research follows these recommended steps, but with several divergences.

Problem Articulation and Reference Modes

This step asks, "What is the issue of greatest concern to the client? It defines clients as "the people you must influence for your work to have impact" (Sterman, 2000, p. 84, p. 87). This research commenced in discussions between the primary researcher and the vice president of human resources (the "client executive") of a mid-sized North American industrial company, a subsidiary of a European-based global firm. This executive identified concerns about a prospective change in the retirement benefits that the firm offers its nonunion, U.S.-based employees. The subsidiary was considering these policy changes in order to deal with excessive and unpredictable annual employee benefits costs. He was concerned that unintended consequences might emerge over time in other human resources areas, if the firm made changes to the retirement plan. Due to the nature of the request from this top executive, the modeling process has taken a strategic future-focused orientation designed to anticipate an array of potential problems that could arise resulting from policy revisions.

In this research, the problem formulation process is prospective, as the problematic behaviors had not yet happened. The HR domain is sufficiently complex that problems may occur indirectly, far from the retirement benefits area of responsibility, or well off in the future. The client executive sought to explore a prospective problem that, if effectively addressed through policy changes, is preventable. SD modelers generally look to develop a reference mode, which is a set of data that describe the behavior of key variables as the problem arose, and how it might develop still more in the future. Reference modes need to extend far enough back to trace the emergence of the problem and "far enough into the future to capture the delayed and indirect effects of potential policies" (Sterman, 2000, p. 90). They needed here to trace variables in the areas of human resources and general management concerns typically considered as being "remote" from the arcane, specialized area of retirement benefits.

Two sources served to develop retrospective reference modes. First, the client provided corporate strategic plan information, data from its general and financial management information systems, and several longitudinal human resources databases covering all individuals who worked for it at any time during a four-year period. The database included both its ongoing workforce and those who left it for any reason during that time span. When aggregated across segments of the workforce, the individual-level data provides such firm-level parameters as: 1. rates of hire (monthly and annual), 2. changes in compensation expense, and 3. retirement rates. The firm's current workforce totaled 5,500 employees, of which approximately 30% are salaried nonunion employees. Because of data quality issues, the number of individual subjects is approximately 3,100, tracked over a four-year period. Taken together with broader industry and regional data obtained from public secondary sources, these provide many of the parameter values required to model historical and prospective HR dynamics of the firm.

Boundary Selection and Expert Delphi Panel

Common SD modeling practice looks to develop working simulation models through an iterative process. Sterman (2000, pp. 79-105) details and summarizes accepted, "good" modeling practices. Articulation of the boundary of the problem commenced through discussions with the client. These helped in identifying key variables at multiple levels of analysis. This aided the formulation of a theory of the possible problematic behavior that spanned them. The dynamic hypothesis focused initially at the macro-organizational level where concerns about continuing affordability of aggregate employee benefit costs gained the attention of the firm's senior management. Their concern was translated into proposed reductions at the program (i.e., meso) level of analysis in future benefits accruals. The reductions would affect dissimilarly situated employees and prospective employees differently, however. Some effects might *seem* directly related to the reductions, but others only to bear an indirect and delayed connection to them.

As Sterman notes (2000, p. 57), it is common for SD modeling efforts to include interviews of many individuals within an organization, to obtain their qualitative and quantitative observations about the modeling problem and the system in which it resides. Because in this case the problematic behaviors have not yet occurred and, if they do arise, may occur in "remote" areas of the SHRM domain, we concluded that we needed to tap additional expertise beyond that held by the firm's HR staff. In addition to the client executive of that subsidiary, we sought input from human resource experts and general managers outside the company regarding expected future behavior. They identified what problems might emerge and what potential patterns of emergence we might observe.

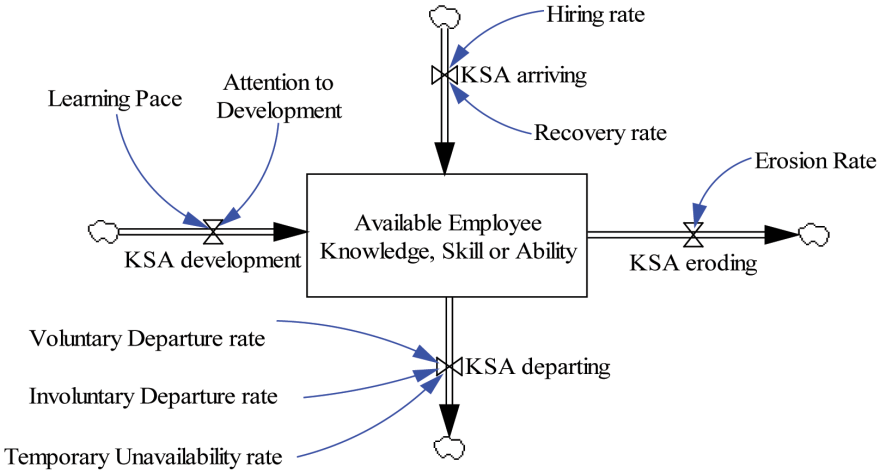
This research makes extensive use of the Delphi method (Dalkey & Helmer, 1963; Adler & Ziglio, 1995). In the absence of empirical data relating to consequences of prospective SHRM actions, four "Delphi panels" of such experts were established. Their charge included: 1. suggesting boundary conditions, 2. providing prospective reference modes, and 3. helping to identify both the dynamic operation of and the interconnectedness among the "remote" areas of human resources management. Additionally, three specialist Delphi panels were created to analyze particular aspects of the anticipated problems.

Work of the Three Specialist Panels: Formulation of the Simulation Model

Eighteen external human resources experts and general managers drew upon their broad, lengthy and complementary experiences to help define the SD model's systems structure or to identify the scope and pattern of any emergent unintended consequences.

Eight of these experts participated in the three specialist panels. They developed the subsystems' causal loop drawings and stocks and flows models, which were then reviewed with the client executive for adequacy and perceived "fit". In one case, the *ability management* specialist panel was charged with identifying and then arraying their understanding of the processes by which a firm's stock of skills, abilities or knowledge change over time. They produced several "ability flow" drawings that combined causal influence as well as stocks and flow features. Figure 1 conceptualizes the stock or current supply of a knowledge, skill or ability (KSA) as the sum of two net flows. The flow depicted vertically inserts the individual capabilities of new employees who arrive at the firm, and subtracts KSAs that become unavailable through an employee's departure or temporary unavailability. The horizontal flow depicts an individual's growth in KSAs through learning, as well as the oft-overlooked decrease in this stock through erosion, including by this both forgetting what one knows and having a particular

Figure 1. Composite "net flows" model of KSAs



knowledge, skill or ability become obsolete for the employer's purposes.

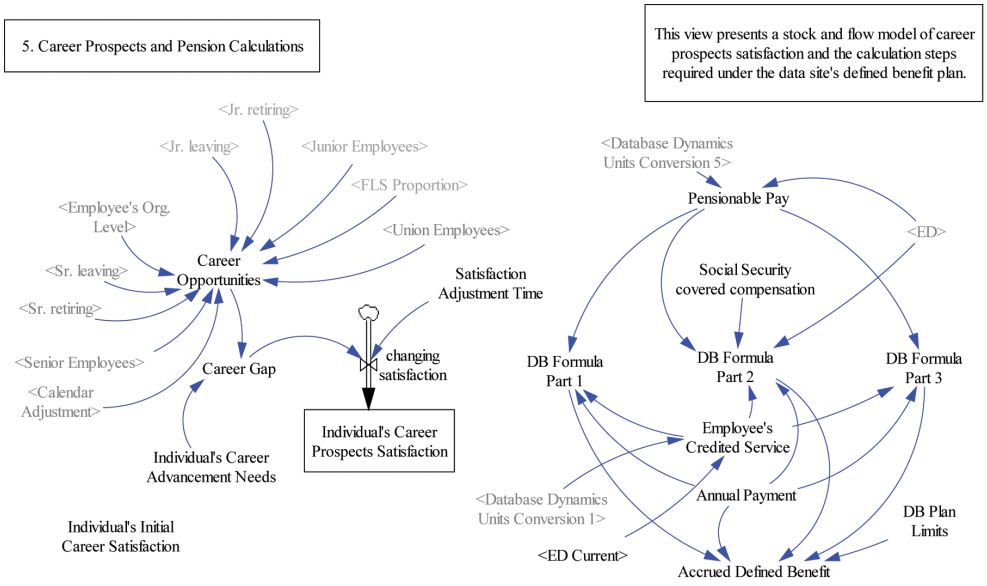
It is important to observe that Figure 1 depicts the stock of KSAs at an individual or a workforce level of observation equally appropriately. In many SD models, stocks of employee abilities are modeled at the workforce level, as when an aging chain is used to track longitudinally the stocks of apprentice, qualified and advanced KSA levels across otherwise-assumed homogeneous workers. The methodology here introduces the ability to trace an aggregated KSA stock as the sums and differences of arrivals, departures, learning and forgetting, observed at the level of individual employees.

Why should this added hybrid detail be important? With distributions of its workforce and hiring and promotion prospects along many and varied demographic and work-related dimensions, a proposed change in Total Rewards offerings may affect them dissimilarly. If so, the effects of departures, promotions and arrivals upon its aggregate KSA may be quite different from those, usually modeled in SD initiatives, as average metrics distributed across assumed-homogeneous workers. As detailed, Hafeez, Aburawi, and Norcliffe (2004), Aburawi and Hafeez (2009), and Geerlings, Verbraeck, de Groot, and Damen (2001) simulate workforce environments involving homogeneous talent pools.

The ability management Delphi panel also developed a traditional "aging chain" rendering of KSA supply, but added to it a co-aging chain or "co-flow" that begins to incorporate the dynamic relationship between KSA supply and the dynamic operational demands of the firm. While the ability management experts focused principally on the detailing the dynamics of the "supply" side of the KSA matching problem, whereas the *opportunity management* panelists worked to describe the "demand" side. They concluded that the unit of analysis for the Opportunity Management subsystem of human resource practice is that of the *position* within the firm. By contrast, the unit of analysis for the Ability Management subsystem is the *individual* who occupies or may occupy the position. This led these panels down parallel modeling paths. The relationship between their work involves paired comparisons, at sequential points in time, of attributes preferred for or required by the position and those offered by the individual.

Figure 2 presents two sub-models. On the left hand side, it models the changing stock of an individual's satisfaction with career prospects.

Figure 2. Career prospects and pension accruals



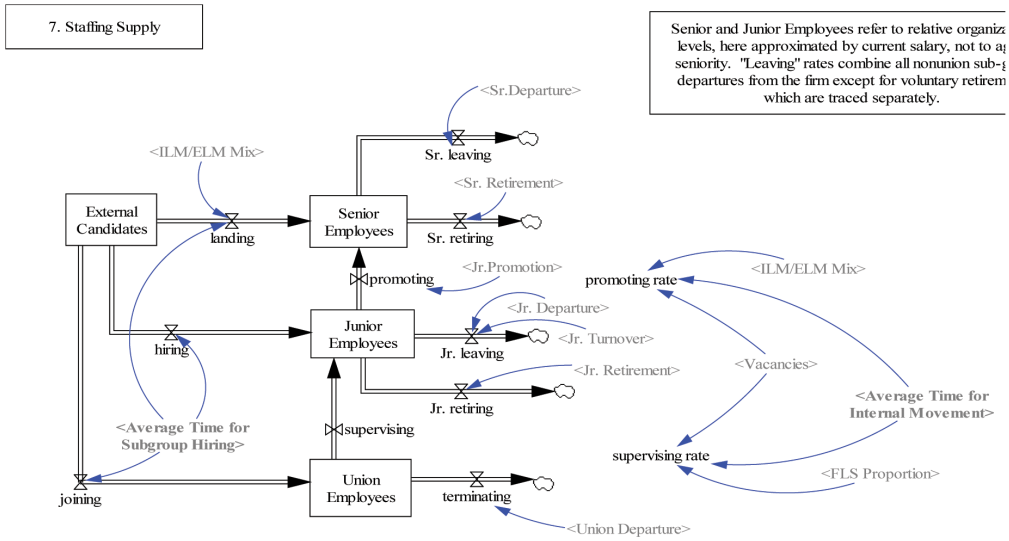
Note that the relevant organizational level is input on a person-by-person basis through a dynamic data-feed from "ED", the employee database constructed in support of this hybrid simulation. Career Opportunities are also affected by numerous inputs identified by the opportunity management panel. The right hand side of this figure presents the mechanism used to calculate the 3-part defined benefit pension accrual for each employee -- under the firm's nonunion plan -- consistent with inputs and review by the total rewards management Delphi panel.

Figure 3 sets forth a traditional aging chain formulation of employees. It begins with that small subset of union employees that agrees to promotion to junior-level supervisory status, and then from junior-level employees into more senior positions. Peterson models junior faculty promotions as perfectly mixed first-order processes, but describes full professors' retirements through third-order delays in order to approximate their generally extended tenures before retirement (Sterman, 2000, p. 486). Within each of its stocks of professors, the members have completely homogeneous characteristics, because this model does not require otherwise. We adopted this approach with modifications. In Figure 3, the several "average time" factors employ dynamic, yet homogeneous, average rates, but the "retirement" and "departure" rates do not. Between any two time steps (i.e., months) during the simulation, these elements count the actual terminations of employment, as they occur, in the employee database through individual-level entries of termination codes. In this exemplar instance and in others, the simulation presented here substitutes agent-level data for group average rates.

Modeling Individual Employees

A limited approach to agent modeling was employed by adopting a number of simplifying assumptions. This is due to the lack of availability from the client firm of many other employee- and organizational-level data elements beyond the substantial data it provided. Each individual employee, former employee and hiring prospect is modeled using his or her distinct properties including: 1. age, 2. gender 3. ethnic status, 4. pay, 5. retirement benefits, and 6. organizational

Figure 3. Employee flow into, up, and out of a workforce

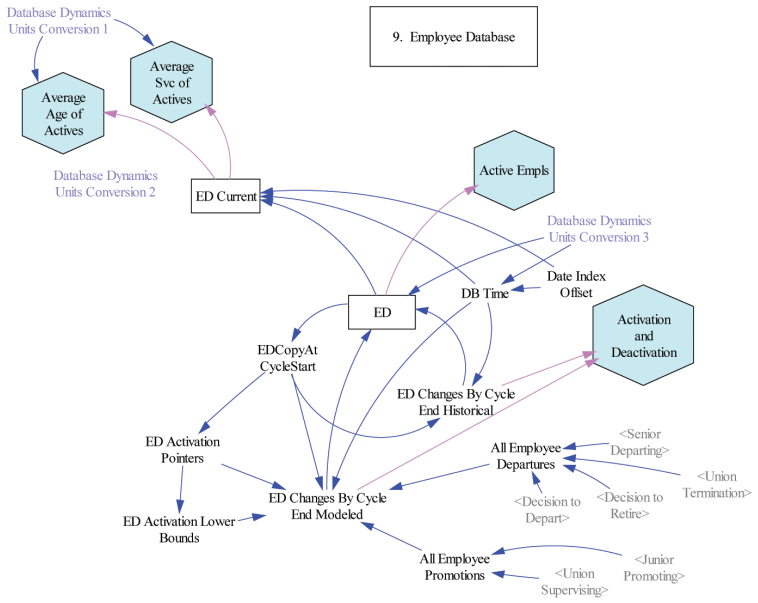


status. In the case of active and former employees, these personal data are input from the databases supplied by the company. In the case of prospects, they are supplied through an algorithm that takes into account the demographic characteristics of the local labor pools available to the firm at its two largest locations. Each employee is modeled as making a decision (to retire, quit, or stay) based on individual properties, including the adequacy of employment-related funds available to that person from time to time. Secondary effects of these individual decisions on one's co-workers (promotion opportunity) and the firm's labor pool (employment opportunity) and aggregate costs, in turn, are modeled. Regression analyses were done among employees' ages, salaries and replacement income percentages, and eta^2 analyses in which decision to terminate was the dependent variable. Inspection of the pattern of values for retirees indicated that decisions to retire had not been strongly associated with their individual replacement income percentages, notwithstanding the vice president's belief.

Individuals are complex organisms. Bar-Yam (1997) estimates the descriptive complexity of human behavior approximating the magnitude of 10^{10} bits of data, or more. Individual employees have many independent multi-valued properties, whether personal characteristics or firm specific attributes. These characteristics are relevant to the management of a firm's human resources. Beyond the characteristics numbered above, an individual's firm-relevant personal attributes include degrees of skill and knowledge, whether technical or interpersonal, and degree of match to current or prospective job responsibilities. Together, these attributes form the basis for defining the many data fields that a comprehensive human resource information system makes available to a firm.

Figures 1 through 3 appropriately sample the outputs of the three specialist Delphi panels. Much of the model structure likely is generic across American industrial companies. All told, more than 300 formulae-specified or test variables, and many more causal loops, comprise the model. All model formulas are presented in Appendix B, and captions describing their organization into 12 model views also appear as Appendix B (additional discussion of the hybrid mechanism may be found in Labedz and Stalker (2005, 2008). At the beginning of each simulated month, there is a complete write of micro-level data from the

Figure 4. The hybrid employee data exchange mechanism (simplified)



employee database (ED) into the simulation within Vensim. The simulation proceeds for one month and then, becomes interrupted. At the end of each simulated month, a complete reverse rewrite from Vensim to ED occurs. Figure 4 depicts the monthly data exchange mechanism.

Work of the Senior Generalist Panel

The fourth Delphi panel of ten senior HR generalists and consultants served in a different capacity than the others. Supplied by the primary researcher with extensive anonymous data regarding the client's SHRM context and workforce, the members of the fourth panel then shared their views, during a moderated asynchronous Delphi discussion, regarding likely unintended consequences of the policy revisions under consideration. They did not have access to the three expert panels' causal loops, nor the stock and flow drawings. The client executive earlier had identified more than ten possible unintended consequences of material reductions in non-union retirement benefits at his company. After comparison with the fourth panel's views, it was determined to test the five hypotheses set forth in Figure 5.

The chief concern of the executive stemmed from a potential slowdown in retirement incidence. He reasoned that employees, aware of their reduced pension amounts and operating as rational economic actors (Luce & Suppes, 1965), would choose to work somewhat longer before retiring, in order to "make up" lost monthly benefits. Their longer tenures would translate into the "right-shift" predicted in hypothesis 1. Many of the senior panelists shared this view. Each of the other hypotheses depends, in turn, for its explanatory power on this assumption of postponed retirements due to reduced replacement income.

Validating the Model and Testing the Hypotheses

Four preliminary behavior reproduction examinations were conducted before testing the hypotheses. After originally experiencing excessive "churning" within the ranks of junior employees, the introduction of a "Jr./Sr. ratio" constant, es-

Figure 5. Dynamic hypotheses tested through the hybrid model

1. The incidence of nonunion employee retirements after attaining age 55 will be delayed (that is, will "right-shift") to later ages;
2. Cumulative nonunion retirements will aggregate at a pace that is significantly slower than the firm's historical experience;
3. Voluntary terminations of junior employees at ages earlier than 55 will increase at a pace significantly greater than the firm's historical experience;
4. Per capita gross costs for salaries and company-provided medical benefits for active nonunion employees will increase to levels higher than those projected on the basis of the firm's historical experience; and
5. Percentages of "diverse" employee nonunion populations will not increase significantly from their current representation at the data site.

sentially a correction reflecting management span of control (Urwick, 1956), finally established initial model equilibrium conditions. Active junior employee counts produced a coefficient of variation of 0.48% following this structure assessment test. The next test under extreme conditions used methods suggested by Sterman (2000, pp. 869-870). For example, setting a model "switch" to stipulate that no employee could long be satisfied in his or her job should cause the modeled firm to exhaust its pool of 10,000 initial external job candidates precipitously, and it did so only 30 months into the simulation. In database replication testing, the various simulation-recreated historical values were then collected and compared to firm-supplied data. R^2 values relating to key headcount values ranged from 0.84 to 0.96. Data were decomposed wherein data series' mean square errors were calculated. It was determined that almost all error represented UM, or slight model bias. Finally, further model refinements were made after reconciliation with historical data. Ratios of mean historical data to refined monthly model outputs across key headcount variables ranged from 0.98 to 1.05. The equilibrium model was tested for appropriate behavior in extreme conditions, by altering key variables dealing with individual career decisions and employee flows.

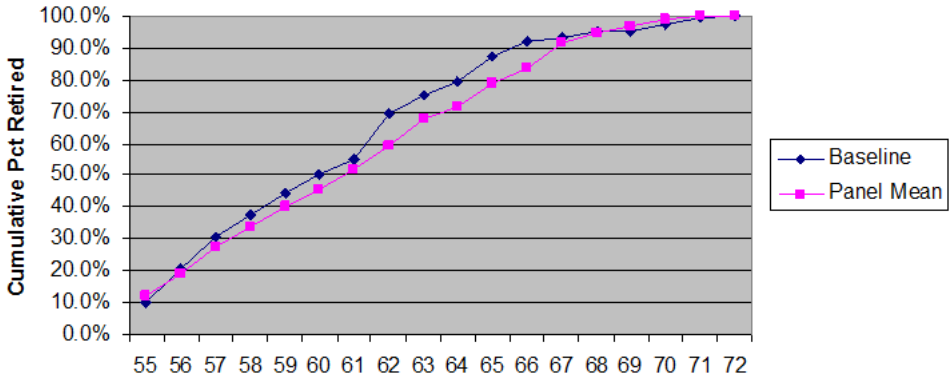
For hypothesis testing, we ran a 16-year simulation (4 years historical and 12 projected) using Vensim in a processing mode as described. The hybrid approach permitted calculation and sharing of each variable's values (e.g., each individual's current age) across all of the monthly time steps. It permits policy design and evaluation through the comparison of projected behaviors of a firm and its heterogeneous workforce over time. The investigations it makes possible exhibit attributes of both "true" pretest-posttest control group and "quasi-experimental" before-after experimental methods. In the base case, behaviors are simulated extrapolations from the historical data provided by the client with adjustments. (Data adjustments are stipulated explicitly in the simulation documentation.) We present and discuss the results of hypothesis testing in the next sections.

RESULTS

Historical Data and Panel-Predicted Data

Figures 6 through 10 present time series data of the actual (or trended as indicated) results, and summarized predictions of the fourth Delphi panel. The panelists were asked to assume the firm's pension policy was revised to reduce pension accruals for all employees after 2005. They assumed other business conditions remained constant. The

Figure 6. Reference mode: Panel predictions of retirement dates



predictions offer reference modes with which the simulation projections are comparable. Figure 6 presents baseline data of the actual incidence of retirements during the period 2000 - 2003.

This baseline depicts retiring employees as percentages of all eligible employees of that age -- whether they retired or not. These measures were provided in the fourth Delphi panel discussion, calculated annually, and summed. Figure 6 also displays the behavior of that measure in 2006-2010 as then predicted by the panelists. The panel predicted a "right-shift" in the behavior over time pattern. The panel expected the odds of retirement of employees to decrease at the historically important ages of:

- 62 (availability of unreduced early retirement pension),
- 65 and 66 (range of full retirement ages under Social Security),
- and to increase at each of ages 67 through 70.

Hypothesis 2 predicts cumulative retirements will aggregate significantly less quickly than the firm's historical experience. Figure 7 presents the cumulative incidence of the firm's retirements during years 2000 - 2003. It also displays the Delphi panel's prediction of behavior from 2006-2010. The panel predicted retirements would decline by 3.9% annually between ages 57 and 61, and then by 8.7% on average over the next five ages.

Figure 7. Reference mode: Panel predictions of cumulative departures

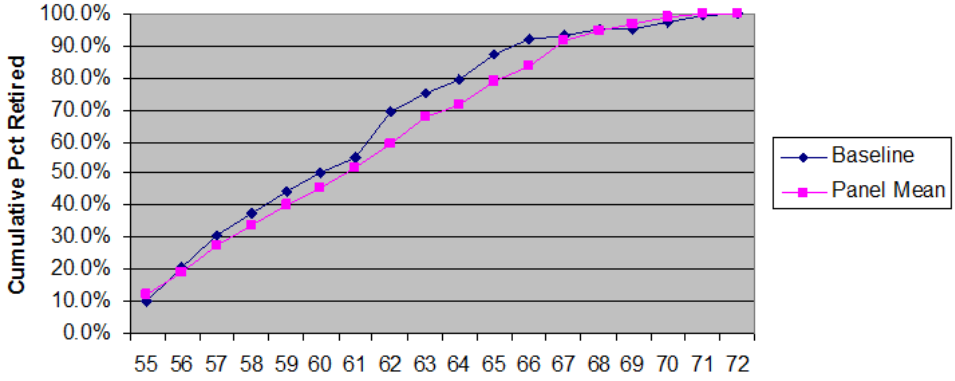
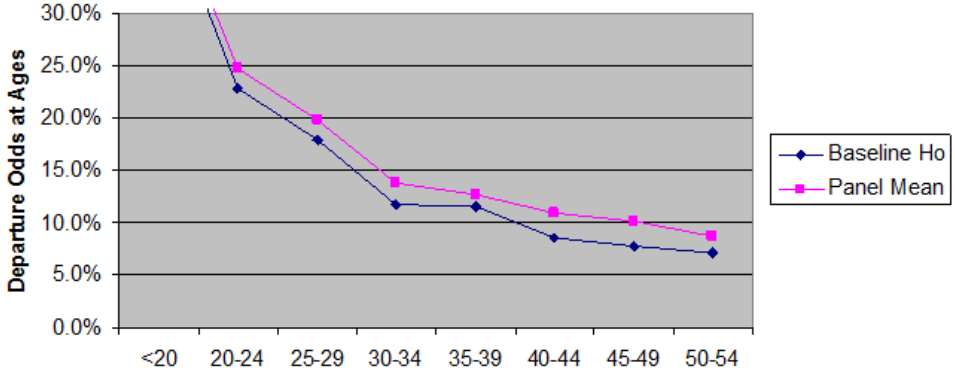


Figure 8. Reference mode: Panel predictions of early departures



Hypothesis 3 predicts voluntary terminations of junior employees at ages earlier than 55 will increase to levels significantly greater than the firm's historical experience. Figure 8 presents the cumulative terminations from 2000 - 2003. It also displays the behavior of that variable during the period 2006-2010 as predicted by the fourth Delphi panel. They predicted that voluntary departures in the age group of 20 through 55 would exceed historical levels by almost 2% (0.0187) each year.

Hypothesis 4 predicts higher-than-anticipated levels of health care and salary costs for active employees due to retirement delays. The panelists' predicted health care costs differed by less than 1% from the 12% annual trend. Figure 9 displays average salaries during 2000-2003, and those projected by the panelists during the period 2006-2010. The panel predicted annual increases averaging 4.1% of pay, 30 basis points greater than the assumed trend.

Hypothesis 5 predicts that workforce diversity percentages (i.e., of all employees other than white males) within the workforce will not increase significantly because the current workforce (more than half of which is White Male) will experience decreased turnover. To the contrary, on average the panelists foresaw increases of 200 basis points or more in the percentages of African American

Figure 9. Reference mode: Panel predictions of average salaries

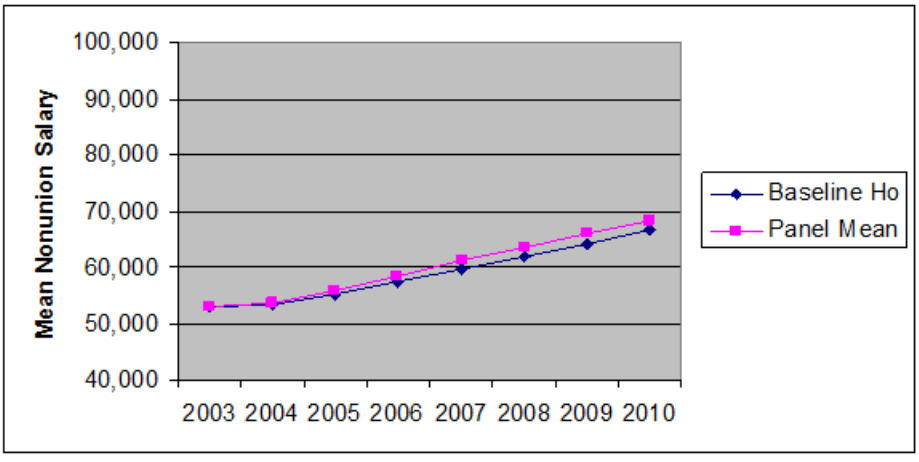
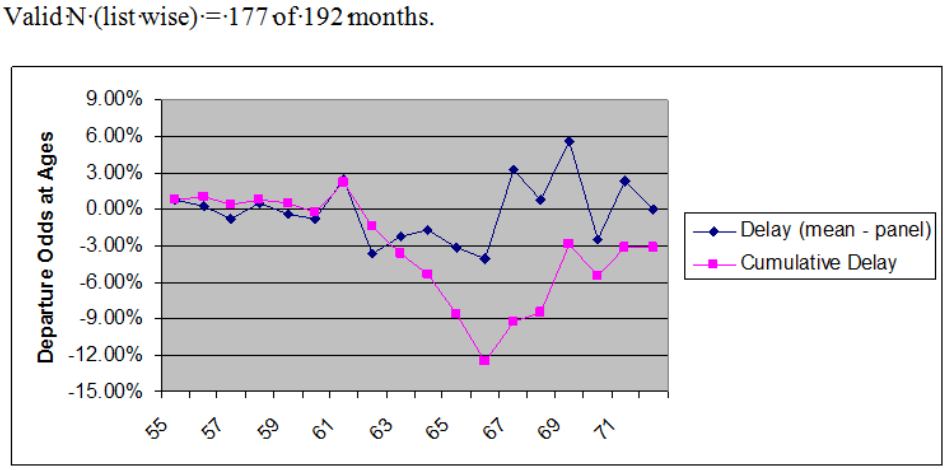


Figure 10. Retirement delays proposed by the fourth delphi panel



Females and Hispanic Males, at the "expense" of the White Males proportion (down 5.6%). Table 1 presents the baseline workforce distribution in 2003, the predictions for 2010 of the nine responding panelists, and the mean predictions.

Historical Employee Behavior as Rational Economic Actors

How have employees actually behaved? Was their decision making about retirement economically rational in past years? After all, the data presented in Figure 6 are based on attained age, not on perceived adequacy of economic resources in retirement. Data for years 2000 - 2003 suggest this decision is driven by one's replacement income percentage. If increased replacement income, as a percentage of one's pay, should predict increased willingness to retire, the null hypothesis is that there is no relationship between these variables.

One's decision to retire is a nominal, binary (i.e., leave or stay) measure. When one variable of interest is interval or ratio in level and the other is categorical, including nominal, eta^2 is an appropriate statistical test for association, whichever variable is considered as the dependent one. Eta

Table 1. Reference mode: Panel predictions of workforce diversity

		WM	WF	AAM	AAF	HM	HF
Baseline	**Ho**	**56.0**	**12.0**	**19.0**	**0.7**	**10.0**	**0.9**
	13	48.0	15.0	17.0	3.0	15.0	2.0
	14	39.0	14.0	20.0	10.0	13.0	4.0
	15	45.0	14.0	20.0	3.0	15.0	3.0
	16	50.0	11.0	23.0	2.0	12.0	2.0
	17	52.0	11.0	22.0	2.0	11.0	2.0
	18	62.0	12.0	16.0	0.7	9.0	1.5
	19	50.0	12.0	17.0	2.0	16.0	2.0
	20	54.0	12.0	20.0	0.9	12.0	1.1
	22	54.0	10.0	20.0	1.0	11.0	1.5
Panel Means		**50.4**	**12.3**	**19.4**	**2.7**	**12.7**	**2.1**
Difference		-5.6	0.3	0.4	2.0	2.7	1.2

defines a "perfect" relationship as curvilinear and defines the null relationship as statistical independence. Eta^2 provides the percent of variance in the dependent variable explained linearly – or non-linearly – by the independent variable – in either case eta will approach 1.0 (Siegel, 1956). Based on inspection of the data (Table 2), an assumption of normal distribution of values was not made, and so the F statistic was not further examined.

This is not to suggest that older retiring employees do not leave the firm with generally greater replacement income percentages than do younger retirees. The data suggest that they do. However, the percentage increases often are gradual from month to month, so that almost every retiree who leaves the firm with a particular income level has previously declined a series of slightly lower levels prior to leaving. The client executive speculated that reduced employee replacement income percentages would lead to delayed retirements. This view assumes a linear relationship that was not supported by the findings of this study. If this assumption is unfounded, the relevance of further analysis might ordinarily be questionable. The highest credibility is given to those cases wherein the simulation results corroborate the simulation data.

Retirement Predictions Based on Replacement Income Levels

Using the simulation permits, however, examination of a scenario in which the assumptions of the executive and the fourth Delphi panel are credited. The simulation contrasted three alternate scenarios based on likelihood of retiring among the firm's employees. Scenario One ("History") projects values based on the firm's data from 2000-3. Scenario Two ("Panel") is based on panelist-provided data, as stated in Figures 6 and 7. Figure 10 presents the annual and cumulative differences between these two arrays. We treat the differences predicted by the panel as resulting from the decrease in participants' defined benefit pension accruals, and workers' wishes to restore their levels of retirement security prior to leaving employment.

The hypotheses were also tested based on a third pattern (Scenario Three). Here, a retirement array was designed that (a) is based explicitly on levels of replacement income percentages, and (b) produces results comparable to the actual staffing patterns of the data site from 2000 through 2003. Replacement income was based on cohorts in 5% increments, and assigned to member's annual likelihoods-to-retire that began at four percent, for those in the 0-5% cohort, and which increased by four percent with each successive 5% cohort. Note that the panelists' hand-drawn estimates of departure odds were not required to net to zero, and over this eighteen-year period they do not. Table 3 presents selected values of this third pattern of departures.

When entered into the simulation, the odds of replacement income percentages operated to substantially reproduce the behavior of key macro-level model variables derived based on ages at retirements. Table 4 compares the mean

Table 2. Measures of association, 2000-3 retirements

Independent	Dependent	Eta	Eta2	r	r2
Age	Current Salary			0.074	0.005***
Age	Replacement Income percentage			0.422	0.178***
Current Salary	Replacement Income percentage			0.112	0.013***
Age	Decision to Terminate	0.227	0.051	0.064	
Replacement Income percentage	Decision to Terminate	0.065	0.004	0.048	

Table 3. Retirement patterns based on replacement income levels

Replacement Income cohort (max. Pct.)	5%	10%	25%	50%	75%	95%	100%	200%	300%	1000%
Annual Likelihood to Retire	0.04	0.08	0.20	0.40	0.60	0.76	1.00			
Odds at Repl. Inc. Percentages	0.003	0.007	0.018	0.042	0.074	0.112	0.250	0.375	0.500	0.750

Table 4. Comparison of replacement income- and age-based results

	Replacement Income based		Age-at-Retirement based	
	Mean	s.d.	mean	s.d.
Active Employees	3149	7.2	3147	8.1
Active Juniors	1439	5.7	1436	6.5
Avg. Age at Term NU under 55	38.3	3.2	39.0	2.5
Avg. Age at Term NU 55 and Up	56.5	4.9	60.4	8.4
Avg. Age: Actives	42.9	0.2	43.4	0.1
Avg. Service: Actives	9.5	0.4	9.9	0.2
Avg. Service: Former Employees	10.5	2.3	9.8	2.0
Diversity Pct.	0.516	0.1	0.514	0.1
Cumulative New Hires	2558		2693	
Cumulative Former Employees (Junior)	914		1049	
Remaining External Candidates	7469		7336	
Average NonUnion Salary	$59,453		$59,967	
Per Capita Cost of Health Care: Firm	$33,127		$32,845	

values of those key variables using the two sets of odds to drive retirements, and the table includes standard deviation values where that statistic is appropriate.

Table 5 compiles the three departure rules, just described, that we will employ in testing the five hypotheses (see Research Note in Appendix A).

Results of Hypothesis Testing

The Table 5 hypotheses were tested to assess the extent to which employee retirement decisions would match simulated predictions and the scenarios formed by the expert panels.

Hypothesis 1

Hypothesis 1 predicted a "right-shift" of retirements. Table 6 presents the results in tabular form across the sixteen years of the simulation. Across just the five years of inputs requested from the panelists (i.e., months 73 through 132 of the simulation), the mean retirement ages evidenced the same trend: 61.6, 61.5, and 60.1. So, although the members of the fourth Delphi Panel on average predicted a delay in retirement ages (overall, and at each quartile) compared to the firm's historical pattern, the "rational economic actor" simulation, based on replacement income percentages, led to the opposite conclusion.

Result

Hypothesis 1 was rejected.

Hypothesis 2

Hypothesis 2 predicts that cumulative nonunion retirements will aggregate at a pace significantly slower than suggested by the firm's historical experience. In essence, it describes the integral of the retirement patterns considered in Hypothesis 1, and it proposes a "right shift" in the graph of cumula-

Table 5. Alternative employee retirement "rules" used in tests

Rule	Retirement "Rule"
History	Pattern by ages of nonunion employee retirements from the data site during 2000-3, as carried forward to all simulated years.
Panel	Pattern, by ages of nonunion employee retirements from the data site during 2006-2010, as predicted by the fourth Delphi panel.
RI Pct	Pattern, by Replacement Income Percentage cohort rates, that produces pretest departure patterns comparable to History, based on Criterion Odds with mean value 2.50 in range [0,5].

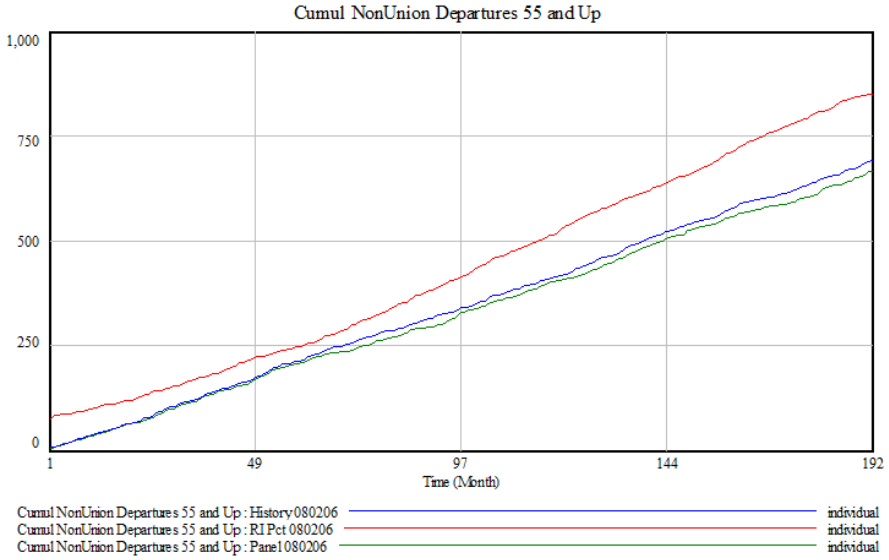
Table 6. Hypothesis 1 results: retirements delay

	Average within Fourth Panel	Historical Trend, Projected	RI Pct Simulated
Mean	61.8	61.4	60.1
s.d.	3.3	3.5	2.9
25th percentile	59.7	59.0	58.1
50th percentile	61.4	61.2	59.8
75th percentile	63.9	63.4	61.5

tive retirements. We predicted that Hypothesis 2 the firm data would not support the hypothesis. Figure 11 presents cumulative incidence data that confirm that result. Cumulative retirements based on replacement income considerations exceed ("left shift") the projection that is based on the firm's historical pattern, notwithstanding the reduction in replacement income percentages caused by the proposed pension accrual reduction.

The consequences predicted in the other hypotheses are dependent on delayed retirements. The executive though a "right-shift" in the number of retirements would lead to increases in

Figure 11. Hypothesis 2 results: Cumulative delay



average pay and benefit cost levels, to decreases in career prospects satisfaction among younger employees about their prospects of organizational advancement, and so forth.

Result

Hypothesis 2 was rejected.

Hypothesis 3

Hypothesis 3 predicted that voluntary terminations of junior employees at ages earlier than age fifty-five would increase to levels significantly greater than the firm's historical experience, as a result. Figure 12 presents the cumulative incidence of such departures as simulated.

Figure 12 shows that panelists predicted a slight increase in the firm's cumulative turnover experience, but that the replacement income settings produced a reduction in cumulative turnover across the years below the levels projected from the firm's 2000-3 data. Departures of under-55 *Junior* Employees (i.e., those earning less than $90,000 annually), however, did increase as predicted.

Result

Hypothesis 3 was supported.

Hypothesis 4

Hypothesis 4 predicted higher-than-anticipated levels of health care (Hypothesis 4A) and salary costs (Hypothesis 4B) for active nonunion employees resulting from the onset of delayed retirements. Figure 13 presents per capita medical costs and Figure 14 presents average salaries of active nonunion employees as predicted.

Result

1. Hypothesis 4A was marginally supported (as to medical costs).
2. Hypothesis 4B was not supported (average salaries of active nonunion employees)

Figure 12. Hypothesis 3 results: Accelerated turnover

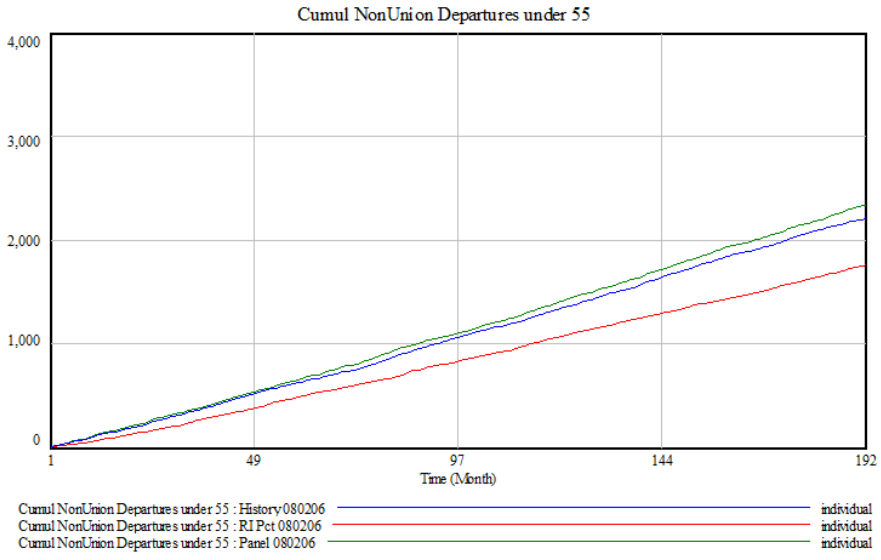


Figure 13. Hypothesis 4 results: Increased program costs

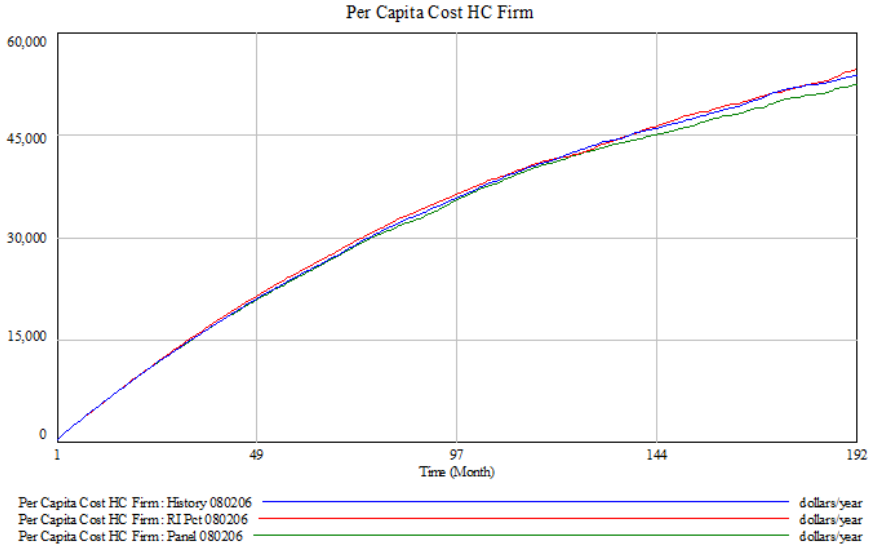
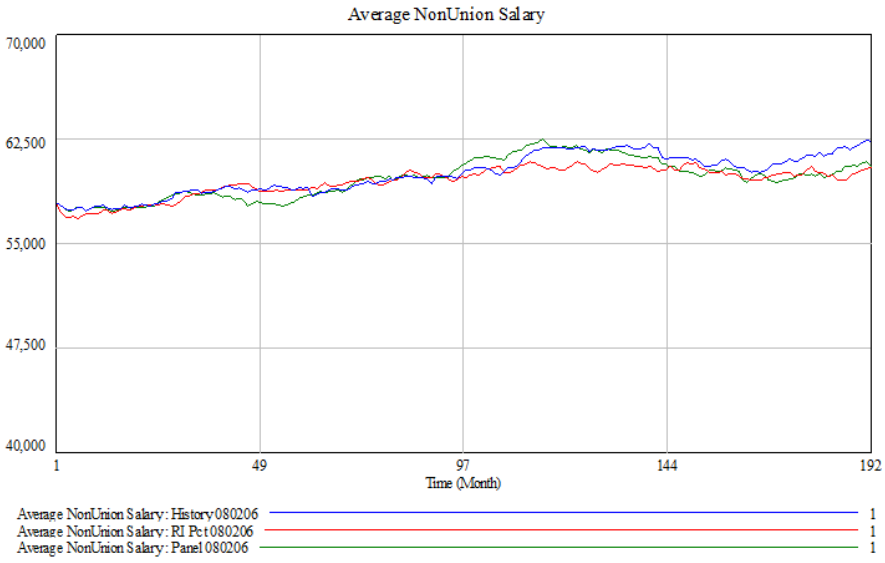


Figure 14. Hypothesis 4 results: Increased salary costs



Hypothesis 5

Hypothesis 5 predicted that workforce diversity percentages (i.e., of all employees other than white males) within the workforce will not increase significantly, because the current workforce will experience decreased turnover. Changes in workforce composition depends not only the "types" of individuals leaving an organization, but also the types of employees that join it. An organization may or may not hire the same types of individuals as those who once joined, and whom it now seeks to replace.

Result

Hypothesis 5 was rejected.

Summary of Hypothesis Testing

Table 7 compiles the principal results from testing the five hypotheses (presenting mean or cumulative values and standard deviations where appropriate) from Table 6, and Figures 11 through 13. Only hypotheses 3 (in part) and 4A were supported. Because hypothesis 2 cumulates all of the retirements counted in testing hypothesis 1, we expected these two results to come out in tandem and they did, albeit not in the predicted direction. The analysis section that follows examines the extent to which the hypotheses were supported and potential reasons that may explain any failures to confirm them.

ANALYSIS

This research investigated how pension policies can be aligned with a firm's strategic goals. SHRM studies rarely account for multiple levels of organizational analysis, longitudinal behavior, or unintended consequences arising from policies. Much of the literature criticizes prevailing SHRM research methods as inadequately taking long- term dynamics into account (Jackson & Schuler, 1999). Current models fail to provide valid methods for testing assumptions, leaving them unverifiable.

Table 7. Summary table: results of the hypothesis tests

Hypothesis	Historical Trend, Projected	RI Pct Simulated
1. Average Retirement Age	61.4 (3.5)	60.1 (2.9)
2. Cumulative Retirements through 2015	694	782
3. Junior Departures; Average Age	630; 39.0 (2.5)	685; 39.6 (3.1)
4a. Health Care Costs	$32,845	$33,127
4b. Average Salary	$59,967	$59,453
5. Diversity Percentage	56%	55%

The research design strategy for this study created three *specialist* Delphi panels composed of expert human resource practitioners. They supplied the inputs for designing the structures built into the simulation model. The firm provided details of its strategic context and four years of employee level data to populate the model. The eight members of the first three panels operated "blind" and were not privy to company data. Their contributions reflected researcher insights that were not contextually bound to the firm. These contributions were then translated into generic inputs of a system dynamics stock/flow model. This model was composed of hundreds of variables related across many levels of analysis. The simulation model imported data from the firm's employee database and provided – through a two-dimensional (employee, property) subscript array within it – for both individual-level and rolled up metrics. The generic structures and the hybrid methodology were tailored transparently to test specific hypotheses relating to the firm's pension policies. The research question focused on determining whether the proposed retirement plan revision would generate unintended SHRM consequences that might be distant in time or "locus" from the intentionally-modified HR program.

Model Parameters and Sensitivity

Only the last of the five hypotheses appeared supportable when pre-test and post-test simulation runs were compared with one another and with the panel's predictions. Most of the post-test results moved in the opposite direction from what almost everyone predicted. This development provoked further review of some key values used in the model to define employee decisions to remain

employed or retire. This review led to the discovery of an unjustified variable parameter in the model. It had been assumed *a priori* that one's replacement income in retirement and one's propensity to retire were positively correlated. All research participants assumed that *retirement-eligible* employees are *rational economic actors*. Actual replacement income data compiled from the firm for years 2000 – 2003, however, did not display such a positive relationship. Employee departures (Figure 6) seemed more closely tied instead to age-related milestones, like one's attainment of the normal retirement age. After reflection, the extent of individual economic rationality in the model was adjusted, and the post-test simulation was run twice more. Doing so altered the corresponding likelihood of employees electing to retire in particular months. The simulation was re-run under both alternate settings, and model variables were re-examined. This new simulation produced credible results using the hybrid methodology. Table 8 restates Table 7 to include these new results.

A decrease in the likelihood of *willingness to retire* at an individual's particular replacement income level (i.e., a quartering of the odds against which a per-employee random value was compared) led to the macro-level behaviors predicted by the panel. With this revision to the model, it caused an increase in the firm's average retirement age (from 60.1 to 61.3 years) in the simulation. The increased average employee retirement age in the firm resulted from the following factors:

1. A decrease in cumulative retirements,
2. An increase in departures by younger employees who were blocked from succession and promotion,
3. Increases in health and salary expenses reflecting a chronologically "more experienced" employee mix.
4. Overall, transition of the active nonunion workforce to become older, more highly paid, and more prone to higher health care expenses.

Conversely, after doubling the value of "Odds at Replacement Income Percentages", the test results all moved in the opposite direction toward a workforce that was younger, had greater tenure, and showed slower growth of total rewards expense. The simulation results continue to show appropriate sensitivity to changes in key parameters, and respond as expected to directed changes in a key assumption.

Table 8. Sensitivity of the results of the hypothesis tests

Hypothesis	Historical Trend, Projected	RI Pct Doubled	RI Pct Simulated	RI Pct Quartered
1. Average Retirement Age	61.4 (3.5)	58.9 (2.2)	60.1 (2.9)	61.3 (3.2)
2. Cumulative Retirements through 2015	694	808	782	687
3. Junior Departures; Average Age	630; 39.0 (2.5)	575; 38.8 (2.7)	685; 39.6 (3.1)	703; 40.1 (4.5)
4a. Health Care Costs	$32,845	$30,742	$33,127	$35,829
4b. Average Salary	$59,967	$56,675	$59,453	$62,759
5. Diversity Percentage (all groups)	56%	49%	55%	54%

Note: standard deviation values, where appropriate, appear in parentheses.

DISCUSSION

The dissonance observed between expert opinion and simulation output raised initial doubts about model validity. Barlas (1996, p. 183) argues that model structure should be the target of efforts to achieve validation in system dynamics simulations. However subsequent simulations, conducted with revised model settings, served to reinvigorate confidence. The revised settings alternately defined individuals as being more or less economically rational in their retirement decisions than empirical data had indicated. Initially, the first null hypothesis predicted no difference in retirement ages once the pension formula reduction was introduced. Therefore, the first simulation run correctly failed to reject this null hypothesis. Other null hypotheses fared similarly in the first run. These failures to reject the null were correct outcomes based on the initial historical values of Odds at Replacement Income Percentages. Employees' actual retirement decisions during 2000 - 2003 proved to be not strongly associated with their replacement income percentages.

This hybrid simulation model permitted additional insights to be obtained by adjusting model parameter values to increase individual sensitivity to replacement income levels. The next simulation run confirmed the predicted differences in retirement, turnover and expense patterns. Employing the rescaled parameter values; most of the null hypotheses could now be "correctly" rejected, in keeping with the concerns of the client executive and the predictions of the fourth Delphi panel.

Although the positive correlation between the simulation behavior and the panel predictions was encouraging, it is not alone sufficient evidence of model validity. As Sterman (2000, pp. 846-850) points out, validation and verification of any non-axiomatic model, simulated or otherwise, are impossible. This model has face validity due to the panel input into model design and the hybrid and multi-level method, use of variables at each level of the firm across a time horizon of 192 months. Ultimately, however, there are practical limits to the testing and conformational analyses, whether in this study or others. Data demands and lacunae also posed limitations for this simulation.

The research question posed in this study seeks to determine if using a hybrid simulation method can yield productive insights into the structurally induced dynamics common to SHRM issues, and specifically to retirement policy issues. The methods used here exhibited dynamic sensitivity to changing replacement income levels and employee characteristics over a 16-year period. The model incorporated behaviors and policies spanning multiple levels of analysis: macro, meso, and micro. The hybrid methodology used four years of the firm's data, enabled systematic testing of the dynamic hypotheses and their retesting after model adjustment.

Efforts to reduce employee pension benefits have accelerated since the late 1980's, originally in the private sector and currently in the public. This study's hypotheses address the heterogeneous, dynamic and unintended effects generated by a firm's policies on its workforce over time. This research also examined the effects of aggregating individual behaviors on the firm's performance over time. The hybrid methodology proposed here is one means to overcome the barriers to studying such issues. The hybrid approach used here also empirically "demonstrates" the invisible linkages and mechanisms by which micro-level responses may aggregate and generate emergent behavior. A general benefit of using the method proposed here is to sensitize decision makers toward more clearly seeing how various stakeholders' roles may cause unanticipated remote effects in the name of taking bold strategic action.

FUTURE DIRECTIONS

Theoretical propositions which were "not intended to be testable" need not, and should not, remain unchallenged save through rhetorical device.

HSDAM helps to reveal plausible patterns of longitudinal behavior and dynamic sensitivity that may emerge from both local operational level inputs and strategic ones. It helps to fill some of the theoretical and practical gaps articulated by SHRM scholars. Yet, the proposed methodology is not without limitations and the modeling process not without challenges. Any research designs which employ expert panels to perform causal analysis of complex dynamic systems can be subject to tendencies toward identifying and preferring policies which reify the value of low-leverage policies. Any sort of group speculation on the future effects of policy revisions is subject to culturally-embedded mental models and bounded rationality unable to account for non-linear effects. We close by citing some cautionary advice on models and modeling from austere historical figures.

- One fictional science officer warns, "We can expect to do no better than our own programming skills*"* (Roddenberry et al., 1967).
- Box and Draper (1987, p. 424) observe, "All models are wrong, but some models are useful".
- Eco (1995, p. 95) cautions us of "the impossibility of drawing a map of the empire on a scale of 1 to 1."
- Hawking (2001, p. 59) notes, "All one can do is find which mathematical models describe the universe we live in. It turns out that a mathematical model involving imaginary time predicts not only effects we have already observed but also effects we have not been able to measure yet nevertheless believe in for other reasons."

Models are simplifications of reality, and their validation is impossible. The overriding goal of modelers should not only be to help their clients make higher quality decisions, but to inform those decisions by designing optimal models. By doing this it will, over time, help clients to understand that theory construction and theory validation are two threads of a fabric woven together through iterations as part of an ongoing recursive learning process.

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APPENDIX A

Research Note

The use of cohort odds (whether arrayed by replacement income percentages or by attained ages) should not imply that all similarly situated individuals will make the same retirement decisions among themselves from month to month. Here, as elsewhere in the simulation, an individual-by-individual and month-by-month random criterion value was used to introduce micro-level variation. This was done because not all eligible-to-retire employees actually leave in a given month. The model variable "Criterion Odds: Replacement Income" provides a random monthly value against which an Employee's Retirement Odds, based on his or her replacement income, are compared in producing a simulated decision that month regarding retirement. We first defined Criterion Odds: Replacement Income as a different random number between zero and five, having a mean value of 2.5 for each employee each month.

The settings that gave rise to the results reported in Table 4 created one issue of interest upon inspection: an excessive number of employee departures occurring only in the first month of the simulation. These values returned promptly to desired equilibrium levels. This pattern was interpreted as reflecting the immediate departures of a "backlog" of employees who each had sufficient replacement income percentages to retire comfortably, but who had actually chosen (in the historical data) to remain employed. Such historical behavior may contribute somewhat to the absence of association between decisions to retire among nonunion employees and replacement income percentages that were reported in Table 2.

APPENDIX B

Model Equations 041211

```
********************************
  .02 TR Cost Eng
********************************

(002)     "Accumulated Gross Cost (Program)"[Program,Empl]= INTEG (
          Gross Cost Adding[Program,Empl],
               Initial Period Base Cost[Program,Empl])
     Units: dollars/year

(003)     "Accumulated Gross Cost (Program) adjusted"[Program,Empl]=
          "Accumulated Gross Cost (Program)"[Program,Empl]
     Units: dollars/year

(004)     Actual Period Cost[ProgramGeneral,Empl]=
          0
     Actual Period Cost[Salary S,Empl]=
          IF THEN ELSE(ED Current[Empl,CLevel]=1, IF THEN ELSE(ED
Current[Empl,CSalary
```

```
     ]<>0,ED Current[Empl,CSalary],Average Salary
          [Senior]),0)*Database Dynamic Units Conversion 6/12
     Actual Period Cost[Salary J,Empl]=
          IF THEN ELSE(ED Current[Empl,CLevel]=0,  IF THEN ELSE(ED
Current[Empl,CSalary
     ]<>0,ED Current[Empl,CSalary],Average Salary
          [Junior]),0)*Database Dynamic Units Conversion 6/12
     Actual Period Cost[Salary U,Empl]=
          IF THEN ELSE(ED Current[Empl,CLevel]=-1,  IF THEN ELSE(ED
Current[Empl,CSalary
     ]<>0,ED Current[Empl,CSalary],Average Salary
          [Union]),0)*Database Dynamic Units Conversion 6/12
     Actual Period Cost[HC Firm,Empl]=
          ED Current[Empl,CHCFirm] /12
     Units: dollars/year

(005)     Annual Books Closing[Program,Empl]=
          IF THEN ELSE(MODULO(Time, 12)=Fiscal Year End Month*Calendar Adjust-
ment,
     Net Program Cost Mirror[Program,Empl], 0)
     Units: dollars/year

(006)     Database Dynamic Units Conversion 6=
          1
     Units: dollars/year

(007)     Gross Cost Adding[Program,Empl]=
          IF THEN ELSE(ED Current[Empl,CActive]=1,IF THEN ELSE(Initial Period
Base Cost
     [Program,Empl]<>0,
          Trend Coefficients[Program]*Initial Period Base
Cost[Program,Empl],Actual Period Cost
     [Program,Empl]),0)
     Units: dollars/year

(008)     Initial Annual Base Cost[Program]=
          GET XLS CONSTANTS('HRM.XLS', 'ProgramStartLevels', 'B2')
     Units: dollars/year

(009)     Initial Period Base Cost[Program,Empl]=
          Initial Annual Base Cost[Program]/12
     Units: dollars/year
```

```
(010)     Net Program Cost in Current Fiscal Year[Program,Empl]=
          "Accumulated Gross Cost (Program) adjusted"[Program,Empl]-Prior FYs
Cumulative Program Costs
     [Program,Empl]
     Units: dollars/year

(011)     Net Program Cost Mirror[Program,Empl]=
          Net Program Cost in Current Fiscal Year[Program,Empl]
     Units: dollars/year

(012)     Per Capita Cost HC Firm=
          SUM(IF THEN ELSE(ED[Empl!,PActive]=1,"Accumulated Gross Cost (Pro-
gram) adjusted"
     [HC Firm,Empl!],0))/ SUM(ED[Empl!,PActive])
     Units: dollars/year

(013)     Period Trend Rates[Program]=
          ((1+AnnualGrossTrendRates[Program])^(1/12))
     Units: Dimensionless/Month

(014)     Prior FYs Cumulative Program Costs[Program,Empl]= INTEG (
          zeroing[Program,Empl],
               0)
     Units: dollars/year

(015)     zeroing[Program,Empl]=
          (Annual Books Closing[Program,Empl])/Calendar Adjustment
     Units: dollars/(Month*year)

*******************************
  .03 Repl Income
*******************************

(017)     "Annual DB Annuity Payable @ Current Age"[Empl]=
          IF THEN ELSE(Employee's Current Age[Empl]>=1100, Accrued Defined
Benefit
     [Empl]*DB Plan fraction[Empl], 0)
     Units: dollars/year

(018)     "Annual DC Annuity @ Current Age"[Empl]=
          IF THEN ELSE(ED Current[Empl,CActive]=1,IF THEN ELSE(Gender[Empl]=0,
Applicable Annuity Value F
     [Empl], Applicable Annuity Value M[Empl])*Defined Contribution Assets[Empl
```

```
     ],0)
     Units: dollars/year

(019)     Annuity Table F D=
          GET XLS LOOKUPS('WORLD.XLS', 'GAM94F','A', 'F61')
     Units: Dimensionless/year

(020)     Annuity Table F LE=
          GET XLS LOOKUPS('WORLD.XLS', 'GAM94F','A', 'L61')
     Units: Dimensionless

(021)     Annuity Table F N=
          GET XLS LOOKUPS('WORLD.XLS', 'GAM94F','A', 'G61')
     Units: Dimensionless

(022)     Annuity Table M D=
          GET XLS LOOKUPS('WORLD.XLS', 'GAM94M', 'A', 'F61')
     Units: Dimensionless/year

(023)     Annuity Table M LE=
          GET XLS LOOKUPS('WORLD.XLS', 'GAM94M', 'A', 'L61')
     Units: Dimensionless

(024)     Annuity Table M N=
          GET XLS LOOKUPS('WORLD.XLS', 'GAM94M', 'A', 'G61')
     Units: Dimensionless

(025)     Applicable Annuity Value F[Empl]=
          IF THEN ELSE(ED Current[Empl,CAge]>=55,LOOKUP BACKWARD(Annuity Table
F D,
      ED Current[Empl,CAge])/  (LOOKUP BACKWARD(Annuity Table F N, ED
Current[Empl
     ,CAge]) -
          (LOOKUP BACKWARD(Annuity Table F N,(ED Current[Empl,CAge]+LOOKUP
BACKWARD
     (Annuity Table F LE,ED Current[Empl,CAge])))),0)
     Units: 1/year

(026)     Applicable Annuity Value M[Empl]=
          IF THEN ELSE(ED Current[Empl,CAge]>=55,LOOKUP BACKWARD(Annuity Table
M D,
      ED Current[Empl,CAge])/  (LOOKUP BACKWARD(Annuity Table M N, ED
Current[Empl
```

```
     ,CAge]) -
          (LOOKUP BACKWARD(Annuity Table M N,(ED Current[Empl,CAge]+LOOKUP
BACKWARD
     (Annuity Table M LE,ED Current[Empl,CAge])))),0)
     Units: Dimensionless/year

(027)     DB Plan early retirement ta-
ble([(0,0)-(900,1)],(0,0),(659,0),(660,0.63
     ),(672,0.68),(684,0.75),(696,0.8),(708,0.85),
               (720,0.9),(732,0.95),(744,1),(745,1),(900,1))
     Units: Dmnl

(028)     DB Plan fraction[Empl]=
          IF THEN ELSE((Employee's Credited Service[Empl]>=240:AND: Employee's
Current Age
     [Empl]>=660), LOOKUP BACKWARD(DB Plan early retirement table
          , Employee's Current Age[Empl]), LOOKUP BACKWARD(DB Plan vested
retirement table
     , Employee's Current Age[Empl]))
     Units: Dimensionless

(029)     DB Plan vested retirement table(
          [(0,0)-
(1000,1)],(0,0),(659,0),(660,0.55),(672,0.61),(684,0.67),(696,0.73
     ),(708,0.79),(720,0.85),(732,0.88),(744,0.91),(756,0.94),(768,0.97),(780,
1
     ),(781,1),(900,1))
     Units: Dimensionless

(030)     DC Plan limits[Empl]=
          MAX(0.5*Current Calendar Year Pay[Empl], 11000)
     Units: dollars/year

(031)     Defined Contribution Assets[Empl]= INTEG (earning[Empl]+adding[Empl],
     Starting Balance[Empl])
     Units: dollars

(032)     earning[Empl]=
          Defined Contribution Assets[Empl]*Investment Returns
     Units: dollars/Month

(033)     Employee Contributions[Empl]=
          Employee's Contribution Decision[Empl]*Current Calendar Year
```

```
Pay[Empl]*"Year:Month conversion"
     Units: dollars/Month

(034)     Employee's Contribution Decision[Empl]=
          ED Ini[Empl,Pct401k]
     Units: Dmnl [?,0.15,0.001]

(035)     Employee's Current Age[Empl]=
          ED Current[Empl,CAgeMonths]*Calendar Adjustment
     Units: Month

(036)     Gender[Empl]=
          ED[Empl,PGender]
     Units: Dmnl

(037)     Investment Returns=
          0.005
     Units: Dimensionless/Month

(038)     Matching Contributions[Empl]=
          MIN(Employee Contributions[Empl], Current Calendar Year
Pay[Empl]*Matching Formula
     *"Year:Month conversion")
     Units: dollars/Month

(039)     Matching Formula=
          0.04
     Units: Dmnl

(040)     "Non-matching formula"=
          0.03
     Units: Dimensionless

(041)     Nonmatching Contributions[Empl]=
          IF THEN ELSE(ED Current[Empl,CActive]=1,Current Calendar Year
Pay[Empl]*"Non-matching formula"
     *"Year:Month conversion",0)
     Units: dollars/Month

(042)     Replacement Estimate from Employer Plans[Empl]=
          IF THEN ELSE(ED Current[Empl,CActive]=1,IF THEN ELSE(Current Calen-
dar Year Pay
     [Empl]<>0,("Annual DB Annuity Payable @ Current Age"[Empl]+"Annual DC
```

```
Annuity @ Current Age”
     [Empl])/Current Calendar Year Pay[Empl],0),0)
     Units: Dmnl

(043)     Social Security early payment reduction[Empl]=
          IF THEN ELSE(Employee’s Current Age[Empl]<744, 1, (0.0055*MIN(36,
MAX(0,SS full retirement age
     -Employee’s Current Age[Empl])))+(0.0042*MAX(0,SS full retirement age-36
          -Employee’s Current Age[Empl])))*Database Dynamics Units Conversion
3
     Units: Dimensionless

(044)     Social Security PIA table(
          [(0,0)-(1e+006,1)],(0,0),(1,0.56),(13164,0.42),(45492,0.35),(
1e+006,0.05)
     )
     Units: Dimensionless

(045)     “Social Security replacement estimate @ Current Age”[Empl]=
          (1-Social Security early payment reduction[Empl])*”Social Security
replacement estimate @ full retirement age”
          [Empl]
     Units: Dimensionless

(046)     “Social Security replacement estimate @ full retirement age”[Empl]=
          LOOKUP FORWARD(Social Security PIA table, Current Calendar Year
Pay[Empl]
     )
     Units: Dimensionless

(047)     SS full retirement age=
          790
     Units: Month

(048)     Starting Balance[Empl]=
          ED Ini[Empl,PBal401kStart]
     Units: dollars

(049)     Total Replacement Income Estimate[Empl]=
          “Social Security replacement estimate @ Current
Age”[Empl]+Replacement Estimate from Employer Plans
     [Empl]
     Units: Dimensionless
```

```
(050)     "Year:Month conversion"=
          1/12
     Units: year/Month

******************************
  .04 Indiv Decisions
******************************

(052)     Add Fac Count=
          SUM(IF THEN ELSE (ED Current[Empl!,CActive] = 1,("Decision: Added
Factors-based"
     [Empl!]),0))
     Units: Dmnl

(053)     Career and Work Dissatisfaction Threshold=
          0.75
     Units: Dimensionless

(054)     Career Wk Dep Count=
          SUM(IF THEN ELSE (ED Current[Empl!,CActive] = 1,("Decision: Career
and Work"
     [Empl!]),0))
     Units: Dmnl

(055)     "Criterion Odds: Age"[Empl]=
          RANDOM UNIFORM(0, 1, 0.5)
     Units: Dimensionless

(056)     "Criterion Odds: Replacement Income"[Empl]=
          RANDOM UNIFORM(0, 2.5, 5)
     Units: Dimensionless

(057)     Decision to Depart[Empl]=
          IF THEN ELSE(ED Current[Empl,CLevel]=0:AND: ED
Current[Empl,CActive]=1
     :AND: Decision to Retire[Empl]=0, IF THEN ELSE("Decision: Added Factors-
based"
     [Empl]*Employee's Departure Criterion[Empl]>=1,1,0),0)
     Units: Dimensionless

(058)     Decision to Retire[Empl]=
          IF THEN ELSE((ED Current[Empl,CLevel]=0:OR: ED
```

```
Current[Empl,CLevel]=1):AND:
      (ED Current[Empl,CActive]=1), IF THEN ELSE(Employee's Retirement Crite-
rion
     [Empl]=1,"Decision: Age-based"[Empl],"Decision: Replacement Income-based"[
     Empl]),0)
     Units: Dimensionless

(059)     "Decision: Added Factors-based"[Empl]=
          ("Decision: Career and Work"[Empl]+"Decision: Rewards"[Empl])
     Units: Dimensionless

(060)     "Decision: Age-based"[Empl]=
          IF THEN ELSE(Retirement Odds at Employee's Current
Age[Empl]>=("Criterion Odds: Age"
     [Empl]*Criterion Odds Factor), 1, 0)
     Units: Dimensionless

(061)     "Decision: Career and Work"[Empl]=
          IF THEN ELSE((Individual's Career Prospects Satisfaction[Empl]+(Zero
+Individual's Satisfaction Other Factors
     [Empl]))<Career and Work Dissatisfaction Threshold
          , 1, 0)
     Units: Dimensionless

(062)     "Decision: Normal Turnover-based"=
          0.05/12
     Units: Dimensionless

(063)     "Decision: Replacement Income-based"[Empl]=
          IF THEN ELSE(Retirement Odds at Current Repl Income[Empl]>="Criterion
Odds: Replacement Income"
     [Empl], 1, 0)
     Units: Dimensionless

(064)     "Decision: Rewards"[Empl]=
          0
     Units: Dimensionless

(065)     Employee's Departure Criterion[Empl]=
          1
     Units: Dimensionless

(066)     "Employee's Org. Level"[Empl]=
```

```
          ED Current[Empl,CLevel]
     Units: Dimensionless

(067)     Employee's Retirement Criterion[Empl]=
          0
     Units: Dmnl

(068)     Individual's Satisfaction Other Factors[Empl]=
          RANDOM NORMAL(-1, 1, 0.5, 0.25, 0.5)
     Units: Dimensionless

(069)     "Jr. Departure"=
          SUM(Decision to Depart[Empl!])*Database Dynamics Units Conversion 2
     Units: individual

(070)     "Jr. Retirement"=
          SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=0, Decision to
Retire[Empl!],0)
     )*Database Dynamics Units Conversion 2
     Units: individual

(071)     "Jr. Turnover"=
          "Decision: Normal Turnover-based"*Junior Employees
     Units: individual

(072)     "Jr.Promotion"=
          SUM(Junior Promoting[Empl!])*Database Dynamics Units Conversion 2
     Units: individual

(073)     Junior Promoting[Empl]=
          IF THEN ELSE(ED Current[Empl,CLevel]=0:AND: ED
Current[Empl,CActive]=1:AND:
      Decision to Depart[Empl]=0 :AND: Decision to Retire[Empl]=0, IF THEN
ELSE
     (promoting rate>=RANDOM UNIFORM(0,1,0),1,0),0)
     Units: Dimensionless

(074)     Odds at Replacement Income Pcts=
          GET XLS LOOKUPS('Firm.xls', 'Criterion RI-based', 'b', 'f3')
     Units: Dimensionless

(075)     Retirement Odds at Ages=
          GET XLS LOOKUPS('Firm.xls', 'Criterion Age-based', 'b', 'd2')
```

```
     Units: Dimensionless

(076)     Retirement Odds at Employee's Current Age[Empl]=
          LOOKUP FORWARD(Retirement Odds at Ages,Employee's Current Age[Empl])
     Units: Dimensionless

(077)     Senior Departing[Empl]=
          IF THEN ELSE(ED Current[Empl,CLevel]=1:AND: ED
Current[Empl,CActive]=1:AND:
      Decision to Retire[Empl]=0, IF THEN ELSE("Sr. Leaving Rate">=RANDOM
UNIFORM
     (0,1,0),1,0),0)
     Units: Dimensionless

(078)     "Sr. Retirement"=
          (0+SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=1, Decision to
Retire[Empl!]
     ,0)))*Database Dynamics Units Conversion 2
     Units: individual

(079)     "Sr.Departure"=
          SUM(Senior Departing[Empl!])*Database Dynamics Units Conversion 2
     Units: individual

(080)     Union Departure=
          SUM(Union Termination[Empl!])*Database Dynamics Units Conversion 2
     Units: individual

(081)     Union Supervising[Empl]=
          IF THEN ELSE(ED Current[Empl,CLevel]=-1:AND: ED
Current[Empl,CActive]=1
     :AND: Union Termination[Empl]=0, IF THEN ELSE(supervising rate>=RANDOM
UNIFORM
     (0,1,0),1,0),0)
     Units: Dimensionless

(082)     Union Termination[Empl]=
          IF THEN ELSE(ED Current[Empl,CLevel]=-1:AND: ED
Current[Empl,CActive]=1
     ,IF THEN ELSE(Terminating Rate>=RANDOM UNIFORM(0,1,0),1,0),0)
     Units: Dimensionless

(083)     Union to Supervision=
```

```
          SUM(Union Supervising[Empl!])*Database Dynamics Units Conversion 2
     Units: individual

*******************************
  .05 Career Prospects
*******************************

(085)     Accrued Defined Benefit[Empl]=
          MIN(DB Plan Limits, (DB Formula Part 1[Empl]+DB Formula Part
2[Empl]+DB Formula Part 3
     [Empl])/Annual Payment)
     Units: dollars/year

(086)     Annual Payment=
          1
     Units: year

(087)     Career Opportunities[Empl]=
          (IF THEN ELSE("Employee's Org. Level"[Empl]=-1, FLS Proportion*("Jr.
leaving"
     +"Jr. retiring")/Union Employees*Calendar Adjustment
          , 0)+IF THEN ELSE
          ("Employee's Org. Level"[Empl]=0, ("Jr/Sr ratio"*("Sr. leaving"+"Sr.
retiring"
     )/Junior Employees)*Calendar Adjustment, 0)+IF THEN ELSE
          (
          "Employee's Org. Level"[Empl]
          =1, ("Sr. retiring"/Senior Employees*Calendar Adjustment), 0)) * 100
     Units: Dimensionless

(088)     Career Unmet Needs[Empl]=
          Individual's Career Advancement Needs[Empl]-Career
Opportunities[Empl]
     Units: Dimensionless

(089)     changing needs[Empl]=
          SMOOTH(Needs Adjustment[Empl], 6)
     Units: Dimensionless/Month

(090)     changing satisfaction[Empl]=
          IF THEN ELSE(ED[Empl,PActive]=1, -Career Unmet Needs[Empl]/Satisfac-
tion Adjustment Time
     , 0)
```

```
     Units: Dimensionless/Month

(091)     DB Formula Part 1[Empl]=
          ((Initial Part 1 DB factor*MIN(30, Credited Service before
Amendment[Empl
     ])+(Amended Part 1 DB factor)*MIN(30, Credited Service after Amendment
          [Empl]))*Pensionable Pay[Empl])/Annual Payment
     Units: dollars

(092)     DB Formula Part 2[Empl]=
          0.005*MIN(30, Employee's Credited Service[Empl])*(MAX(0,(Pensionable
Pay[
     Empl]-Social Security covered compensation(INTEGER
     ((ED[Empl,DOBIndex]/12)+1900)))))/Annual Payment
     Units: dollars

(093)     DB Formula Part 3[Empl]=
          0.005*MAX(0, Employee's Credited Service[Empl]-30)*Pensionable
Pay[Empl]/
     Annual Payment
     Units: dollars

(094)     DB Plan Limits=
          175000
     Units: dollars/year

(095)     Employee's Credited Service[Empl]=
          ED Current[Empl,CServiceDecimal]*Database Dynamics Units Conversion
1
     Units: year

(096)     FAP factor=
          GET XLS LOOKUPS('HRM.XLS', 'SalaryTrend', 'A', 'E2')
     Units: Dimensionless

(097)     Individual's Career Advancement Needs[Empl]= INTEG (
          changing needs[Empl],
               Individual's Initial Advancement Needs[Empl])
     Units: Dimensionless

(098)     Individual's Career Prospects Satisfaction[Empl]= INTEG (
          changing satisfaction[Empl],
               Individual's Initial Career Satisfaction[Empl])
```

```
     Units: Dimensionless

(099)     Individual's Initial Advancement Needs[Empl]=
          0
     Units: Dimensionless

(100)     Individual's Initial Career Satisfaction[Empl]=
          1
     Units: Dimensionless

(101)     Needs Adjustment[Empl]=
          RANDOM NORMAL(-1, 1, 0, 0.1, 0.1)
     Units: Month

(102)     Pensionable Pay[Empl]=
          (ED Current[Empl,CSalary]/FAP factor(ED[Empl,PSenior]))*Database
Dynamics Units Conversion 5
     Units: dollars

(103)     Satisfaction Adjustment Time=
          6
     Units: Month

(104)     Social Security covered compensation=
          GET XLS LOOKUPS ('WORLD.XLS', 'CC', 'B', 'D6')
     Units: dollars

*******************************
  .06 Staffing Supply
*******************************

(106)     External Candidates = INTEG (
          -hiring-joining-landing,
               10000)
     Units: individual

(107)     hiring=
          INTEGER(Vacancies[Junior]/Average Time for Subgroup Hiring[Junior])
     Units: individual/Month

(108)     joining=
          INTEGER(0.5+Vacancies[Union]/Average Time for Subgroup Hiring[Union])
     Units: individual/Month
```

```
(109)     "Jr. leaving"=
          ("Jr. Departure"+(Zero*"Jr. Turnover"))/Calendar Adjustment
     Units: individual/Month

(110)     "Jr. retiring"=
          "Jr. Retirement"/Calendar Adjustment
     Units: individual/Month

(111)     Junior Employees= INTEG (
          hiring+supervising-"Jr. leaving"-"Jr. retiring"-promoting,
               SUM(IF THEN ELSE(ED Ini[Empl!,PSenior]=0,ED
Ini[Empl!,PActive],0)))
     Units: individual

(112)     landing=
          INTEGER(0.5+(Vacancies[Senior]*(1-"ILM/ELM Mix")/Average Time for
Subgroup Hiring
     [Senior]))
     Units: individual/Month

(113)     promoting=
          "Jr.Promotion"/Calendar Adjustment
     Units: individual/Month

(114)     promoting rate=
          IF THEN ELSE(Junior Employees<>0,((Vacancies[Senior]*"ILM/ELM Mix")/
Average Time for Internal Movement
     )/Junior Employees,0)
     Units: 1/Month

(115)     Senior Employees= INTEG (
          +landing+promoting-"Sr. leaving"-"Sr. retiring",
               SUM(IF THEN ELSE(ED Ini[Empl!,PSenior]=1,ED
Ini[Empl!,PActive],0)))
     Units: individual

(116)     "Sr. leaving"=
          "Sr.Departure"/Calendar Adjustment
     Units: individual/Month

(117)     "Sr. Leaving Rate"=
          0.005
```

```
     Units: 1/Month

(118)     "Sr. retiring"=
          "Sr. Retirement"/Calendar Adjustment
     Units: individual/Month

(119)     supervising=
          Union to Supervision/Calendar Adjustment
     Units: individual/Month

(120)     supervising rate=
          (((Vacancies[Junior]*FLS Proportion)/Average Time for Internal Move-
ment))
     /Union Employees
     Units: 1/Month

(121)     terminating=
          Union Departure/Calendar Adjustment
     Units: individual/Month

(122)     Terminating Rate=
          0.01
     Units: 1/Month

(123)     Union Employees= INTEG (
          joining-supervising-terminating,
               SUM(IF THEN ELSE(ED Ini[Empl!,PSenior]=-1,ED
Ini[Empl!,PActive],0)))
     Units: individual

******************************
  .07 Staffing Demand
******************************

(125)     Adjustment for Labor[Senior]=
          ("Authorized Sub-group Jobs"[Senior]-Senior Employees)/Labor Adjust-
ment Time
     Adjustment for Labor[Junior]=
          ("Authorized Sub-group Jobs"[Junior]-Junior Employees)/Labor Adjust-
ment Time
     Adjustment for Labor[Union]=
          ("Authorized Sub-group Jobs"[Union]-Union Employees)/Labor Adjust-
ment Time
```

```
     Units: individual/Month

(126)     Adjustment for Vacancies[Empl Subgroups]=
          (Desired Vacancies[Empl Subgroups]-Staffing Demand Model
Vacancies[Empl Subgroups
     ])/Vacancy Adjustment Time
     Units: individual/Month

(127)     "Authorized Sub-group Jobs"[Empl Subgroups]=
          INTEGER((Starting Jobs[Empl Subgroups]*Open Reqs Factor*Test Input
Sine[Empl Subgroups
     ]*(1-Use Historical Hiring 1))+("Historical Actual Sub-group Jobs"
          [Empl Subgroups]*Test Input Sine[Empl Subgroups]*Use Historical
Hiring 1*
     Open Reqs Factor))
     Units: individual

(128)     Desired Hiring Rate[Senior]=
          Adjustment for Labor[Senior]
     Desired Hiring Rate[Junior]=
          Adjustment for Labor[Junior]
     Desired Hiring Rate[Union]=
          Adjustment for Labor[Union]
     Units: individual/Month [0.01,?]

(129)     Desired Vacancies[Empl Subgroups]=
          MAX(0, Expected Time to Place Employees*Desired Hiring Rate[Empl
Subgroups
     ])
     Units: individual

(130)     Desired Vacancy Creation Rate[Empl Subgroups]=
          INTEGER(Desired Hiring Rate[Empl Subgroups]+Adjustment for
Vacancies[Empl Subgroups
     ])
     Units: individual/Month

(131)     FLS Proportion=
          0.05
     Units: Dimensionless

(132)     Hiring Variance[Empl Subgroups]=
          Desired Hiring Rate[Empl Subgroups]-Vacancy Closure Rate[Empl Sub-
```

```
groups]
     Units: individual/Month

(133)     "Initial Sub-group Vacancies"[Empl Subgroups]=
          "Authorized Sub-group Jobs"[Empl Subgroups]-Starting Jobs[Empl Sub-
groups]
     Units: individual

(134)     Labor Adjustment Time=
          3
     Units: Month

(135)     Open Reqs Factor=
          1.04
     Units: Dimensionless

(136)     Staffing Demand Model Vacancies[Empl Subgroups]= INTEG (
          +Vacancy Creation Rate[Empl Subgroups]-Vacancy Closure Rate[Empl
Subgroups
     ],
               "Initial Sub-group Vacancies"[Empl Subgroups])
     Units: individual [0,?]

(137)     Vacancies Variance[Empl Subgroups]=
          Staffing Demand Model Vacancies[Empl Subgroups]-Vacancies[Empl Sub-
groups]
     Units: individual

(138)     Vacancy Adjustment Time=
          3
     Units: Month

(139)     Vacancy Closure Rate[Senior]=
          MAX(0,promoting+landing)
     Vacancy Closure Rate[Junior]=
          MAX(0,hiring+supervising)
     Vacancy Closure Rate[Union]=
          MAX(0,joining)
     Units: individual/Month

(140)     Vacancy Creation Rate[Empl Subgroups]=
          MAX(0, Desired Vacancy Creation Rate[Empl Subgroups])
     Units: individual/Month
```

```
********************************
  .08 Firms Dyn Exp
********************************

(142)     Attractiveness to ELM Candidates=
          0.8
     Units: Dimensionless

(143)     Attractiveness to ILM Candidates=
          0.75
     Units: Dimensionless

(144)     Attrition Difference=
          IF THEN ELSE(Junior Employees>0:AND: Senior Employees>0:AND: Union
Employees
     >0, ((("Sr. retiring"+"Sr. leaving")/Senior Employees)+(("Jr.
leaving"+"Jr. retiring"
     +promoting)/Junior Employees)+((supervising+terminating)/Union Employ-
ees))
     -Expected Attrition Rate,0)
     Units: Dimensionless/Month

(145)     Attrition Expectation Adjustment Time=
          3
     Units: Month

(146)     Average Time for Internal Movement=
          2
     Units: Month

(147)     Average Time for Subgroup Hiring[Empl Subgroups]=
          GET XLS CONSTANTS('HRM.xls', 'HiringTime', 'B6')
     Units: Month

(148)     Change in Placement Expectation=
          Placement Lag/Placement Expectation Adjustment Time
     Units: months/Month

(149)     Changes in Attrition Expectation=
          Attrition Difference/Attrition Expectation Adjustment Time
     Units: Dimensionless/Month/Month
```

```
(150)     Expected Attrition Rate= INTEG (
          Changes in Attrition Expectation,
               0.05)
     Units: Dimensionless/Month

(151)     Expected Time to Place Employees= INTEG (
          Change in Placement Expectation,
               1.31)
     Units: Month

(152)     "ILM/ELM Mix"=
          0.3
     Units: Dmnl

(153)     Placement Expectation Adjustment Time=
          3
     Units: Month

(154)     Placement Lag=
          ((Average Time for Internal Movement*Attractiveness to ILM
Candidates*"ILM/ELM Mix"
     )+(Average Time for Subgroup Hiring[Junior]*Attractiveness to ELM Candi-
dates
     *(1-"ILM/ELM Mix"))-Expected Time to Place Employees)
     Units: Month

********************************
  .09 Empl DB
********************************

(156)     Activation and Deactivation=
          IF THEN ELSE(Use Historical Hiring 1=1,SUM(ED Changes By Cycle End
Historical
     [Empl!,PActive]),SUM(ED Changes By Cycle End Modeled[Empl!,PActive]))
     Units: Dimensionless

(157)     Active Junior Empl Count=
          SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=0,ED
Current[Empl!,CActive]=1,0
     ))*Database Dynamics Units Conversion 2
     Units: individual

(158)     Active Senior Empl Count=
```

```
          SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=1,ED
Current[Empl!,CActive]=1,0
     ))*Database Dynamics Units Conversion 2
     Units: individual

(159)     Active Union Empl Count=
          SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=-1,ED
Current[Empl!,CActive]=1,
     0))*Database Dynamics Units Conversion 2
     Units: individual

(160)     All Employee Departures[Empl]=
          IF THEN ELSE((Union Termination[Empl]+Senior Departing[Empl]+Decision
to Depart
     [Empl]+Decision to Retire[Empl])>=1,1,0)
     Units: Dimensionless

(161)     All Employee Promotions[Empl]=
          IF THEN ELSE((Union Supervising[Empl]+Junior Promoting[Empl])>=1,1,0)
     Units: Dimensionless

(162)     Average Salary[Union]=
          SUM(IF THEN ELSE (ED Ini[Empl!,PSenior]=-1:AND:  ED
Ini[Empl!,PActive]=
     1,  ED Ini[Empl!,PSal2000] , 0))  / SUM(IF THEN ELSE (ED Ini[Empl!,PSenior
     ]=-1, ED Ini[Empl!,PActive]=1 , 0))
     Average Salary[Junior]=
          SUM(IF THEN ELSE (ED Ini[Empl!,PSenior]=0:AND:  ED
Ini[Empl!,PActive]=1
     ,  ED Ini[Empl!,PSal2000] , 0))  / SUM(IF THEN ELSE (ED Ini[Empl!,PSenior
     ]=0, ED Ini[Empl!,PActive]=1 , 0))
     Average Salary[Senior]=
          SUM(IF THEN ELSE (ED Ini[Empl!,PSenior]=1:AND:  ED
Ini[Empl!,PActive]=1
     ,  ED Ini[Empl!,PSal2000] , 0))  / SUM(IF THEN ELSE (ED Ini[Empl!,PSenior
     ]=1, ED Ini[Empl!,PActive]=1 , 0))
     Units: Dmnl

(163)     Database Dynamics Units Conversion 1=
          1
     Units: Years

(164)     Database Dynamics Units Conversion 2=
```

```
          1
     Units: individual

(165)     Database Dynamics Units Conversion 3=
          1
     Units: Dimensionless/Month

(166)     Database Dynamics Units Conversion 4=
          1
     Units: individual/Month

(167)     Database Dynamics Units Conversion 5=
          1
     Units: dollars

(168)     Date Index Offset=
          1199
     Units: Dimensionless

(169)     DB Time=
          (Date Index Offset + Time  * Database Dynamics Units Conversion 3)
     Units: Dimensionless

(170)     ED[Empl,Prop]= INTEG (
          IF THEN ELSE(Use Historical Hiring 1=1,ED Changes By Cycle End His-
torical
     [Empl,Prop],ED Changes By Cycle End Modeled[Empl,Prop])*Database Dynamics
Units Conversion 3
     ,
               ED Ini[Empl,Prop])
     Units: Dimensionless

(171)     ED Activation Lower Bounds[Empl Subgroups]=
          1+ED Activation Pointers[Empl Subgroups]-(ED Employee Activation[Empl
Subgroups
     ]-ED Truncated Overflow[Empl Subgroups])
     Units: Dimensionless

(172)     ED Activation Pointers[Union]=
          VMAX(IF THEN ELSE(EDCopyAtCycleStart[Empl!,PSenior]=-1 :AND:  ED-
CopyAtCycleStart
     [Empl!,PEverActive]=0,EDCopyAtCycleStart[Empl!,PId],0))
     ED Activation Pointers[Junior]=
```

```
          VMAX(IF THEN ELSE(EDCopyAtCycleStart[Empl!,PSenior]=0 :AND:  ED-
CopyAtCycleStart
     [Empl!,PEverActive]=0,EDCopyAtCycleStart[Empl!,PId],0))
     ED Activation Pointers[Senior]=
          VMAX(IF THEN ELSE(EDCopyAtCycleStart[Empl!,PSenior]=1 :AND:  ED-
CopyAtCycleStart
     [Empl!,PEverActive]=0,EDCopyAtCycleStart[Empl!,PId],0))
     Units: Dimensionless

(173)     ED Changes By Cycle End Historical[Empl,PActive]=
          IF THEN ELSE(((EDCopyAtCycleStart[Empl,DOTIndex]))=DB Time,0-ED-
CopyAtCycleStart
     [Empl,PActive],IF THEN ELSE
          (((EDCopyAtCycleStart[Empl,DOHIndex]))=DB Time,1-
EDCopyAtCycleStart[Empl,
     PActive],0))
     ED Changes By Cycle End Historical[Empl,PEverActive]=
          IF THEN ELSE(((EDCopyAtCycleStart[Empl,DOHIndex]))=DB Time,1-ED-
CopyAtCycleStart
     [Empl,PEverActive],0)
     ED Changes By Cycle End Historical[Empl,StableProp]=
          0
     Units: Dimensionless

(174)     ED Changes By Cycle End Modeled[Empl,StablePropModeling]=
          0
     ED Changes By Cycle End Modeled[Empl,PActive]=
          IF THEN ELSE(EDCopyAtCycleStart[Empl,PId]<=ED Activation
Pointers[Union]
     :AND: EDCopyAtCycleStart[Empl,PId]>=ED Activation Lower Bounds[Union],1,
     IF THEN ELSE(EDCopyAtCycleStart[Empl,PId]<=ED Activation Pointers[Junior]
     :AND: EDCopyAtCycleStart[Empl,PId]>=ED Activation Lower Bounds[Junior],1,
     IF THEN ELSE(EDCopyAtCycleStart[Empl,PId]<=ED Activation Pointers[Senior]
     :AND: EDCopyAtCycleStart[Empl,PId]>=ED Activation Lower Bounds[Senior],1,
     IF THEN ELSE(All Employee Departures[Empl]=1,-1,0)
          )))
     ED Changes By Cycle End Modeled[Empl,PEverActive]=
          IF THEN ELSE(EDCopyAtCycleStart[Empl,PId]<=ED Activation
Pointers[Union]
     :AND: EDCopyAtCycleStart[Empl,PId]>=ED Activation Lower Bounds[Union],1,
     IF THEN ELSE(EDCopyAtCycleStart[Empl,PId]<=ED Activation Pointers[Junior]
     :AND: EDCopyAtCycleStart[Empl,PId]>=ED Activation Lower Bounds[Junior],1,
     IF THEN ELSE(EDCopyAtCycleStart[Empl,PId]<=ED Activation Pointers[Senior]
```

```
     :AND: EDCopyAtCycleStart[Empl,PId]>=ED Activation Lower Bounds[Senior],1,0
     )
          ))
     ED Changes By Cycle End Modeled[Empl,DOHIndex]=
          IF THEN ELSE(EDCopyAtCycleStart[Empl,PId]<=ED Activation
Pointers[Union]
     :AND: EDCopyAtCycleStart[Empl,PId]>=ED Activation Lower Bounds[Union]:OR:
      EDCopyAtCycleStart[Empl,PId]<=ED Activation Pointers[Junior]:AND: ED-
CopyAtCycleStart
     [Empl,PId]>=ED Activation Lower Bounds[Junior]:OR: EDCopyAtCycleStart[Empl
     ,PId]<=ED Activation Pointers[Senior]:AND: EDCopyAtCycleStart[Empl,PId]>=
     ED Activation Lower Bounds[Senior],(DB Time - EDCopyAtCycleStart[Empl,DOH
Index
     ]),0)
     ED Changes By Cycle End Modeled[Empl,DOTIndex]=
          IF THEN ELSE(All Employee Departures[Empl]=1,DB Time-
EDCopyAtCycleStart[Empl
     ,DOTIndex],0)
     ED Changes By Cycle End Modeled[Empl,PSenior]=
          IF THEN ELSE(All Employee Promotions[Empl]=1,1,0)
     ED Changes By Cycle End Modeled[Empl,PGender]=
          IF THEN ELSE(EDCopyAtCycleStart[Empl,PId]<=ED Activation
Pointers[Union]
     :AND: EDCopyAtCycleStart[Empl,PId]>=ED Activation Lower Bounds[Union]:OR:
      EDCopyAtCycleStart[Empl,PId]<=ED Activation Pointers[Junior]:AND: ED-
CopyAtCycleStart
     [Empl,PId]>=ED Activation Lower Bounds[Junior]:OR: EDCopyAtCycleStart[Empl
     ,PId]<=ED Activation Pointers[Senior]:AND: EDCopyAtCycleStart[Empl,PId]>=
     ED Activation Lower Bounds[Senior],(IF THEN ELSE(RANDOM
UNIFORM(0,1,99)>New Hire Sex
     ,0,1)-EDCopyAtCycleStart[Empl,PGender]),0)
     ED Changes By Cycle End Modeled[Empl,PRace]=
          IF THEN ELSE(EDCopyAtCycleStart[Empl,PId]<=ED Activation
Pointers[Union]
     :AND: EDCopyAtCycleStart[Empl,PId]>=ED Activation Lower Bounds[Union]:OR:
      EDCopyAtCycleStart[Empl,PId]<=ED Activation Pointers[Junior]:AND: ED-
CopyAtCycleStart
     [Empl,PId]>=ED Activation Lower Bounds[Junior]:OR: EDCopyAtCycleStart[Empl
     ,PId]<=ED Activation Pointers[Senior]:AND: EDCopyAtCycleStart[Empl,PId]>=
     ED Activation Lower Bounds[Senior],(LOOKUP BACKWARD(New Hire Race,RANDOM
UNIFORM
     (0,1,97)) - EDCopyAtCycleStart[Empl,PRace]),0)
     ED Changes By Cycle End Modeled[Empl,DOBIndex]=
```

```
          IF THEN ELSE(EDCopyAtCycleStart[Empl,PId]<=ED Activation
Pointers[Union]
     :AND: EDCopyAtCycleStart[Empl,PId]>=ED Activation Lower Bounds[Union]:OR:
      EDCopyAtCycleStart[Empl,PId]<=ED Activation Pointers[Junior]:AND: ED-
CopyAtCycleStart
     [Empl,PId]>=ED Activation Lower Bounds[Junior]:OR: EDCopyAtCycleStart[Empl
     ,PId]<=ED Activation Pointers[Senior]:AND: EDCopyAtCycleStart[Empl,PId]>=
     ED Activation Lower Bounds[Senior],((DB Time-INTEGER(New Hire Age(RANDOM
UNIFORM
     (0,1,98))))- EDCopyAtCycleStart[Empl,DOBIndex]),0)
     Units: Dimensionless

(175)     ED Current[Empl,CActive]=
          ED[Empl,PActive]
     ED Current[Empl,CSalary]=
          ((ED[Empl,PSal2000] *ED[Empl,PActive])*Individual Salary Growth by
Subgroup
     (ED[Empl,PSenior])^(DB Time - MAX(Date Index Offset
     , ED[Empl,DOHIndex])))
     ED Current[Empl,CAge]=
          INTEGER(((DB Time)-ED[Empl,DOBIndex])/12)
     ED Current[Empl,CService]=
          IF THEN ELSE(INTEGER(((DB Time)-ED[Empl,DOHIndex])/12)<0,0,INTEGER((
(DB Time
     )-ED[Empl
          ,DOHIndex])/12))
     ED Current[Empl,CLevel]=
          ED[Empl,PSenior]
     ED Current[Empl,CAgeMonths]=
          ((DB Time)-ED[Empl,DOBIndex])
     ED Current[Empl,CHCFirm]=
          IF THEN ELSE(ED[Empl,PActive]=1, LOOKUP FORWARD(Health Factor,((DB
Time)
     -ED[Empl,DOBIndex]))*Annual HC Firm Start(ED[Empl
     ,PMarit])*Trend Coefficients[HC Firm],0)
     ED Current[Empl,CServiceMonths]=
          IF THEN ELSE(INTEGER(((DB Time)-ED[Empl,DOHIndex])/12)<0,0,INTEGER((
(DB Time
     )-ED[Empl
          ,DOHIndex])))
     ED Current[Empl,CServiceDecimal]=
          IF THEN ELSE((((DB Time)-ED[Empl,DOHIndex])/12)<0,0,((DB Time)-
ED[Empl
```

```
          ,DOHIndex])/12)
     Units: Dimensionless

(176)     ED Employee Activation[Union]=
          joining/Database Dynamics Units Conversion 4
     ED Employee Activation[Junior]=
          hiring/Database Dynamics Units Conversion 4
     ED Employee Activation[Senior]=
          landing/Database Dynamics Units Conversion 4
     Units: Dimensionless

(177)     ED Excess Process Vacancies[Empl Subgroups]=
          MAX((ED Employee Activation[Empl Subgroups]*Database Dynamics Units
Conversion 2
     -Vacancies[Empl Subgroups]),0)
     Units: individual

(178)     ED Ini[Empl,Prop]=
          GET XLS CONSTANTS ('HRIS.xls', 'PROPS_xl', 'B2')
     Units: Dimensionless

(179)     ED Limiting Pointers[Union]=
          VMAX(IF THEN ELSE(ED Ini[Empl!,PActive]=1,ED Ini[Empl!,PId],0))
     ED Limiting Pointers[Junior]=
          VMAX(IF THEN ELSE(ED Ini[Empl!,PSenior]=-1 :AND:  ED
Ini[Empl!,PActive]=
     0,ED Ini[Empl!,PId],0))
     ED Limiting Pointers[Senior]=
          VMAX(IF THEN ELSE(ED Ini[Empl!,PSenior]=0 :AND:  ED
Ini[Empl!,PActive]=0
     ,ED Ini[Empl!,PId],0))
     Units: Dimensionless

(180)     ED Truncated Overflow[Empl Subgroups]=
          IF THEN ELSE(ED Activation Pointers[Empl Subgroups]=0,ED Employee
Activation
     [Empl Subgroups],  MAX(ED Employee Activation[Empl Subgroups]-(ED Activa-
tion Pointers
     [Empl Subgroups]-ED Limiting Pointers[Empl Subgroups]),0) )
     Units: Dimensionless

(181)     EDCopyAtCycleStart[Empl,Prop]=
          ED[Empl,Prop]
```

```
     Units: Dimensionless

(182)     Individual Salary Growth by Subgroup=
          GET XLS LOOKUPS('HRIS.xls', 'SalaryCalculations', 'B', 'D4')
     Units: Dimensionless

(183)     New Hire Age=
          GET XLS LOOKUPS('WORLD.xls', 'DemogCalc', 'B', 'C3')
     Units: Dimensionless

(184)     New Hire Race=
          GET XLS LOOKUPS('WORLD.xls', 'DemogCalc', 'H', 'I3')
     Units: Dimensionless

(185)     New Hire Sex=
          GET XLS CONSTANTS('WORLD.XLS', 'DemogCalc', 'E3')
     Units: Dimensionless

(186)     Starting Jobs[Junior]=
          (SUM(IF THEN ELSE(ED Ini[Empl!,PSenior]=0,ED Ini[Empl!,PActive],0)))
*Database Dynamics Units Conversion 2
     Starting Jobs[Senior]=
          (SUM(IF THEN ELSE(ED Ini[Empl!,PSenior]=1,ED Ini[Empl!,PActive],0)))
*Database Dynamics Units Conversion 2
     Starting Jobs[Union]=
          (SUM(IF THEN ELSE(ED Ini[Empl!,PSenior]=-1,ED Ini[Empl!,PActive],0))
)*Database Dynamics Units Conversion 2
     Units: individual

(187)     Use Historical Hiring 1=
          0
     Units: Dimensionless

(188)     Vacancies[Union]=
          MAX(0,"Authorized Sub-group Jobs"[Union]-Active Union Empl Count)
     Vacancies[Junior]=
          MAX(0,"Authorized Sub-group Jobs"[Junior]-Active Junior Empl Count)
     Vacancies[Senior]=
          MAX(0,"Authorized Sub-group Jobs"[Senior]-Active Senior Empl Count)
     Units: individual

(189)     YTD Cost by Program[Program]=
          SUM(Net Program Cost in Current Fiscal Year[Program,Empl!])
```

```
     Units: dollars/year

*******************************
  .10 Bkgrnd Clock Mechs
*******************************

(191)     Balance of Year=
          IF THEN ELSE(Month of Calendar Year>Middle of Fiscal Year, 19-Month
of Calendar Year
     , 1)
     Units: Dmnl

(192)     Beginning of Next Year=
          IF THEN ELSE(Month of Calendar Year<Middle of Fiscal Year, 7-Month
of Calendar Year
     , 1)
     Units: Dmnl

(193)     Calendar=
          MAX(Balance of Year, Beginning of Next Year)
     Units: Dmnl

(194)     Calendar Adjustment=
          1
     Units: Month

(195)     Fiscal Year End=
          IF THEN ELSE((MODULO((Time/Calendar Adjustment)-Fiscal Year End
Month, 12
     )=0), 1, 0)
     Units: Dmnl

(196)     Fiscal Year End Month=
          0
     Units: Dimensionless

(197)     Middle of Fiscal Year=
          MODULO(Fiscal Year End+7, 12)
     Units: Dmnl

(198)     Month in Fiscal Year=
          MODULO(((Time/Calendar Adjustment)+(12-Fiscal Year End Month)), 12)
     Units: Dimensionless
```

```
(199)     Month of Calendar Year=
          (MODULO(Time-1, 12)+1)/Calendar Adjustment
     Units: Dmnl

*******************************
  .11 Port Test Mech
*******************************

(201)     Adjustment Time=
          7
     Units: Month

(202)     Avg Age at Term NU under 55=
          (SUM(IF THEN ELSE (ED Changes By Cycle End[Empl!,PActive] = -1  :AND:
ED
     [Empl!,PSenior] <>-1  :AND: ED Current[Empl!,CActive] = 1:AND:  ED Cur-
rent
     [Empl!,CAge]<55, (ED Current[Empl!,CAgeMonths]),0)) / SUM(IF THEN ELSE
(ED Changes By Cycle End
     [Empl!,PActive] = -1:AND:  ED[Empl!,PSenior] <>-1 :AND:  ED[Empl!,PActive
     ] =1:AND:  ED Current[Empl!,CAge]<55, 1, 1e-015)) / 12)*Database Dynamics
Units Conversion 1
     Units: year

(203)     Change in Perceived Value=
          "Error (Reported Value - Perceived Value)"/Adjustment Time
     Units: Units/Month

(204)     Change in Pink Noise = (White Noise - Pink Noise)/Noise Correlation
Time
     Units: 1/Month

(205)     "Error (Reported Value - Perceived Value)"=
          "Input: Reported Value of Variable (X)"-"Output: Perceived Value of
Input"
     Units: Units

(206)     Exogenous Rate=
          Initial Rate*Test Input
     Units: Widgets/Week

(207)     Initial Rate = 10000
```

```
     Units: Widgets/Week

(208)     "Input: Reported Value of Variable (X)"=
          RANDOM NORMAL(20,200,100,25,1000)
     Units: Units

(209)     Noise Correlation Time = 4
     Units: Month

(210)     Noise Standard Deviation = 0
     Units: Dimensionless

(211)     Noise Start Time = 5
     Units: Month

(212)     "Output: Perceived Value of Input"= INTEG (
          Change in Perceived Value,
               100)
     Units: Units

(213)     Pink Noise = INTEG(Change in Pink Noise,0)
     Units: Dimensionless

(214)     Pulse Quantity=
          -43
     Units: Month

(215)     Pulse Time=
          2
     Units: Month

(216)     Ramp End Time=
          1
     Units: Month

(217)     Ramp Slope=0
     Units: 1/Month

(218)     Ramp Start Time=5
     Units: Month

(219)     Sine Amplitude=
          0
```

```
     Units: Dimensionless

(220)     Sine Period=
          96
     Units: Month

(221)     Step Height=0
     Units: Dimensionless

(222)     Step Time=
          13
     Units: Month

(223)     Test Input=
          1+STEP(Step Height,Step Time)+
          (Pulse Quantity/TIME STEP)*PULSE(Pulse Time,TIME STEP)+
          RAMP(Ramp Slope,Ramp Start Time,Ramp End Time)+
          Sine Amplitude*SIN(2*3.14159*Time/Sine Period)+
                 STEP(1,Noise Start Time)*Pink Noise
     Units: Dimensionless

(224)     White Noise = Noise Standard Deviation*((24*Noise Correlation Time/
TIME STEP
     )^0.5*(RANDOM 0 1() - 0.5
     ))
     Units: Dimensionless

*******************************
  .12 Bkgnd Elems
*******************************

(226)     Annual HC Firm Start=
          GET XLS LOOKUPS('HRM.xls', 'MedicalDistrib', 'I', 'O20')
     Units: **undefined**

(227)     AnnualGrossTrendRates[Salary S]:HOLD BACKWARD::=
          GET XLS DATA('HRM.xls', 'TrendRates', 'A', 'B2')
     AnnualGrossTrendRates[Salary J]:HOLD BACKWARD::=
          GET XLS DATA('HRM.xls', 'TrendRates', 'A', 'C2')
     AnnualGrossTrendRates[Salary U]:HOLD BACKWARD::=
          GET XLS DATA('HRM.xls', 'TrendRates', 'A', 'D2')
     AnnualGrossTrendRates[Incentive]:HOLD BACKWARD::=
          GET XLS DATA('HRM.xls', 'TrendRates', 'A', 'E2')
```

```
     AnnualGrossTrendRates[Hiring Bonus]:HOLD BACKWARD::=
          GET XLS DATA('HRM.xls', 'TrendRates', 'A', 'F2')
     AnnualGrossTrendRates[EE401k]:HOLD BACKWARD::=
          GET XLS DATA('HRM.xls', 'TrendRates', 'A', 'G2')
     AnnualGrossTrendRates[Firm401k]:HOLD BACKWARD::=
          GET XLS DATA('HRM.xls', 'TrendRates', 'A', 'H2')
     AnnualGrossTrendRates[DiscContr]:HOLD BACKWARD::=
          GET XLS DATA('HRM.xls', 'TrendRates', 'A', 'I2')
     AnnualGrossTrendRates[Pens]:HOLD BACKWARD::=
          GET XLS DATA('HRM.xls', 'TrendRates', 'A', 'J2')
     AnnualGrossTrendRates[PensRevis]:HOLD BACKWARD::=
          GET XLS DATA('HRM.xls', 'TrendRates', 'A', 'K2')
     AnnualGrossTrendRates[HC Firm]:HOLD BACKWARD::=
          GET XLS DATA('HRM.xls', 'TrendRates', 'A', 'M2')
     AnnualGrossTrendRates[HC EE]:HOLD BACKWARD::=
          GET XLS DATA('HRM.xls', 'TrendRates', 'A', 'L2')
     Units: Dimensionless

(228)     Health Factor=
          GET XLS LOOKUPS('HRM.xls', 'MedicalDistrib', 'E', 'F16')
     Units: **undefined**

(229)     Period Trend Lookup=
          GET XLS LOOKUPS('HRM.xls', 'SalaryTrend', 'a', 'b2')
     Units: Dimensionless/year

(230)     Program Start Lookup=
          GET XLS LOOKUPS('HRM.xls', 'ProgramStartLevels', 'a', 'b2')
     Units: dollars/year

(231)     Trend Coefficients[Program]= INTEG (
          Trend Coefficients[Program]*((AnnualGrossTrendRates[Progr
am]^(1/12))-1),
               1)
     Units: Dimensionless

*******************************
  .13
*******************************

(233)     Current Calendar Year Pay[Empl]=
          IF THEN ELSE(ED Current[Empl,CActive]=1,MAX(Net Program Cost in
Current Fiscal Year
```

```
     [Salary S,Empl]*(12/Month of Calendar Year)+Net Program Cost in Current
Fiscal Year
     [Salary J,Empl]*(12/Month of Calendar Year)+Net Program Cost in Current
Fiscal Year
     [Salary U,Empl]*(12/Month of Calendar Year),1e-005),0)
     Units: dollars/year [0,?]

******************************
  .14 Hist vs Model
******************************

(235)     Average Age of Active Empls=
          (SUM(IF THEN ELSE (ED Current[Empl!,CActive] = 1,(ED
Current[Empl!,CAgeMonths
     ]),0)) / SUM(ED Current[Empl!,CActive])*Database Dynamics Units Conver-
sion 1
     )/12
     Units: year

(236)     Average NonUnion Salary=
          SUM(IF THEN ELSE (ED Current[Empl!,CActive] = 1:AND:  ED
Current[Empl!,CLevel
     ] >-1 , (ED Current[Empl!,CSalary]),0)) / SUM(IF THEN ELSE(   ED Current[
     Empl!,CLevel] >-1,  ED Current[Empl!,CActive], 0))
     Units: 1

(237)     Average Service of Actives=
          SUM(IF THEN ELSE (ED Current[Empl!,CActive] = 1,(ED
Current[Empl!,CServiceDecimal
     ]),0)) / SUM(ED Current[Empl!,CActive])*Database Dynamics Units Conver-
sion 1
     Units: year

(238)     Avg Service of Former Empls=
          SUM(IF THEN ELSE (ED Changes By Cycle End[Empl!,PActive] = -1:AND:
ED Current
     [Empl!,CActive] = 1,(ED Current[Empl!,CServiceDecimal]),0)) / SUM(IF THEN
ELSE
      (ED Changes By Cycle End[Empl!,PActive] = -1:AND:  ED[Empl!,PActive] =1,
      1, 0))*Database Dynamics Units Conversion 1
     Units: year

(239)     Count of Active Empls=
```

```
          Count of Active Juniors+Count of Active Seniors+Count of Active
Union
     Units: 1

(240)     Count of Active Juniors=
          SUM(IF THEN ELSE(ED[Empl!,PSenior]=0,ED[Empl!,PActive],0))
     Units: Dmnl

(241)     Count of Active NonUnion=
          SUM(IF THEN ELSE(ED[Empl!,PSenior]<>-1,ED[Empl!,PActive],0))
     Units: Dmnl

(242)     Count of Active NonUnion AA F=
          SUM(IF THEN ELSE(ED[Empl!,PSenior]<>-1:AND: ED[Empl!,PGender]=1
:AND: ED
     [Empl!,PRace]=1, ED[Empl!,PActive],0))
     Units: Dmnl

(243)     Count of Active NonUnion AA M=
          SUM(IF THEN ELSE(ED[Empl!,PSenior]<>-1:AND: ED[Empl!,PGender]=0
:AND: ED
     [Empl!,PRace]=1, ED[Empl!,PActive],0))
     Units: Dmnl

(244)     Count of Active NonUnion Other F=
          SUM(IF THEN ELSE(ED[Empl!,PSenior]<>-1:AND: ED[Empl!,PGender]=1
:AND: ED
     [Empl!,PRace]>1, ED[Empl!,PActive],0))
     Units: Dmnl

(245)     Count of Active NonUnion Other M=
          SUM(IF THEN ELSE(ED[Empl!,PSenior]<>-1:AND: ED[Empl!,PGender]=0
:AND: ED
     [Empl!,PRace]>1, ED[Empl!,PActive],0))
     Units: Dmnl

(246)     Count of Active NonUnion W F=
          SUM(IF THEN ELSE(ED[Empl!,PSenior]<>-1:AND: ED[Empl!,PGender]=1
:AND: ED
     [Empl!,PRace]=0, ED[Empl!,PActive],0))
     Units: Dmnl

(247)     Count of Active NonUnion W M=
```

```
          SUM(IF THEN ELSE(ED[Empl!,PSenior]<>-1:AND: ED[Empl!,PGender]=0
:AND: ED
     [Empl!,PRace]=0, ED[Empl!,PActive],0))
     Units: Dmnl

(248)     Count of Active Seniors=
          SUM(IF THEN ELSE(ED[Empl!,PSenior]=1,ED[Empl!,PActive],0))
     Units: Dmnl

(249)     Count of Active Union=
          SUM(IF THEN ELSE(ED[Empl!,PSenior]=-1,ED[Empl!,PActive],0))
     Units: Dmnl

(250)     Cumul NonUnion Departures 55 and Up=
          Ex NonUnion Departures 55 and Up+NonUnion Departures 55 and Up
     Units: individual

(251)     Cumul NonUnion Departures under 55=
          NonUnion Departures under 55+Ex NonUnion Departures under 55
     Units: individual

(252)     Cumulative Former Employees[Empl Subgroups]=
          Ex Terminations[Empl Subgroups]+Terminations All Levels[Empl Sub-
groups]
     Units: Dimensionless

(253)     Cumulative New Employees=
          New Employees All Levels+Ex New Employees
     Units: Dimensionless

(254)     ED Changes By Cycle End[Empl,Prop]=
          IF THEN ELSE(Use Historical Hiring 1=1,ED Changes By Cycle End His-
torical
     [Empl,Prop],ED Changes By Cycle End Modeled[Empl,Prop])
     Units: 1

(255)     Ex New Employees= INTEG (
          New Employees All Levels,
               0)
     Units: Month

(256)     Ex NonUnion Departures 55 and Up= INTEG (
          NonUnion Departures 55 and Up,
```

```
               0)
     Units: Month

(257)     Ex NonUnion Departures under 55= INTEG (
          NonUnion Departures under 55,
               0)
     Units: Month

(258)     Ex Terminations[Empl Subgroups]= INTEG (
          Terminations All Levels[Empl Subgroups],
               0)
     Units: Month

(259)     New Employees All Levels=
          SUM(IF THEN ELSE (ED Changes By Cycle End[Empl!,PActive] = 1:AND:
ED[Empl
     !,PActive] =0, 1, 0))
     Units: Dimensionless

(260)     NonUnion Departures 55 and Up=
          SUM(IF THEN ELSE (ED Changes By Cycle End[Empl!,PActive] = -1:AND:
ED[Empl
     !,PActive] =1:AND:  ED[Empl!,PSenior]>-1
          :AND:  ED Current[Empl!,CAge]>=55, 1, 0))
     Units: 1

(261)     NonUnion Departures under 55=
          SUM(IF THEN ELSE (ED Changes By Cycle End[Empl!,PActive] = -1:AND:
ED[Empl
     !,PActive] =1:AND:  ED[Empl!,PSenior]>-1
          :AND:  ED Current[Empl!,CAge]<55, 1, 0))
     Units: 1

(262)     Relative Service of Former Empls=
          Avg Service of Former Empls/Average Service of Actives
     Units: 1

(263)     Terminations All Levels[Union]=
          SUM(IF THEN ELSE (ED Changes By Cycle End[Empl!,PActive] = -1:AND:
ED[Empl
     !,PSenior] =-1:AND:  ED[Empl!,PActive] =1, 1, 0))
     Terminations All Levels[Junior]=
          SUM(IF THEN ELSE (ED Changes By Cycle End[Empl!,PActive] = -1:AND:
```

```
ED[Empl
     !,PSenior] =0:AND:  ED[Empl!,PActive] =1, 1, 0))
     Terminations All Levels[Senior]=
          SUM(IF THEN ELSE (ED Changes By Cycle End[Empl!,PActive] = -1:AND:
ED[Empl
     !,PSenior] =1:AND:  ED[Empl!,PActive] =1, 1, 0))
     Units: Dimensionless

********************************
  .Control
********************************

          Simulation Control Parameters

(265)     adding[Empl]=
          MIN((DC Plan limits[Empl]*"Year:Month conversion"), (Employee Con-
tributions
     [Empl]+Matching Contributions[Empl]+Nonmatching Contributions
          [Empl]))
     Units: dollars/Month

(266)     FINAL TIME  = 192
     Units: Month

(267)     INITIAL TIME  = 1
     Units: Month

(268)     SAVEPER  =
             TIME STEP
     Units: Month [0,?]

(269)     TIME STEP  = 1
     Units: Month [0,1,1]

********************************
  .Model080206cb testing
********************************

(271)     Amended Part 1 DB factor=
          0.008
     Units: Dimensionless

(272)     Annuity Factors:
```

```
          D current, N retire, N expect

(273)     Avg Age at Term NU 55 and Up=
          (SUM(IF THEN ELSE (ED Changes By Cycle End[Empl!,PActive] = -1  :AND:
ED
     [Empl!,PSenior] <>-1  :AND: ED Current[Empl!
          ,CActive] = 1:AND:  ED Current[Empl!,CAge]>=55,(ED
Current[Empl!,CAgeMonths
     ]),0)) / SUM(IF THEN ELSE (ED Changes By Cycle End[Empl!,PActive] =
-1:AND:

          ED[Empl!,PSenior] <>-1 :AND:  ED[Empl!,PActive] =1:AND:  ED
Current[Empl
     !,CAge]>=55, 1, 1e-015)) / 12)*Database Dynamics Units Conversion 1
     Units: year

(274)     Avg Ret Ages Cumulating= INTEG (
          cum over 55,
               0)
     Units: year

(275)     Avg Ret Ages Cumulative=
          Avg Ret Ages Cumulating/Time
     Units: **undefined**

(276)     Chang Sat Avg J=
          SUM(changing satisfaction[Empl!]) / Junior Employees
     Units: Dimensionless/Month

(277)     CO Avgs[Senior]=
          SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=1,ED
Current[Empl!,CActive]=1,Career Opportunities
     [Empl!]))/Senior Employees
     CO Avgs[Junior]=
          SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=0,ED
Current[Empl!,CActive]=1,Career Opportunities
     [Empl!]))/Junior Employees
     CO Avgs[Union]=
          SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=-1,ED
Current[Empl!,CActive]=1,
     Career Opportunities[Empl!]))/Union Employees
     Units: Dimensionless
```

```
(278)     Count Diff 2=
          DD Count-"Jr. Departure"
     Units: Dmnl

(279)     Count Difference=
          Add Fac Count-Career Wk Dep Count
     Units: Dmnl

(280)     Credited Service after Amendment[Empl]=
          MAX(0,Employee's Credited Service[Empl]-Credited Service before
Amendment
     [Empl])
     Units: year

(281)     Credited Service before Amendment[Empl]=
          MAX(Credited Service Ramp[Empl], Prior Credited Service freeze[Empl])
     Units: **undefined**

(282)     Credited Service Freeze Time Step=
          1-STEP(1, 73)
     Units: **undefined**

(283)     Credited Service Ramp[Empl]=
          MAX(Employee's Credited Service[Empl]*Credited Service Freeze Time
Step,0
     )
     Units: year

(284)     Criterion Odds Factor=
          1.3
     Units: Dimensionless

(285)     cum over 55=
          Avg Age at Term NU 55 and Up
     Units: **undefined**

(286)     CUN Avgs[Senior]=
          SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=1,ED
Current[Empl!,CActive]=1,Career Unmet Needs
     [Empl!]))/Senior Employees
     CUN Avgs[Junior]=
          SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=0,ED
Current[Empl!,CActive]=1,Career Unmet Needs
```

```
     [Empl!]))/Junior Employees
     CUN Avgs[Union]=
          SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=-1,ED
Current[Empl!,CActive]=1,
     Career Unmet Needs[Empl!]))/Union Employees
     Units: Dmnl

(287)     DD Count=
          SUM(IF THEN ELSE (ED Current[Empl!,CActive] = 1,(Decision to
Depart[Empl!
     ]),0))
     Units: Dmnl

(288)     "Diff Jrs."=
          Active Junior Empl Count-Junior Employees
     Units: Dmnl

(289)     "Diff Srs."=
          Active Senior Empl Count-Senior Employees
     Units: Dmnl

(290)     Diff Unions=
          Active Union Empl Count-Union Employees
     Units: Dmnl

(291)     Diversity Count=
          Count of Active NonUnion AA F+Count of Active NonUnion AA M+Count of
Active NonUnion Other F
     +Count of Active NonUnion Other M+Count of Active NonUnion W F
     Units: Dmnl

(292)     "Diversity Pct."=
          Diversity Count/Count of Active NonUnion
     Units: Dmnl

(293)     Empl:
          (E1-E17292)

(294)     Empl Subgroups:
          Senior, Junior, Union

(295)     "Historical Actual Sub-group Jobs"[Empl Subgroups]=
           LOOKUP FORWARD("Historical Actual Sub-group Jobs Lookups"[Empl
```

```
Subgroups
     ], Time)
     Units: individual

(296)     "Historical Actual Sub-group Jobs Lookups"[Senior](
          [(0,0)-
(200,600)],(0,379),(13,411),(25,412),(36,406),(48,377),(120,377))
     "Historical Actual Sub-group Jobs Lookups"[Junior](
          [(0,0)-
(200,2000)],(0,1434),(13,1647),(25,1762),(36,1656),(48,1572),(120,
     1434))
     "Historical Actual Sub-group Jobs Lookups"[Union](
          [(0,0)-
(200,2000)],(0,1311),(13,1356),(25,1311),(36,1311),(48,1311),(120,
     1311))
     Units: individual

(297)     ICPS Avgs[Senior]=
          SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=1,ED Current[Empl!,CActive
]=1,Individual's Career Prospects Satisfaction
     [Empl!]))/Senior Employees
     ICPS Avgs[Junior]=
          SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=0,ED Current[Empl!,CActive
]=1,Individual's Career Prospects Satisfaction
     [Empl!]))/Junior Employees
     ICPS Avgs[Union]=
          SUM(IF THEN ELSE(ED Current[Empl!,CLevel]=-1,ED
Current[Empl!,CActive]=1,
     Individual's Career Prospects Satisfaction[Empl!]))/Union Employees
     Units: Dimensionless

(298)     Initial Part 1 DB factor=
          0.01
     Units: Dimensionless

(299)     "Jr/Sr ratio"=
          3.82
     Units: Dimensionless

(300)     Junior flow diff L=
          hiring-"Jr. leaving"
     Units: individual/Month
```

```
(301)     Junior flow diff LR=
          hiring-("Jr. leaving"+"Jr. retiring")
     Units: individual/Month

(302)     Opp Adv Diff[Empl]=
          Individual's Initial Advancement Needs[Empl]-Career
Opportunities[Empl]
     Units: Dimensionless

(303)     Prior Credited Service freeze [Empl]=
          IF THEN ELSE(Time>72, MAX(Employee's Credited Service[Empl]-
(0.0825*(Time
     -72)),0), 0)
     Units: **undefined**

(304)     Program:
          Salary S, Salary J, Salary U,Incentive,Hiring
Bonus,EE401k,Firm401k,DiscContr
     ,Pens,PensRevis,HC EE,HC Firm

(305)     ProgramGeneral:
          Incentive,Hiring Bonus,EE401k,Firm401k,DiscContr,Pens,PensRevis,HC
EE

(306)     Prop:
          PId,PNull,PActive,PGender,PMarit,PSenior,PSalary,PSal2000,PBal401kSt
art,PDef401kLast
     ,Pct401k,DOBIndex,DOHIndex,DOTIndex,PRace,PFLSA,PSite,PEverActive

(307)     PropCurrent:
          CActive, CAge,CAgeMonths,CService,CSalary,CLevel,CHCFirm,CServiceMon
ths,CServiceDecimal

(308)     Retirement Odds at Current Repl Income[Empl]=
          LOOKUP FORWARD(Odds at Replacement Income Pcts,Total Replacement
Income Estimate
     [Empl])
     Units: Dimensionless

(309)     Salary:
          SalaryS,SalaryJ,SalaryU

(310)     Sine Amplitude 0[Empl Subgroups]=
```

```
          0.12,0.24,0.04
     Units: Dimensionless

(311)     Sine Period 0[Empl Subgroups]=
          96,90,48
     Units: Month

(312)     StableProp:
          PId,PNull,PGender,PMarit,PSenior,PSalary,PSal2000,PBal401kStart,PDef
401kLast
     ,Pct401k,DOBIndex,DOHIndex,DOTIndex,PRace,PFLSA,PSite

(313)     StablePropModeling:
          PId,PNull,PMarit,PSalary,PSal2000,PBal401kStart,PDef401kLast,Pct401k
,PFLSA
     ,PSite

(314)     Test Input Sine[Empl Subgroups]=
          (1+(Zero*(Sine Amplitude 0[Empl Subgroups]*SIN(2*3.14159*Time/Sine
Period 0
     [Empl Subgroups])))
     Units: Dimensionless

(315)     Total retiring=
          "Jr. retiring"+"Sr. retiring"
     Units: individual/Month

(316)     Vacancy Rate Diffs[Empl Subgroups]=
          Vacancy Creation Rate[Empl Subgroups]-Vacancy Closure Rate[Empl
Subgroups
     ]
     Units: individual/Month

(317)     Zero=
          0
     Units: Dimensionless
```

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Chapter 84
Trends in IT Human Resources and its Determinants

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ABSTRACT

This chapter discusses the driving forces behind the trends in Information Technology (IT) that are likely to influence the number of available IT jobs in the future. One advantage of focusing on industry trends as opposed to the current job market is that long term trends are more likely to be useful for strategic planning. Institutions of higher education (IHE) want to provide their graduates with the knowledge and skills needed by employers, but given the rapid change within the IT industry, chasing short term trends as part of a multi-year degree is a fool's errand.

The purpose of this chapter is to examine the various, sometimes contradictory, factors influencing the demand for IT professionals and to build a simple framework that can be used to predict demand. The ability to predict the demand for IT professionals with a reasonable degree of accuracy is important for IHE's and businesses to correctly identify where their scarce resources should be allocated to develop a curriculum for the 21st century workforce.

INTRODUCTION

When one of the authors was in a doctoral program, the PhD students from the business school would occasionally gather in a local drinking establishment and engage in an attempt at scholarly banter over various fun topics. One of the topics that emerged on several occasions was which business discipline is the most important for a successful business.

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The accounting students might point out that without accounting you would not be able to effectively keep track of your money. Management students might counter that without operations you would not be able to effectively make products. Marketing would try to sell us on the idea that without marketing a firm could not effectively sell products and thus there would be no need for any of the other disciplines. All the other disciplines would pitch in with why their area was the most important area of study and so the conversation would go. There was one exception to the arguments. It emerged during those conversations that nearly every discipline admitted that an understanding of Information Technology was essential for a complete understanding of their discipline. Correspondingly, an understanding of other disciplines was essential for most Information Technology students and practitioners.

The emergence of IT as a discipline has been recent and has evolved rapidly. Topics such as Business Intelligence, Data Mining, and Software Development were once mainly topics that Information Technology researchers discussed and only a few large businesses experimented with using a small fraction of their budgets. Now IT has become essential for most businesses and is becoming more integrated into the way businesses function each year. IT areas such as software development have also become much more of a process driven endeavor and have moved away from the days of an individual or small team working in isolation to produce spaghetti code that resulted in software that seemed to be produced by magic to the end user. Modern business software tends to be very complex and to span multiple business functions. Because it is beyond the capability and an individual to be able to build software in isolation project teams are formed. These teams have functions that can largely be broken down into three areas, management, technology expertise, and domain expertise in area such as accounting, marketing, or consumer psychology to give a few examples. Each of the team members contributes toward the design and implementation of application that would be beyond the ability of even the most capable person to produce in isolation.

Officers and managers of a firm no longer have the luxury of an army of data analyst at their disposal to find data, analyze it and then present the findings to the executives. Because of the IT revolution management has had to embrace the use of technology and learn how to use the firm's IT tools to utilize the data resources for more efficient and effective operations across all areas. The digital revolution has caused IT to go from being something a firm might use to being a core part of most organizations.

IT cannot exist in isolation because it is integrated throughout the firm. In fact, IT has become so pervasive that most jobs now require interacting with IT. To have competent IT performance, firms need an adequate supply of IT professionals and many of these professionals will need to be provided by institutions of higher education. The challenge for institutions of higher education is how to balance the need for rigorously teaching students the underlying theory of a field, needed skills, and how to engage in the type of continuous life-long learning that will be needed to keep them up to date after completion of their degree. These goals should be accomplished within a curriculum that provides students with relevant knowledge and skills that are in demand by employers. One of the reasons it is difficult to develop such a curriculum is that the technology field is in a period of tremendous change.

According to futurist George Gilder (2002) the amount of technical knowledge is doubling every two years and it is expected that the pace of growth will continue to increase. Because of this rate of rapid change, institutions of higher education that offer degrees in the Information Technology fields will have difficult choices to make regarding how their curriculum should be structured. Schools will have to be willing to adapt quickly to the needs of their key stakeholders to remain viable (Fleming, 2008). Some scholars

question whether it is even possible for business schools to adequately prepare their graduates for the workforce given the current structure of the schools (Mintzberg, 2004; McKenna, Cotton, & Van Auken, 1995; Bennis & O'Toole, 2005; McNamara, 2006).

As a result an increasing number of businesses are choosing to train their employees in-house through corporate universities (Gerdes, 2005). Corporate University Xchange estimates that the number of corporate universities totals 2000 which is up from only 400 about 15 years ago and they predict that the number will grow to 3,700 by 2010 (AACSB, 2002).

This chapter reviews trends in IT human resources (HR) and postulates some factors that are likely to impact the number of IT jobs, filled or vacant. One advantage of looking at industry trends as opposed to current jobs is that long term trends are more likely to be detected since the short term vagrancies of the job market are filtered out. Another advantage of looking at industry trends is that we can develop a framework that is generic enough so that human resources departments can use the frame work to better communicate with IT departments at educational institutions for the purpose of developing a customized curriculum. It is imperative that businesses and IHE's work together to develop students into graduates who are exceptionally well qualified and can contribute value to an organization quickly. This collaboration will also enable IHE and businesses to correctly identify where their scarce resources should be allocated to develop employees for the 21st century workforce. IT graduates face a highly competitive job market while businesses face a competitive global marketplace so any efforts to produce market ready graduates and to increase productivity should be explored.

Curriculum committees can conduct curriculum reviews to indentify niches that are available for their particular institution by considering the framework presented in this paper. Gerdes (2005) reported that for mid-tier MBA programs, focusing on niche areas has led to growth in their programs. While no research could be found that examined niche undergraduate programs, it is not unreasonable to believe that a curriculum that is employer friendly and results in more job offers for graduates would also be welcomed by students. For example, if an environmental scan reveals that many businesses who are key stakeholders of the educational institution are involved in the use of business intelligence (BI) then the curriculum can be developed so that more graduates will have knowledge and skills that are valued for that application of IT. A different institution might find that they are located in an area where their key stakeholders rarely use BI but there is a huge demand for graduates with programming and system analysis and design knowledge, in which case the curriculum could be adapted to produce well rounded graduates who have a concentration of courses in that area.

It is in the best interest of businesses and IHE's to work together to help determine what skills and abilities are likely to be in demand. Human Resource departments are tasked with finding the right personnel for the available positions. By working with IHE's HR departments can increase the number of qualified applicants and decrease the amount of time needed for newly hired employees to provide value.

BACKGROUND

Bureau of Labor Statistics Projected Growth Rate

Bureau of Labor Statistics (BLS) data indicates that one of the fastest-growing sectors in the U.S. economy is the IT sector (Dohm & Shniper, 2007). Ten year employment rolling forecasts of IT labor demand have been made every other year since 2000 (Dohm & Shniper, 2007; Hecker, 2006; Hecker, 2004; Hecker, 2001). These forecasts are published biennially and each biennium the future

growth rates are revised. Based on projections it is anticipated that the increase in demand for IT professionals will continue but it will do so at a decreasing rate. Figure 1 shows a plot of these projections.

Each revised projection is getting flatter indicating that the growth rate of IT related jobs is being revised down with each new report. One possible explanation that we will explore in this chapter is that the nature of who performs the business processes is transitioning from IT specialist to more general knowledge workers in other functional areas.

The BLS has a reputation for nonpartisan research and does an excellent job. However, all projections are necessarily subject to error by their very nature. Figure 2 compares actual IT professional jobs to BLS projections. The intent is not to in anyway criticize the BLS projections but rather to gain some insights into what type of errors may be occurring in order to consider possible sources for the nature of the error. In 2002, BLS was very optimistic about the IT labor market which is reflected in the more than 10% projection over actual number of jobs. In 2004, the difference reduced drastically to 2.1%, and in 2006 BLS was pessimistic about the market, with the projected number of jobs being 4.4% less than the predicted jobs. Although the latest projection (2008) is greater than the actual, the difference in percentage points is one third that of 2002. As the IT field matures and is incorporated into other functional areas it is anticipated that the BLS projections will continue to become more accurate as errors generated by the evolutionary nature of IT enabled business practices diminishes.

From examining Figure 2 it would appear that the increase in demand for IT professionals is actually present. One shortcoming with the forecast as presented so far is that skills sets for IT professionals are not easily transferable. That is to say for example, a programmer is generally not equipped to perform well as a business analyst or vice versa. Knowing if there are particular job categories that are net winners and losers in the job creation process would be more useful.

From 2000 until 2008 there was a positive overall growth rate for the development and adoption of IT applications but the growth was not across all categories. Two out of the eleven IT professional job categories experienced declines between 2000 and 2008 as shown in Figure 3. The

Figure 1. BLS 10-year labor projections

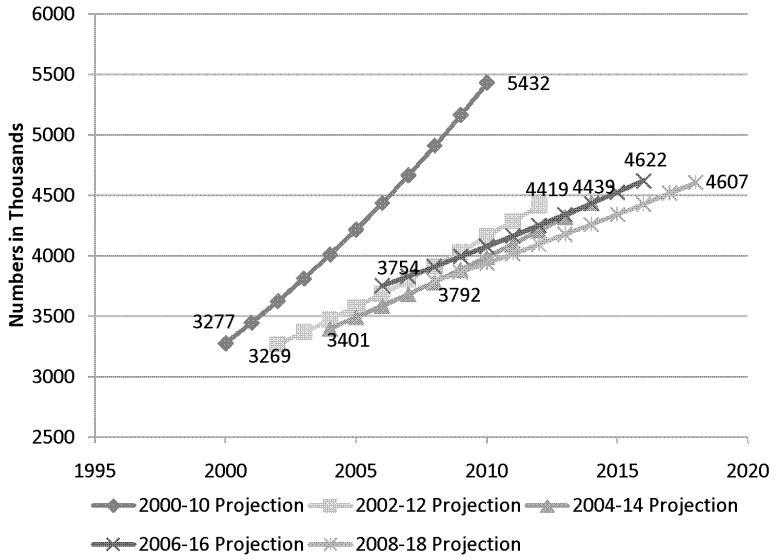
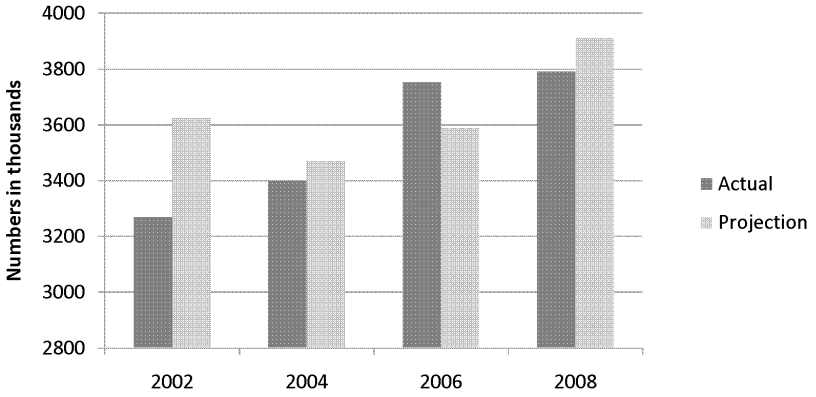


Figure 2. Actual jobs compared to projected

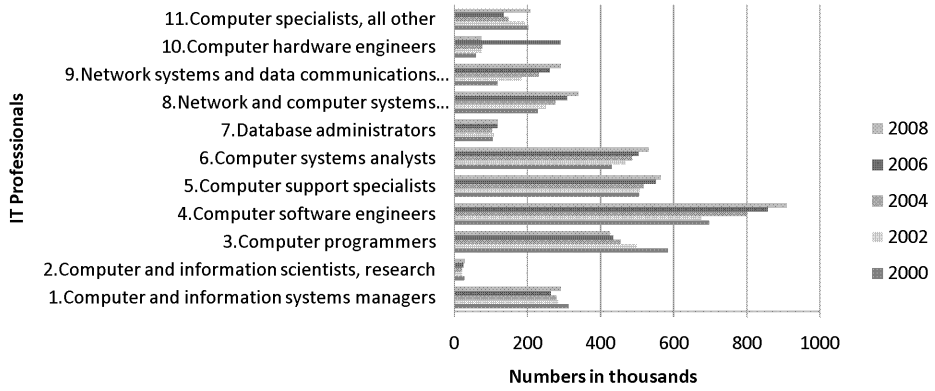


categories are computer and Information Systems managers and computer programmers. The fastest growing IT jobs include network systems and data communications analyst (145%) and network and computer systems administrators (48%). Computer software engineers accounts for the highest proportion of all IT professional jobs (over 21%).

One complicating factor that makes the BLS data of very limited value for predicting HR needs is that the job growth rates across different industry segments and geographic regions are not likely to have a uniform demand for different knowledge sets. As an example, the demand for a systems analyst might be high in an urban area or an area where there are a lot of software development firms but it is likely that in some rural areas those skills would not be in high demand because of the lack of larger companies or software development houses.

That does not indicate an absence of need for courses that develop students for other IT areas such as business analyst. Instead it is an indicator that while a standardized approach such as that put forth by the Association for Computing Machinery is a very valuable guide for developing a core curriculum that covers the knowledge all IT majors need in their respective broad subject areas, it will not be sufficient to produce an agile IT workforce that is able to become productive

Figure 3. IT jobs by category



quickly after employment. In areas where there is a thriving vibrant business environment that needs a certain IT niche there is an opportunity for businesses and institutions of higher learning to partner together to serve that community's needs by developing and emphasizing an area of study that will increase the value of IT graduates.

Therefore, the needed framework is one that can serve as a lens through which trends in the community can be viewed so that areas of emphasis can be identified. Toward that end, we have identified the key factors that are likely to influence the demand for IT professionals and allow for the prediction of which areas are likely to be in most demand.

FACTORS CONTRIBUTING OR INHIBITING GROWTH IN IT HUMAN RESOURCES

Demand for IT Applications

The average IT investment by U.S. organizations is approximately 3.5 to 7.0% of their sales revenue (Network World, 2009) and contributes up to 50% in total capital costs (Applegate et. al. 2007). IT is essential to survival for most businesses but while IT jobs have not been spared from the economic downturn currently impacting the global economy they have not been as hard hit as the overall economy in the United States. According to an analysis of Bureau of Labor Statistics data conducted by GovInfoSecurity.com the unemployment rate for IT professionals was 4.1 percent for the second quarter of 2009. While that was up substantially from the 2.3 percent unemployment of a year earlier it was still far better than the overall jobless rate of 9.3 percent (BLS, 2010). There are also some signs of recovery on the IT front. President Obama has requested an increase of 1.2 percent in spending for IT projects for fiscal year 2011 bringing total requested IT spending for the United States Government to $79.4 billion. Global spending on IT was down 4.6 percent in 2009 but it is expected to rebound to $3.4 trillion in 2010 (Gartner, 2010). This increase is likely to be driven by demand for new technologies such as cloud computing, software as a service (SaaS) and Enterprise Resource Planning packages among others.

Reliance upon Information Technology is pervasive and is likely to become more so in the future. The acquisition of new software can be broken down into two categories. The first category is software that a company acquires primarily from another source. This includes common applications such as Microsoft Office, Quickbooks, and more complex applications such as Peoplesoft which have to be extensively customized during implementation. For the purpose of discussion we will refer to software made by other companies that is not for one particular client as Commercial Off-The-Shelf (COTS) applications. The second category is software that a company largely develops on their own and for their own use. Software developed largely in-house and not for sale will be considered proprietary software.

The skill set needed to manage an IT infrastructure consisting primarily of COTS software is different than the skill set needed to build and maintain proprietary software. In order to predict the demand for different types of software professionals we need to understand the trends in COTS and proprietary software development.

Businesses are moving toward great use of software solutions to satisfy customer demand, increase effectiveness, and become more efficient. This is leading to an overall growth in demand for IT applications that is driving the greater need for both proprietary and COTS software. As an example, customers increasingly want to utilize their mobile communications devices, such as smart phones, netbooks, and tablet computers, to check their account information online. This creates a demand for a service that many businesses have to satisfy. In looking for a solution they might need to purchase a COTS solution from a

vendor or they might decide to build a proprietary system. Whichever choice they make will influence the skill set needed to implement, manage, and maintain the solution The trends could be explained with the framework depicted in Figure 4. The framework is developed based on the model suggested by Agrawal, Tenkorang, Agrawal and Taylor (2009) and Agrawal (2005 a, b).

Components of the Framework

The growth in demand for IT applications is driving the greater need for proprietary software and COTS software. However, assuming constant demand for IT applications, increase in demand for proprietary software will have a negative impact on COTS and end user computing. A detailed discussion of the framework components is presented below.

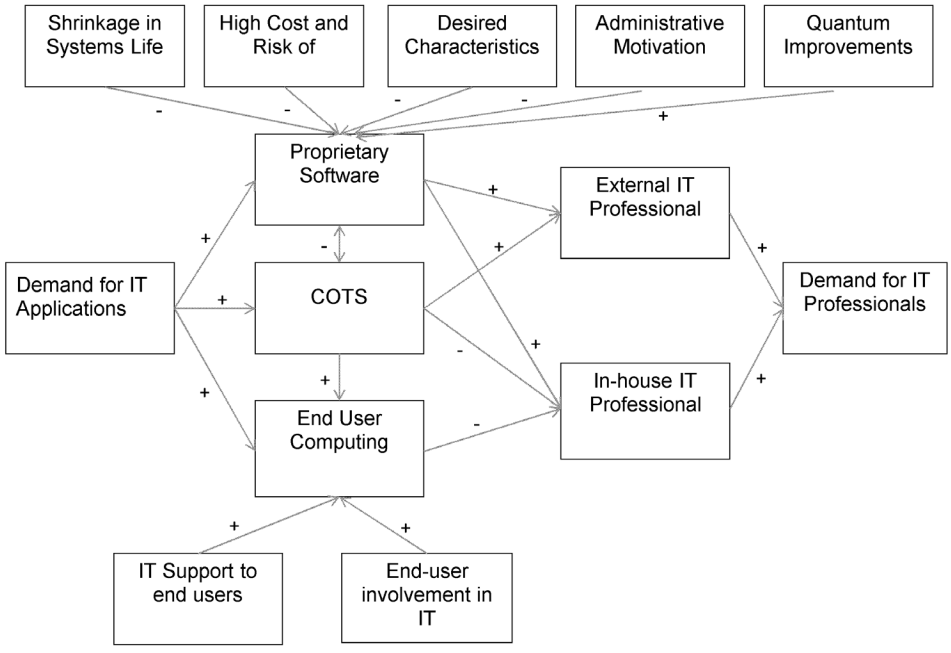
Proprietary Software

The shifting role of IT as a strategic necessity will affect strategic decisions regarding the level of corporate investment in IT (Carr, 2003). When organizations have a possibility of strategic advantage, the organizations will maximize investments and develop proprietary application packages, maintaining control of the software development and the flexibility in the packages.

In a free market, it is very difficult to get and maintain a sustainable competitive advantage (Porter, 1980). This goes for using IT as a competitive advantage as well. When a competitive advantage is achieved the time to duplicate the advantage is very short (months not years) once a rival's IT is understood.

Organizations such as Wal-Mart, Dell, and JetBlue have used proprietary IT to gain a competitive advantage in the marketplace (Wailgum, 2007). By using proprietary software these companies and others have been able to add capabilities that were hard for their competitors to copy as long as the capabilities remained confidential. However, because of factors associated with developing customized software companies have begun to use less proprietary software in favor of COTS

Figure 4. Framework



software. Even companies such as Wal-Mart that have traditionally believed that technology should be built to support best practice business procedures have started to adopt best of breed commercial application for business intelligence and other infrastructural technological needs (Wailgum, 2007) while at the same time building new custom applications when there is a potential to gain a large strategic advantage. The observed decline in proprietary software use is attributed to four major trends.

These trends are shrinkage in systems life cycle (faster development time), high cost and risk-prone tendency of the needed software (more complex projects), desired characteristics of the software solution (ease of use and predictability), and administrative motivation (desire of management to avoid risks and to focus on core competencies.

Each of these serves to make the development of proprietary software more risky and of less incremental value than using commercial off the shelf software. One countervailing force is when quantum improvements, improvements that radically change existing business practices, in software are desired in order to get a competitive advantage. The overall decrease in dependence of firms on proprietary software is seen in their shift to COTS software for an increasing percentage of their applications. We will consider each of the trends in turn with respective to its impact on COTS.

Commercial-Off-The-Shelf Software (COTS)

As a result of the trends previously mentioned human resource departments need to identify which strategy their company is likely to predominantly employ so the skill sets of employees will meet the needs of the business. In order for human resource professionals to understand which strategy their business is likely to adopt we will consider each of these in turn. This overview is not intended to be exhaustive but is instead designed to serve as a primer to enable the reader to converse with senior management regarding areas of long-term strategic alignment of HR resources with business needs.

The ***systems life cycle is shrinking*** as software development advances. With blurring national boundaries, the numbers of competing organizations and knowledge workers have been increasing. Additionally, the environment is turbulent, changing rapidly, and in an unpredictable manner (Applegate, 2007, Scott-Morton, 1991; Turban et al., 2001). The characteristics of this environment identified by El Sawy et al. (1999) include time-compression, short product life cycles, strategic discontinuity, increase in knowledge intensity, and a customer-focused approach. The environmental trends will make organizational processes and resulting software applications vulnerable to frequent changes. The faster obsolescence of packages will result in an increase in the cost of the IT applications. Li and Ye (1999) also contend that it is an era of time-based competition. The same strategy will not work for a prolonged period of time. The changes in strategy will lead to alteration in the processes and the resulting software. Matheson and Tarjan (1998) and Nidumolu and Knotts (1998) found that software firms have very short development time cycles since technology changes very rapidly. Brancheau et al. (1996) asserted that the effectiveness of software development has been a key management Information Systems issue since the 1980s. Agrawal (2005d) asserted that the higher rate of product obsolescence will lead to increased adoption of Enterprise Resource Planning (ERP) packages and decrease in usage of off-the-shelf applications (other than ERP packages). Under such circumstances organizations are expected to invest a minimum amount of time and money on the software by using traditional off-the-shelf solutions, cloud computing, software as a service, Enterprise Resource Planning packages, and other COTS solutions as appropriate.

Software development is expensive and risky due to the complexity of modern systems and high

project failure rates. A report by Standish Group International on the success of software projects reveals that in the United States 31.1% of projects are not completed; while 52.7% are completed, but with an average cost overrun of 189%, and many of these did not contain all the functionalities of original specifications. Only 16.2% of projects are completed in-time and on-budget (Hays, 1997; Turban et al. 2001). Since the early 1980s the estimated failure rate of large-scale software development is 85% (Ambler, 1999). According to Laudon and Laudon (1999), a complex package is one which contains more than 400 programs and 500,000 lines of codes. Jeong and Klein (1999) note that more complex systems are susceptible to high failure. Most integrated packages can be considered large and complex, and therefore have an inherent risk of failure. Turban et al. (2001) have stated that because of associated risks, some managers refuse to develop systems that require budgets over $1 million, take more than one year, or require more than ten people for completing the project. Agrawal (2005a) stated that the higher costs and risks are associated in development of organization specific software and therefore, organizations are using off-the-shelf/ERP packages in higher proportion compared to proprietary packages. In the past, in-house development was popular due to the flexibility needed in the packages and the control on the development cycle. Because of the reusability of codes and customizability, the object oriented approach results in higher software development productivity. It will also lead to increased flexibility, increased predictability, and few errors (Nidumolu & Knotts, 1998). However, the faster rate of obsolescence, high cost, and risk factor will make the in-house development option unattractive for all but the simplest projects unless the functionality required is such that COTS is not a viable option.

Desired characteristics of software that favor a transition to COTS are ease of use and predictability of cost and outcome. In order to reduce training costs and improve user satisfaction firms want software that is easy to use. A simpler user interface and improved artificial intelligence are factors that are leading many COTS systems to be usable with little or no training. To avoid some of the risk factors mentioned earlier firms want predictability. By using an established COTS solution firms are able to know the approximate costs, requirements, and functionality before committing to a product. In the case of the off-the-shelf/ERP solutions, it is possible to get reliable predictions of costs of acquisition, implementation, and use (Heikkila et al., 1991; Laudon and Laudon, 1999). Furthermore, these software packages are available without delay and can save up to 50% or more in development efforts. In addition, organizations can save high maintenance costs associated with in-house developed packages. The maintenance costs of in-house developed packages are as high as 80% of the corporate IT budget (Turban et al. 2001).

The ***administrative motivation*** for moving to COTS includes many of the factors mentioned previously. Some reasons for administrative motivation include the continuing growth in software and the outsourcing market that can be attributed to the reliability of services provided by these sources and to the role of IT as a commodity. Because management is not satisfied with the performance of IT departments they are replacing in-house development with COTS (Turban et al. 2001). The shift to the COTS or outsourcing helps organizations survive in an increasingly competitive environment.

Agrawal, et al. (2001) argued that a move from proprietary to COTS packages will reduce cost at the expense of flexibility. If IT's role is only a strategic necessity and not a source of competitive advantage, then the substantial risks and high investments associated with proprietary packages are not desirable. In a turbulent environment with faster obsolescence in product/services, the combination of limited time available for development and the need for frequent changes will also make the option of proprietary packages infeasible and

unattractive (Agrawal, 2005d) and the uses of commercial off-the-shelf/ERP packages will be in higher proportion compared to proprietary/ customized packages (Agrawal, 2005a). Thus, it does not seem possible in a short period for organizations to develop the complex and integrated large size packages which can be used for a short amount of time. Additionally, such projects may require a very large in-house IT department with continuous training and upgrades of technology. Under this situation the organizations will tend to rely more on commercial off-the-shelf packages/ ERP solutions and outsourcing.

Continuous improvements/quantum improvements: Intense competition leads to uncertainty and stimulates higher innovation and adoption rates that will, in turn, increase competition (Ettlie, 1983; Lewin et al., 1987). Porter (1980) argued that in a competitive market with free entry, firms cannot earn sustainable supernormal profit. While in the short-run it may be possible to earn such profits, in the long-run the accounting profit will be just enough to pay for the cost of capital and compensation to the owner for any unique inputs to production (i.e. management expertise). It is possible to achieve a short-term competitive advantage with IT if secrecy is maintained. However, the time to duplicate applications is months, not years, and new innovations (which are very fast and rapid) will make the old ones obsolete (Porter, 1996; Turban et al., 2001), raising doubts about the role of IT in gaining competitive advantages. Conversely, there are a number of arguments identifying IT mostly as a commodity or a strategic necessity for the organization. Thus, IT cannot be a source of sustainable competitive advantage (Brynjolfsson, 1996; Clemons 1990, 1991; Clemons & Kimbrough, 1986; Emery, 1990; Kermer & Sosa, 1991; McNurlin, 1991).

Further, most businesses in the industrial world could not compete, and many could not even survive without computers and software (Jones, 1994). The shifting role of IT as a strategic necessity will affect strategic decisions regarding the level of corporate investment in IT. Considering IT's role as a strategic necessity, the organizations will invest minimally on application packages by using off-the-shelf/ERP solutions with a policy of continuous improvements. On the contrary, with a possibility of strategic advantage, the corporations will maximize investments and develop proprietary application packages, maintaining the control on the software development and the flexibility in the packages.

The increase in usage of COTS software will lead to lesser demand for programmers and higher demand for system analysts including project managers. It is important for HR planning professionals to keep in mind that these changes are macroeconomic and apply to the United States. Individual labor markets may vary. In the cases where a labor demand in a local market is markedly different from the national market it is important that partners in higher education be advised of the differences so appropriate strategic planning can occur.

Generally, COTS involves point-and-click and/or very simple commands to solve problems, hence it has led to increase in end-user computing.

End-User Computing

The growth in the importance of Information Technology as part of an enterprise's basic infrastructure is augmented by evolutions in hardware, software, and the graphic user interface (GUI) which facilitates the use of IT applications by many end-users. The growth in the usefulness and the ease of use of software applications has greatly increased demand for the number of people who are knowledge workers and this growth is expected to continue. The radical transformation of business processes from IT centric computing to increased adoption of end-user computing (EUC) has fundamentally changed the way businesses operate. This trend accelerated in the 1980's when the effectiveness of software development became a key management Information Systems issue. As

executives wanted access to information to make better decision and companies needed more IT applications developed by IT professionals there was not enough capacity to get things done in a timely manner. The growth in end-user computing is one of the solutions to handle such a backlog of information demand. Trends in hardware and software such as miniaturization, speed, connectivity, interactivity, multimedia, and affordability (Sawyer and William, 2003) have contributed to the growth of end-users computing by providing more *support to end-users from the technical component of IT*. The control of Information Systems departments on their manpower and IT budget has been decreasing and has shifted to end-users (Edberg & Bowman, 1996; He et al., 1998; Lucas, 2000). These and other factors are *drivers working toward involving end-users in the IT functions*.

The end-users are taking more and more responsibilities of Information Systems applications, and their involvement is also positively correlated with the success of Information Systems (Doll & Torkzaddah, 1988; McLean et al., 1993; Winter et al., 1997). Turban et al. (2001) claimed that many of the user requirements are smaller in size and can be developed by end-users themselves.

The modular approach in an object-oriented system makes some programming jobs much less complex, and allows end users to accomplish some functions that formerly required professional programmers.

Furthermore, because of the reusability of codes and customizability, the object oriented approach results in higher software development productivity. Agrawal et al. (2001) claimed that the object-oriented approach would make the development process simple, enhancing customizability and contributing to the growth of EUC. These projections have been largely born out and are expected to continue.

Expert systems and other forms of artificial intelligence (AI) hastened the trend toward end-user computing. The use of AI helps businesses make decision better and faster. As these tools have spread throughout businesses their use has become common and continues to spread to jobs throughout the corporate hierarchy. Examples range from executives using applications that utilize artificial intelligence to build complex risk analysis models to cashiers using AI to identify produce (Sadahiro, Checkley, & Trivedi, 2001).

The natural language processing will lead to simple user interface. It will also lead to increased flexibility, increased predictability, and fewer errors (Nidumolu & Knotts, 1998). The graphical user-interface (GUI) makes software user friendly and allows end-users to communicate with the application more effectively in their familiar vocabulary. These trends have lead to the development and adoption of Web 2.0 applications that allow the user to customize the way they interact with the virtual world. Customers expect businesses to be able to provide an interactive experience for viewing bills, shopping, and getting support among other traditional activities. This trend has important implications for the type of employees human resource departments need to hire. Employees who are technology illiterate will not have the needed skills to provide maximum benefit in the Web 2.0 world. Employees who have extensive technical skills will have some benefit but in order to be of maximum value to the firm they will need to learn business processes and how to interact with customers.

Agrawal and Kotcherlakota (2006) asserted that in a stable IT environment end-users will make more use of the technical component of IT. Contrarily, in an unstable environment the end-users will not be able to work effectively with IT and will thus be required to look for tools and/or skills that are not IT based in order to meet their functional requirements. This reduction in the use of IT would also lead to a corresponding reduction in the need for end-user support but the enterprise would have a competitive disadvantage in regards to their technological infrastructure.

The trends seen in proprietary software, COTS, and end-user computing have implications for both external and in-house IT professionals.

The trend toward more end-user computing will reduce the number of tasks that are required of in-house IT professionals as end users are increasingly able to accomplish tasks that formerly required an IT professional. This trend will be across industries. Some companies will see a growth in the number of IT professionals required to support functions not previously offered so the human resource professionals at those companies will need to work closely with the firms IT department to identify areas of need. Since the overall trend should be toward a reduction of in-house personnel dedicated to IT infrastructure demand it is important that sources for the entry level personal who will be needed should be identified.

External and In-House IT Professionals

When firms decide to build their own proprietary software applications they can either build the applications in-house or they can outsource the development of the application. If the application is built in-house the demand for in-house software developers will increase. If the application is built by a professional software development shop the demand for software developers will increase. Hence, in both scenarios there will be an increased demand for more programming for potential employees.

External IT Professionals

Outsourcers, application service providers, and software houses using their economies of scale can meet their requirements economically. The current declining trends (compared to the projections of BLS) in the requirements of IT professionals, in addition to the earlier discussion, leads one to believe that the concentration of IT professionals will shift heavily from in-house IT departments to software houses, outsourcers, and application service providers. Moreover, it implies that the current declining trend in the requirement of IT professionals is the symptom of the higher use of readily available solutions, i.e. production and usage of more and more COTS/ERP solutions.

In-House IT Professionals Demand

The shift to COTS and subsequently to more end-users control has led Information Systems departments to reduce control of their manpower and IT budget (Edberg & Bowman, 1996; He et al., 1998; Lucas, 2000). The main reason for this shift is credited to the availability of user-friendly software, knowledgeable end-users and extensive company support to EUC (Turban et al., 2001). The end-users are taking more and more responsibilities for Information Systems applications, and their involvement is also positively correlated with the success of Information Systems (Doll & Torkzaddah, 1988; McLean et al., 1993; Winter et al., 1997). Agrawal (2005b) stated that the growth in EUC will increase the requirements of help desk support. Furthermore, the faster obsolescence in products/services and turbulent environment will lead to higher involvement of end-users in implementation and maintenance of software packages (Agrawal, 2005c).As end-users start to become more involved in areas that were once exclusively within the purview of IT departments, a decline in the requirements of in-house software developers is likely to occur (Agrawal, 2005b)). It should also be pointed out that the increased demand for COTS will have some positive impact on in-house IT professionals required. However the net overall effect will be a reduction since the usage of COTS/ERP packages in higher proportion will further lead to a decline in the requirements of in-house IT professionals. Lazowska (2008) asserted that 70% of all IT jobs are with “IT consumers” (companies that use it) rather than with “IT producers” (companies that invent it). The increased usage in COTS/ERP

packages will lead to a growth in 30% segment and shrinkages in 70% segment.

Projected Demand for External IT Professionals

We predict that the demand for external IT professionals will increase. This will be driven by a shift toward more commercial off-the-shelf software applications, increased utilization of application service providers (ASPs), as well as mainstream outsourcing arrangements. Commercial off–the-shelf solutions include ERP applications and other packages that allow for customization. The advantages that specialized developers have in areas such as scale, experience, and specialization are difficult for an in-house team to compete against on a consistent basis (Klepper & Jones, 1998). Companies that develop software as their primary business also have the added advantage of being able to more easily introduce the latest technologies and skills into their labor force without a disruption of their business.

Implications of Growth in IT Human Resources in Curriculum Design

This chapter has discussed the various drivers of demand for IT professionals and the impact to IT HR. While there are macroeconomic factors at work the microeconomic considerations are paramount considering the difference in demand among firms and regional industries. In the absence of careful planning and the development of proactive solutions for future IT needs firms are facing a sustained shortage of IT professionals and knowledge workers who work outside of the IT functional area but who do many of the jobs that have traditionally been within the province of IT professionals. Human resource professionals and IHE's should work together to plan for changes in curriculum and course offerings that will allow graduates to be productive in the shortest possible time while also equipping the graduates with a knowledge of theoretical principles that with enable lifelong learning.

LESSONS LEARNED

The role of IT is a strategic necessity but is unlikely to be a source of sustained competitive advantage. Because of this management is likely to focus on strengthening their products and services and forego development of proprietary software. In most cases current IT requirements can be met by complex and integrated high volume off-the-shelf/ ERP software without the need for the problems associated with proprietary software, such as risk associated with time pressure and very high costs. This will lead to a higher dependency on outsourcers and software vendors as well as consulting services for professional assistance. The shift toward more reliance on outsourcers, software vendors, and consultants will lead to organizations adapting be reducing IT manpower for implementation and increasing support to end-users. Few senior IT executives will be needed in the organization for IT strategy and planning; maintenance and development of IT architecture. The trends will lead to growth in IT manpower for technical positions such as programmers and systems analyst at outsourcers and software houses, but the in-house departments dedicated solely to IT may start to shrink. Furthermore, the growth in end-users computing and faster obsolescence in technology would lead an increased demand for employees to integrate the use of technology throughout their job functions. This will lead to a need for human resource departments to revise their hiring practices to increasingly look for employees who not only have the expertise needed in the functional area being filled but who can also demonstrate proficiency in IT through course work and/or experience. Human resource professionals will also need to manage the training and development of end-users to keep them current in the IT skills needed to be productive. The needed

training could be obtained from the in-house IT department or from outsourcers.

CONCLUSION

IT curriculum committees are faced with an ever more difficult challenge as they try to retain a curriculum core of knowledge that should be universally understood by all graduates in their departmental areas. At the same time, these committees are trying to predict what knowledge is most needed by the rapidly changing society so that students can have both the depth and breadth of knowledge they will need upon graduation. To facilitate the planning process we have developed a conceptual framework that is based upon a review of megatrends within the IT area that will drive the market.

The framework was developed by looking at macro level trends. One trend found is that some industry experts are strongly predicting the demise of corporate IT departments allowing business users the capability to take on operational-level technical tasks, freeing a small core of IT staffers to focus on analytical and strategic issues. Because technology is becoming easier for end users, and considering IT function as problematic to manage, a lot of IT processes will move to outsourcers. The cost and risk of developing applications in-house will also prompt some organizations to rely more on customized or off-the-shelf packages, including ERP software. However, each IHE has its own unique group of stakeholders to be served so each school will need to review the model looking at the environment for their school and determine the effects of the short and long term trends upon their program viability. The framework presented in the paper is general and can be used as a template by human resource professionals to help shape their mental model when developing a staffing strategy plan.

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Chapter 85
Anonymous Workblogging and Organizational Coping Strategies

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ABSTRACT

In recent years, the rise of blogging has led to debate about whether employees should be free to talk about their employers on the Internet, and whether they should be able to blog on company time. Several high-profile cases of fired bloggers between 2002 and 2006, drew attention to important labor and civil rights issues that led to debate among human resources and employment law experts in the mainstream media. The negative publicity surrounding the cases of fired bloggers has given rise to an alternative management strategy – a cautious embrace of blogging by employers, who saw the practice as a potential opportunity for marketing and professional development. However, efforts by bloggers to retain their right to blog anonymously signify continuing tensions, revealing the contradictions between workplace surveillance and an "enlightened" management doctrine based on openness and trust, indicating a refusal by some employees to align their blogging endeavors with the interests of their employer. This chapter examines the workblogging phenomenon as an intersection of organizations, technology, and trust, and makes some tentative connections between Guerra et al.'s (2003) concept of "trust-tension" and the critical management literature.

INTRODUCTION

Ever since workblogs – online diaries about work – entered the mainstream in 2002, bloggers' rights have been controversial, and the fight for blogger freedoms has raised labor and civil rights issues that go far beyond the act of blogging itself. High-profile cases of fired bloggers have helped to shape the debate and led to discussion about free speech in the workplace, the right of workers to organize, employees' freedom to do what they like when off-duty, and the encroachment of work into personal space.

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This debate has placed management in an uncomfortable position: employers who have disciplined or fired bloggers in order to remove what they perceive as a potential threat to their company have been subjected to hydra-like retaliation from the blogging community. For business as a whole, the media focus on fired workbloggers has created bad publicity, drawing attention to the economic vulnerability of workers and revealing cracks in a corporate ideology that is ostensibly founded on openness and mutual trust.

The goal of this chapter is to question whether employers have contained the blogging phenomenon, surveying media coverage and blog content, and looking in particular at the limitations of both surveillance and more "trust-based" management strategies that have been used to deter or co-opt bloggers. The study, which is strictly exploratory and not aimed at offering practical advice, situates the practice of employee blogging (or "workblogging") in relation to the sociological literature on workplace resistance, trust, and blogging. Arguing that the content of these blogs mirrors the criticisms of modern work culture that have been raised by writers such as Hochschild and Ross, the literature review contextualizes workblogging in terms of recent studies of worker recalcitrance. This chapter makes an exploratory connection between this critical management literature, which highlights ongoing employee discontent in today's "enlightened" workplaces, and Guerra et al.'s (2003) concept of "trust-tension."

Exploring how organizations have coped with the workblogging phenomenon, the chapter analyzes two key cases: Dooce (a.k.a. Heather Hamilton), a Los Angeles-based web designer who lost her job in 2002 after her supervisor found irreverent comments about the company on her blog; and Petite Anglaise (a.k.a. Catherine Sanderson) whose dismissal in 2006 led to a successful labor tribunal and a lucrative book deal. These cases are set against a backdrop of emerging management responses to employee blogging, which range from draconian surveillance measures to a cautious embrace of the practice by companies such as Yahoo and Sun Microsystems. Looking at these developments, this chapter illustrates how some employees have publicly refused to align themselves with management policies that attempt to co-opt and contain blogging, and traces organized efforts to protect bloggers' rights to anonymous and non-corporate sponsored self-expression.

BACKGROUND

Knowledge organizations demand free-flowing information, employee autonomy, and flexibility. However, this can create anxiety for the organization in terms of minimizing worker behaviors that might threaten the organization. This chapter examines the workblogging phenomenon as an intersection of organizations, technology, and trust, and draws some tentative connections between the trust literature and the critical management sphere.

The wide-ranging debate about trust and technology examines the relationship between proximity or familiarity with technology and one's willingness to engage in online social or economic transactions (Dutton & Shepherd, 2006); the impact of the loss of physical cues (Wallace, 2001), and the possibility for alternative trust-generating mechanisms such as the availability of high-quality online information in computer-mediated interactions (Ben-Ner & Putterman, 2002; Riegelsberger, Sasse, & McCarthy, 2003). Of particular interest to this study, however, is Guerra et al.'s (2003) notion of trust-tension.

In their discussion of e-commerce transactions, Guerra et al. emphasize the transfer of data that must take place in order to establish accountability, but point out how this flow of personal information creates anxiety over the potential misuse of the information: "In this way, there is a 'trust-tension' between privacy and identity: absence of data impedes trust as accountability is limited, but data gathering creates trust problems regarding the use of the data in question and intrusions on privacy"

(2003, p.5). Guerra et al., draw on Bacharach and Gambetta's (2001) three-component definition of trust: uncertainty, exposure on the part of the trustor, and temptation on the part of the trustee. This chapter posits that the concept of trust-tension might also apply to internet use in the workplace, where knowledge organizations demand free-flowing information for their smooth functioning, yet this creates anxiety among managers because this information might be used or represented by employees in ways that are damaging to the firm, especially in the presence of the Internet's rapid dissemination infrastructure.

As we have transitioned from the rule-bound certainty of Taylorized workplaces to "looser" management cultures based on normative control, the interplay of organizational exposure and worker temptation has become a central component of the workplace. By granting autonomy, management exposes the organization to disruption. On the one hand, knowledge work has been facilitated by corporate cultures that promise self-actualization through non-hierarchical teams, flexible schedules, and strong social ties, which produce loyalty and hard work in the absence of command and control structures (Deal & Kennedy, 1982; Drucker, 1973, 1994; Peters & Waterman, 1982). However, this openness also creates vulnerability, as organizational exposure to the outside world is increased and workers are tempted to indulge in behaviors that are not sanctioned by the employer. These concerns are amplified by Internet connectivity, which transcends organizational boundaries, and potentially connects recalcitrant workers to mainstream media.

As illustrated by the testimony later in this chapter, the practice of anonymous workblogging has been perceived by some legal and business interests as a breach of the trust that has been placed in today's knowledge workers by employers. However, efforts to restrict anonymous workblogging have resulted in negative publicity since punitive measures clash with organizational philosophies that are ostensibly based on autonomy. Aware of the ideological disconnect presented by anonymous workbloggers, savvy corporations have, instead of banning the practice, begun to accept blogging, by promoting employer-sanctioned blogs and open discourse between workers and their supervisors. However, the energetic pursuit of anonymizing strategies and legal protections on the part of the blogging community indicates that bloggers continue to see a conflict between company interests and their creative freedom.

Building on Guerra et al.'s concept of trust-tension, it appears that the contemporary knowledge organization is in a quandary. From a critical management perspective, it might be argued that, despite the promises of management gurus, underlying conflict between workers and management precludes complete openness between organizations and employees. On the part of employers this has resulted in a complex interplay of blogging deterrents, moral injunctions, and pro-blogging maneuvers. Meanwhile, anonymous workblogging persists, albeit in a significantly suppressed form.

The persistence of workblogging is consistent with Thompson and Ackroyd's (1995) claim that even today's relatively comfortable workplaces cannot eliminate worker misbehavior. In their study, *All Quiet on the Workplace Front*, Thompson and Ackroyd call for renewed study of worker resistance in environments where workers are not necessarily physically oppressed – the well-lit, Internet-enabled offices that nourish today's bloggers are a far cry from the grueling labor process endured by yesterday's factory workers, yet there still seems to be a need to resist or push back. Anonymous workbloggers are often productive employees but they make fun of management buzzwords, celebrate time-wasting on the job, and express a lack of motivation and an underlying conviction that their labor is meaningless (Schoneboom, 2007).

Their writings mirror the claims of a critical sociological literature that includes the work of Hochschild (1997) and Ross (2002), which expos-

es the insidious consequences of corporate culture in terms of time-scarcity and self-exploitation. As an act of ironic distancing from one's job, anonymous workblogging is reminiscent of the complex navigation of organizational self outlined by Kunda (1992), where workers use dramatization and irony to resist the colonization of their private thoughts and emotions by the company. However, I argue that the highly networked, Internet-based nature of the blogosphere[1] affords employees the opportunity to transcend organizational boundaries, form alliances, and connect with traditional media in ways that go beyond the individualized and easily contained resistance demonstrated by Kunda.

Recent studies have revealed that workbloggers generally do not see themselves as engaged in a labor struggle, and tend to characterize their blogging activity as a form of creative self-expression rather than an act of resistance or defiance (Lenhart & Fox, 2006; Richards, 2007). The blog cases featured in this chapter fit this description. Dooce's blog, at the time of her firing, was a well-written narrative about her daily life, which happened to include details about her job; Petite Anglaise's blog touched on work very rarely before her firing, and focused on Paris, her love life, and childrearing, not on a systematic critique of the labor process. However, I argue that when bloggers have been fired, their blogs become sites of resistance, loosely organizing diffuse employees and other interested parties around common concerns. Where cases of fired bloggers have become *causes célèbres*, the debate has focused on labor issues, especially knowledge workers' sense of vulnerability and their rejection of job-centered fulfillment. While these efforts are relatively diffuse and ephemeral, I argue that they are useful to the labor movement, and that they signal future organizing possibilities for labor, in spite of management's ongoing effort to contain and co-opt the blogging phenomenon.

This study was originally part of my PhD dissertation, which examines the practice of workblogging as a creative act of resistance. The research for this section consisted of an informal exploration of the phenomenon, followed by three case studies (two of which are included in this chapter). In order to familiarize myself with the phenomenon, I downloaded and read several hundred postings and comments from 25 bloggers who had been fired between January 2002 and December 2006, which had been identified through the *Morpheme Tales* blog (Hopkins, 2009), reading postings dates three months before and after each firing and following all links from these postings to news and blog coverage of firings. I narrowed this sample to three blogs (*Dooce*, *Petite Anglaise* and *The Woolamaloo Gazette*), reading all postings submitted 12 months before and after the firing. I also performed Google searches for journalism and policy articles related to these three bloggers. Two of the case studies (*Dooce* and *Petite Anglaise*) are detailed in this chapter, while the third is being developed as a longer journal article. I analyzed the blog postings, comment streams, and news articles using techniques drawn from grounded theory (Glaser & Straus, 1968). This entailed coding content related to specific issues and aligning common material with particular concepts that emerge from the blog. For the 2004-2006 period, I adopted a virtual ethnographic stance as a blog reader, regularly reading workblogs as part of my dissertation research. I followed firing events as they unfolded on blogs, and analyzed the impact of the mainstream media coverage as it echoed through the blogs and new sources that I was monitoring. One obvious shortcoming of this method is that no direct participation and observation of fired bloggers was built into the study. However, I am concerned less with measuring blog realities against "real life" events than with evaluating the media effect and social interaction to which these events led. I have therefore focused on the blogosphere as the "field" of study, exploring it as a loosely cohesive and unfolding social network that is open to virtual ethnographic analysis (Beaulieu, 2004; Hakken, 1999).

FIRED WORKBLOGGERS AND ORGANIZATIONAL POLICY

Being Dooced: The Fired Blogger Phenomenon

In February 2002, Los Angeles-based web designer Heather B. Hamilton was fired from her job because of comments posted on her blog, *Dooce* (http://www.dooce.com). She had not mentioned the company by name and had concealed her identity, using only the pseudonym "Dooce," but someone emailed top executives at the company, informing them that she was writing about the company on her blog and she was fired shortly thereafter. The firing of Dooce immediately became a hot topic in the blogging community and she was flooded with emails from her readers. The press picked up on the issue and before long the term "dooced," to be fired from one's job because of one's blog, had become part of the blogging lexicon.

Dooce's blog was notable because it was extremely well written, irreverent, and funny. Her postings in 2002 were varied but many described her experiences in the workplace, offering vivid and scathing caricatures of her colleagues. In "The Proper Way to Hate a Job" (Hamilton, 2002b), she counseled readers on "successfully avoiding any work related to your actual job," suggesting that readers spend the afternoon conducting, "seemingly academic experiments with bandwidth by seeing how many simultaneous downloads of 'Get Ur Freak On' your CPU can handle." At other times her portraits of colleagues were cleverly evocative, as in this description of her boss, entitled "Intimidation": "When she talks with her hands she looks like she's molesting the air around her, sticking her fingers in holes and around forbidden curves. Often the air around her is the air around me, and my air doesn't appreciate it" (Hamilton, 2002a). Dooce's posts were littered with cynical references to team meetings and PowerPoint presentations, making fun of corporate buzzwords like "consumerizing," "creative shaping," and "expandable flow linkage," and demonstrating contempt for the company's cultural norms and its butchery of the English language.

As a well-paid employee of a high-tech company that had embraced contemporary management thinking, Dooce's comments emerged from a workplace that afforded workers a significant degree of freedom to manage their time and set their own schedules, and her writing pointed to the exploitative and frustrating aspects of a boundaryless labor process. Yet prior to her firing, Dooce was in good standing at the company and was far from being perceived as a disgruntled worker in the eyes of her supervisor. In addition to providing a place to vent about interpersonal conflicts, Dooce's blog gave her a way of distancing herself from those aspects of her job that she could not reconcile with her own value system, helping her to maintain an organizational self that could perform well on the job without having to submit entirely to the company's culture.

As Kunda (1992) has shown, workers respond to the new emphasis on employee participation in a strong corporate culture in diverse ways, using irony, humor, and dramatic metaphors to negotiate an "organizational self" that meets the demands of the job while maintaining some distance from the company's claims on their private resources and emotional lives. In this sense, "The organizational self becomes an active and artful construction, a performance, a tightrope walk, a balancing act of organizational reality claims, fluctuating between contradictory modes of relating to the organization and always threatened with the threat of burnout, or the exposure of its own illusions" (p. 216).

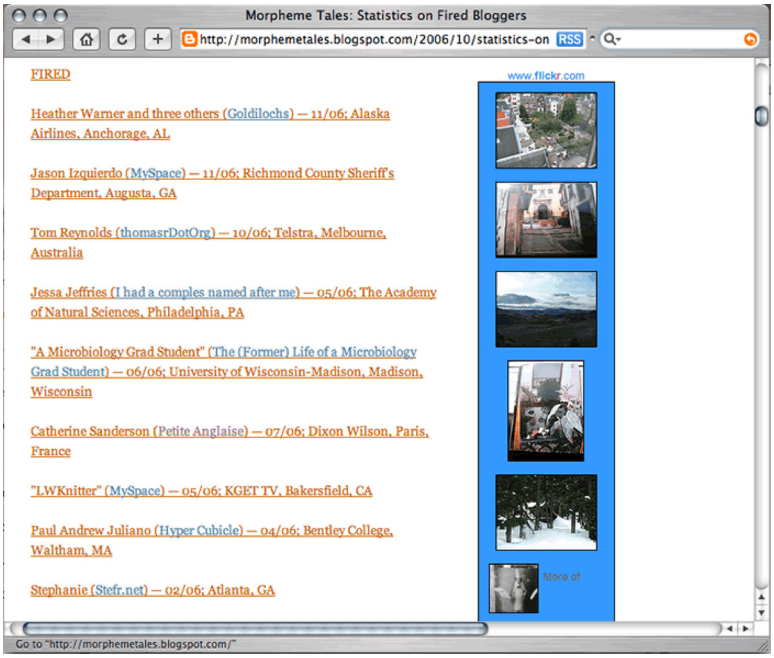
Dooce's blog is an example of individualized role-distancing (Kunda, 1992), or innocuous blowing off of steam about minor workplace frustrations (Barsoux, 1993). However, the tone of her writings, the public nature of her blog and the media attention that her firing generated, suggests an altogether more explosive ideological disconnect, and represents a more threatening situation

that goes beyond the type of self-contained and largely apolitical employee behavior analyzed by Kunda or Barsoux. Dooce's commitment to free self-expression, regardless of the consequences, persists as an inspiration to the community of bloggers who continue to risk being "dooced" by writing about their job or blogging on company time: "I made a conscious decision when I conceived dooce.com that I would never bow to the intimidation of others, including employers or pussy-ass cocksmacks who think I should just stop complaining and be a good worker bee already" (Hamilton, 2002).

Dooce's firing was the first of many highly publicized blogging cases between 2002 and 2006 that caught the attention of the mainstream media, drawing attention to labor issues and demonstrating the reach that could be commanded by individual employees. These included Delta employee Ellen Simonetti, who was fired in 2004 for posting photos of herself in uniform on her blog, and the UK's first fired blogger, Joe Gordon, a Waterstone's bookstore employee who lost his job because of irreverent comments he had made about his boss on his blog, *The Woolamaloo Gazette*. In 2004, San Francisco-based writer Curt Hopkins began to keep track of fired bloggers via his posting, "Statistics on Fired Bloggers." This posting has been updated many times, based on information provided by readers, and has become an authoritative source of information on people around the world who have lost their jobs because of blogging (Hopkins, 2009). Between 2002 and 2006, Hopkins lists 42 fired bloggers from organizations as diverse as Richmond County Sheriff's Department and the *Ladies' Home Journal*. Most of these firings appear to have occurred without being generating a media furor, but a small percentage garnered international media attention.

During this period, some popular workplace blogs disappeared without warning, raising suspicions that authors had been discovered by their employees and forced to take down their blogs. For example, Dr. Dre's blog, *Doing Less Harm*,

Figure 1. Curt Hopkins' blog posting "Statistics on Fired Bloggers." (© 2009, Curt Hopkins. Used with permission.)



based on the perspective of a National Health Service employee, was removed suddenly in January 2004, leading to suggestions in *The Guardian* that the NHS had forced Dr. Dre to remove his postings (Butler, 2005).

The firing of workbloggers points to an interesting tension between organizational and private selves and raises questions about how far organizational mandates about appropriate behavior extend into the personal lives of employees. Again drawing on the concept of trust-tension, anonymous workblogging has clearly tested the limits of a system that increases autonomy and free-flowing information as a means of promoting organizational health and harmony between workers and management. Critical revelations about the workplace that stem from anonymous workblogs represent a failure of the system to maintain complete openness, resulting in a sense of over-exposure for the organization and signifying that, with the Internet at their fingertips, temptation on the part of recalcitrant workers is too difficult to resist.

The following sections explore the ways in which organizations have responded to the workblogging phenomenon, tracing a growing awareness among employers that summarily firing employees could lead to damaging publicity. I show that employers who wished to promote workplace cultures based on trust and openness were moved to accept and co-opt blogging rather than prohibit it. However, organized efforts to protect anonymous workblogging indicate that many employees do not wish to align their identities with corporate interests. Irreverent workplace blogs may, I contend, reflect fundamental criticisms of contemporary work culture, which may ultimately be of use to the labor movement.

Technology Policies with Teeth: Employers Respond to Bloggers

Organizational reactions to the blogging phenomenon range from disciplinary action to the development of "enlightened" strategies that cautiously encourage employees to blog about work, while reminding them of the firm's trust in their responsible behavior. On the disciplinary side, there was an increased demand in 2004 and 2005 for surveillance of employees' computer use, and the promotion of blogging policies that discouraged anonymous blogging about work. According to the 2005 Electronic Monitoring and Surveillance Survey conducted by the American Management Association (AMA) and the ePolicy Institute (American Management Association, 2005), "companies increasingly are putting teeth into their technology policies," with 26% firing workers for misusing the Internet and 76% monitoring workers' website connections. According to guidelines on Internet and email policies, produced by ACAS, similar trends were identifiable in the UK (Advisory Conciliation and Arbitration Service, 2004).

According to AMA data, firms were intensifying their monitoring of Internet use and adopting technological surveillance tools to "battle people problems" (American Management Association, 2005). The AMA survey reports that 89% of firms inform employees that their Web usage is being tracked but that only 20% had policies on operating personal blogs on company time. Firms were encouraged by the ePolicy Institute to institute specific blogging policies that would supplement existing policies on Internet and email use. Law experts argued that such a policy could protect an employer from appearing heavy-handed when it came to disciplinary action. For example, in February 2005, the UK employment law firm Cobbetts (2005) advised employers, "failure to have such a policy in place may result in claims that sanctions imposed are too draconian and may lay an employer open to claims in the employment tribunal."

During 2004 and 2005 an alternate corporate strategy emerged that is in some ways a tacit acknowledgement of the ideological limitation of punitive workplace policies that result in bloggers

being fired. This new strategy has been promoted by David Sifry, founder and CEO of Technorati, which monitors trends in the blogosphere and advises businesspeople about commercial opportunities. In October 2004, Sifry announced in his blog, "there is still a tremendous opportunity for forward-thinking companies and management to have a significant positive impact on their public perception by encouraging an enlightened blogging policy, encouraging openness both within and outside of the organization" (Sifry, 2004). Sifry announced that forward-thinking companies such as Sun Microsystems were encouraging their workers to have personal blogs, while other firms, including Boeing and General Motors, were setting up corporate blogs where they invited employees to post authoritatively on new developments and products. This news marked a new corporate embrace of blogging, with firms competing to adopt these "enlightened" strategies that reflected the latest management thinking.

In this spirit of open embrace of employee blogging, several companies, including IBM and Yahoo, officially encouraged public posting and discussion of their blogging policies. Writing in May 2005, IBM employee and blogger James Snell praised IBM's policy as a triumph over anonymous blogging, noting the company's endorsement of IBM bloggers and its enlistment of employees in devising and formalizing the policy:

IBM today is publishing an announcement on its Intranet site encouraging all 320,000+ employees worldwide to consider engaging actively in the practice of "blogging" [...] The core principles – written by IBM bloggers over a period of ten days using an internal wiki – are designed to guide IBMers as they figure out what they're going to blog about so they don't end up like certain notable ex-employees of certain notable other companies. (Snell, 2005)

Snell dismisses as "crap," a CNN article offering advice on anonymous workblogging, and reminds IBMers, "this isn't a policy that IBM is imposing upon us – it is a commitment that we all have entered into together." The guidelines emphasize IBM's corporate values of "open exchange and learning" and "trust and personal responsibility in all relationships," and encourage IBM bloggers to identify themselves and their role in the company. Company-hosted blogs are to be written in a way that "adds value" to the company, and, while the guidelines indicate that what employees do outside of work is their own business, they are cautioned that, "activities in or outside of work that affect your IBM job performance, the performance of others, or IBM's business interests are a proper focus for company policy" (Snell, 2005).

The development of corporate blogging as a strategic response to anonymous workblogging signifies the ability of organizations to respond quickly to perceived threats and minimize potential damage by devaluing acts of resistance. Corporate blogging policies such as those launched by IBM, cleverly restore to employees the idea of self-management and self-determination, while subtly impugning the moral value to workers who blog under a pseudonym. However, such openness creates uncertainty over how information might be shared or misused, leading to some organizational anxiety over how to control or limit the potential for such behavior without leading to negative publicity.

Anonymous Blogging Continues

In 2004 and 2005 period, corporate blogging strategies aimed at co-opting or condemning anonymous workblogging were received skeptically by many in the blogging community, and the mainstream media continued to express concerns that an employer-sanctioned blog would be no substitute for one written in complete freedom. In the *Daily Telegraph*, James Hall (2005) captured this reaction, commenting that, "The very point of blogs is that they are open and honest. But how can blogs that have been sanctioned

by a company be objective, wary bloggers ask." Amid proposals that employees should obtain permission from their employer before starting their blog, *The Guardian*'s Patrick Butler (2005) argued that employer-sanctioned workblogs by definition lacked the satirical edge that made them capable of revealing truths and perspectives that could be gained elsewhere. In some cases, bloggers themselves were given a mouthpiece by mainstream media sources. In an August 2005 *New York Times* Op-Ed column, Jeremy Blachman, who had been "outed" in December 2004 as the author of the very popular blog *Anonymous Lawyer* argued for the continuation of anonymous blogging about work:

Now that everyone can publish online, we can get these incredible glimpses into worlds we might otherwise never get to see. People across the world can share stories, commiserate and connect with each other. Potential employees can see beyond the marketing pitches. (Blachman, 2005)

The promotion of corporate blogging by David Sifry, James Snell, and other supporters was met by a vigorous rebuttal from non-profit organizations and individual bloggers devoted to anonymous blogging. Most prominently, in April 2005, The Electronic Frontier Foundation (EFF, http://www.eff.org), a US-based nonprofit organization dedicated to protecting Internet freedoms, published its guide, "How to Blog Safely about Work or Anything Else" (2005a) which clearly stated the EFF's support for anonymous blogging and provided concrete advice on how workers could blog without revealing their identity.

The EFF guide describes blogs as "personal telephone calls crossed with newspapers," and counsels bloggers not to give away telling details about their workplace, as well as strongly advising against blogging while at work due to the high probability of detection. It outlines anonymizing technologies and services, such as Tor, Invisiblog, and Anonymous Surfing software, which conceal the IP address of a computer, potentially helping bloggers to elude surveillance efforts. The EFF issued popular FAQs that explain bloggers' legal rights, reminding non-unionized US employees that in most states they are hired "at will," a status that affords workers very few protections from being arbitrarily fired. The Labor Law FAQ (2005b) informs US-based bloggers that, under the First Amendment, they cannot be fired for talking about unionizing or (so long as they notify the appropriate regulatory body first) for whistle blowing, and it explains the protected category of "concerted speech," where two or more people may legally blog about their working conditions, such as the pay scale or vacation policy, without fear of retaliation.

By reminding employees of their at-will status and their right to organize, EFF reaffirmed the role of unions in protecting workers' rights and reinvigorating labor questions that may previously have seemed irrelevant or anachronistic. Although EFF's guides focus on US employment law, the organization's efforts toward protecting the right to anonymous and free speech on the Internet generated considerable interest and support in the UK, revealing the need for a similar organization specializing in UK issues and triggering an Internet campaign that led to the formation of the UK-based Open Rights Group (http://www.openrightsgroup.org) in November 2005 (Doctorow, 2005).

For members of the blogging community who write irreverently or critically about their work, it has been difficult to avoid the cautionary tales about fired bloggers, and some have responded to the warnings by reevaluating their practice. Many of the anonymous workblogs that flourished in 2004 and 2005 were discontinued by 2006. These included fairly widely read blogs such as *Doing Less Harm*, and the supermarket blog *Life of a Morrison's Employee*, which was suddenly taken down and replaced by a link to an employee forum. Some bloggers removed only their work-related postings, leaving those that could not get them in trouble, while others took down

Figure 2. Graphic promoting the Electronic Frontier Foundation's resources protecting bloggers' rights. (Courtesy Electronic Frontier Foundation. Used with permission.)



their entire blogs. Google's addition of blog searchability in 2005 (Sifry, 2005) made it hard for bloggers to hide in obscurity, creating an additional deterrent for those who wished to blog even occasionally about work. As "Dan," a blogger in the north of England, comments:

One thing I don't write about now, although I used to, is my work. I had written a series of posts, starting out quite harmless, but ending up a lot more risky- there was one all about racist remarks made by a colleague, one comparing a visiting VIP visitor from company HQ to a particularly self-important Roman Emperor, and another about my unwillingness to take on a move to another team because, among other things, it sounded a bit too much like hard work and I would have less time to devote to the blog. I started to worry about being found out (it would at that time have only taken a Google search for my name) so one day took them all down. But those stories are all just in hibernation really and the day will come when they reappear in some untraceable online place – I even have the title of my new blog all worked out. (Dan, personal communication, November 11, 2005)

Dan has been alarmed at the prospect that blogging might threaten his livelihood but he hasn't given up hope of continuing once he has covered his tracks better. However, the concerted effort to protect bloggers' rights indicates a more sustained

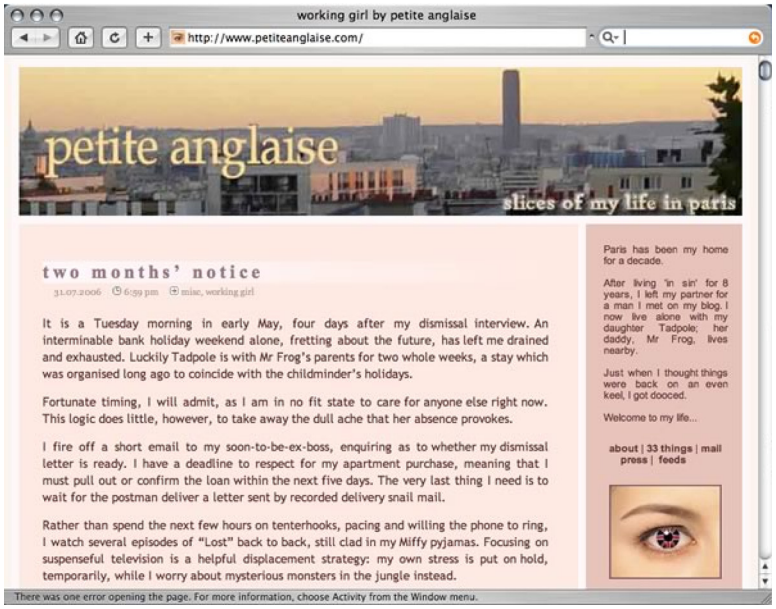
threat, made possible by Internet-enabled, loosely networked bloggers who, like Dan, have been temporarily cowed but remain committed to the ideal of non-corporate self-expression.

The Case of Petite Anglaise

Exemplifying this commitment, the 2006 firing of the Paris-based blogger Petite Anglaise, confirms the persistence of recalcitrant blogging despite corporate attempts to control it. Petite, whose real name (as revealed by the press) is Catherine Sanderson, was terminated from the accounting firm of Dixon Wilson in April 2006 after her employer found out about her blog, accused her of blogging on company time, and of potentially bringing the firm into disrepute through her writings. Sanderson, who worked as a bilingual secretary, had never identified the firm or referred to the accounting industry in her blog, and wrote only rarely about incidents at work.

The sacking of Petite was in some ways anachronistic – her firm was notably conservative and clearly oblivious to the learning curve that many organizations have followed with regard to the negative publicity that could result from firing an employee for blogging. However, the case also represented a maturing of the blogging community and confirmed the persistence of anonymous workblogging in spite of corporate attempts limit or prohibit it. Petite's case highlights widespread attachment in the blogging community to principles of free speech and the right to maintain a detached and even critical orientation to the labor process. Her firing, and the explosive media and Internet coverage that it generated, awakened a "sleeping giant": the possibility that any employee could be connected to a powerful and vocal network. The case also highlighted knowledge workers' dedication to making use of workplace resources and networks for their own creative projects, pursuing self-fulfillment through avenues other than their formal work duties. Further, Petite Anglaise illustrated the power of creative writing itself in cultivating a following, creating a sense of intimacy among a diffuse group of readers, and

Figure 3. One of Petite's postings from July 2006, telling the story of her firing and its aftermath. (© 2006, Catherine Sanderson. Used with permission.)



nurturing countercultural values that clash, albeit subtly, with the idea of job commitment.

Catherine Sanderson started writing *Petite Anglaise* in July 2004 after reading about blogging on *The Guardian*'s website and following links to blogs such as Belle de Jour, the now discontinued blog of a London call girl (Anglaise, 2007a). Writing pseudonymously as "Petite," Sanderson's blog chronicles her personal struggles in raising a child, coping with the ends and beginnings of relationships, and trying to survive financially in the French capital. It was already a relatively popular blog before her firing, commanding a readership of about 3000 visitors per day (Randall, 2006), but this number swelled ten-fold to 30,000 a day immediately afterwards (Frost, 2006).

In Sanderson's entire blog, only a handful of anecdotes pertain to workplace events and characters – Petite gives the number as 12 out of 384 posts (Anglaise, 2006a). In one, "titillation," she describes the accidental baring of her cleavage during a videoconference hookup, making reference to the conservatism and sexism that prevails at the firm. In a passage that was repeatedly cited in the press, she writes of one of the firm's partners: "This other boss is very old school. He wears braces and sock suspenders (although I don't have any firsthand experience of those), stays in gentlemen's clubs when in London, and calls secretaries 'typists'" (Anglaise, 2005b). Petite also intimated in her blog that she had taken time off from work on a false excuse in order to spend time in a hotel room with her new lover (Anglaise, 2005a). And, as became important in the later legal tribunal, it was evident from the timestamps on her blog entries that she had blogged during work hours.

Petite wrote about her firing in July 2006 and was immediately bombarded with comments from readers, provoking interest from a Paris-based *Daily Telegraph* reporter who broke the story in the mainstream press, quoting Sanderson as taking a moral stand, "defining the boundaries between personal and professional activities, where the line should be drawn for bloggers who touch on the events of their working life in their writing" (Randall, 2006). Multiple press and radio interviews followed and the story was picked up by Associated Press and syndicated worldwide. In *The Guardian*, Petite described herself as a "competent and dependable worker" (Sanderson, 2007), commenting in *The Times* that she objected to otherwise good workers being sanctioned for their blogging activity (Bremner, 2007). In the following months, she was given opportunities to write opinion pieces for *The Guardian* (Sanderson, 2007) and *New Statesman,* and secured a book deal worth close to a million dollars with Penguin (Rickett, 2006). A memoir based on her blog was released in 2008. In March 2007, Petite won a legal victory against her employer, when a French labor tribunal granted an unfair dismissal verdict and ordered her firm to pay 44,000 Euros in damages. She told *The Guardian* that she hoped her case would, "send out reassuring signals to the millions of people blogging in France" (Johnson, 2007).

In the aftermath of Petite's firing, regular followers of the blog were joined by new readers who had heard of Petite's plight, and the slew of comments immediately following the media publicity overloaded the server that hosted Sanderson's blog (Anglaise, 2006a). The comment box at *Petite Anglaise* became a gathering place for people who wanted to offer their sympathies, express their support for free speech, and report on how the story had been covered in their local media. Readers from places as far afield as Estonia and China posted comments about how the story had reached their local and national newspapers. While not all comments were supportive, the vast majority were, leading a reader called O. to comment, "there are literally thousands of readers supporting you," while a visitor called Monty chimed in with, "You represent the people and to all our eyes you are perceived as the victim" (Anglaise, 2006b).

More specifically, Petite's blog became a site where other workers talked about their own fears

about blogging from work. Several "Dooced" bloggers commented about having themselves been fired, and others posted information about employee rights, including the Advisory Conciliation and Arbitration Service (ACAS) Internet guidelines (2006) and the EFF guide to anonymous blogging (2005). A reader called Sydneysnider commented, "hope everyone reading this is unionized" (Anglaise, 2006b). Some readers lamented the increased surveillance that bloggers faced at work – as the labor tribunal commenced, a reader called Morgan wrote, "This e-climate of terror will have most of us censoring ourselves for protection, even though we write because we believe in free speech and rights to personal, non-corporate opinion" (Anglaise, 2007b). Among the comments, were several demonstrations of solidarity with Petite in asserting the right to blog from work, with visitors commenting that they were reading through the comments and posting from work on company computers in their own workplaces. According to one commenter, Petite's fans temporarily detonated a Google bomb (influencing the ranking of a given page in results returned by the Google search engine), associating the search term "Dixon Wilson" with the Wikipedia definition of stupidity (Anglaise, 2006a).

Although most of the comments were one-off remarks, at times, readers responded to each other, building on previous comments and bringing forth diverse viewpoints amidst the largely supportive tone of the discussion. In response to the tribunal result, a reader called Paul Reichel interrupted the generally supportive vein of opinion by posting an opposing view: "You used their time and their facilties [sic] - both of which they and not you had paid for." A debate ensued, with some readers defending Petite's right to blog on company time or to be given fair warning rather than an immediate dismissal, while a smaller number upheld the view that Petite's employer was partly in the right.

The incidents surrounding Petite's firing and subsequent legal proceedings, gave her readers – many of whom were bloggers themselves – an opportunity to reflect on their orientation to their organizational role and to elevate their acts of creative self-expression onto a plane in which the reclamation of time and resources from the labor process became a communal rather than an individual act. Petite's widely publicized case elevated the everyday acts of resistance undertaken by her audience, imbuing the reading of blogs on company time with moral and political significance. Through engagement in the discussion, readers were able to affirm their ideological distance from corporate values, renewing their commitment to writing anonymously on their own blogs. Regular readers who had been attracted to the blog by the quality of Petite's writing, became united around shared values – such as a lack of job commitment – that were subtly present in the blog before the incident but became overt after the firing. By demonstrating their intellectual sophistication – expressing contempt for tabloid newspapers, for example – Petite's readers attempted to distinguish themselves as educated, critical thinkers, ready to contribute their ideas and analysis to the case.

While Petite's readers made no move toward any kind of long-term political organization, their willingness to engage in discussion about the labor process demonstrated a creative need for unfettered self-expression and a commitment to borrowing time from the work day for dialogue and artistic endeavors. Research on workblogs has indicated that bloggers do not identify their activity as resistance (Richards, 2007), and has highlighted the personal nature of the phenomenon (Lenhart et al., 2006), emphasizing that most anonymous workbloggers blog as an act of creative self-expression rather than an act of defiance. Amidst the media furor over her firing, Sanderson referred to her blog as a personal endeavor, yet acknowledged its inherently public nature: "I've often thought it's a little like being an actor on the stage and not being able to see the audience because of the lights. You can kind of forget that they're there and just write for yourself" (Frost, 2006). Her blog underscores the connection be-

tween creative writing and resistance, reconciling the seeming contradiction between writing that is intimate and personal yet able, albeit ephemerally, to precipitate large-scale political mobilization in support of worker's rights. In the long-term, Petite's blog, and others like it, helps members of the blogging community to strengthen their adherence to iconoclastic values, making subtle connections between their writing and a literary culture that rejects traditional career values and fuels its members' individual efforts to limit their participation in a labor process that they find somewhat alienating.

FUTURE RESEARCH DIRECTIONS

Assessing the potential impact of anonymous workblogging is difficult, since the practice is a moving target that shifts continually in response to workplace computing policies and rapidly evolving Internet technology. The case studies presented here are very specific to the technological and social moment in which they emerged and, as such, they are not presented as generalizable phenomena, but rather as unique manifestations of technologically enabled employee recalcitrance that, it is suggested, is likely to continue in as yet undetermined forms.

Blogging technology is constantly morphing, and blogs themselves will inevitably be replaced by other social technologies. As Internet-enabled cell phones become the norm, reliance on workplace networks in order to blog from work is no longer a necessity, and new developments such as "microblogging" (see Twitter, http://www.twitter.com/) may take advantage of SMS text capabilities, being driven by postings from handheld devices rather than desktop computers.

Some commentators have observed that amateur blogging is already very much on the decline (Boutin, 2008), and that there has been a mass migration to Facebook as an alternative communication medium. Future research might explore whether these developments represent new avenues for dissent, permitting workers to circumvent company network surveillance and use their own wireless technologies for workplace-based resistance. Another relevant task for researchers is to assess the degree to which the human need to elude surveillance drives the development of new Internet technologies, rather than merely responds and adapts to technological developments.

Recent discussion in the media has pointed to concern among neuroscientists that newer tools such as Facebook lack any sustained narrative and lead to atomized and self-absorbed communication. As blogs give way to Twitter and Facebook, it may be interesting to explore the presence (or absence) of narrative in these newer tools, which may have implications in terms of organizing power or media impact.

Workplace policies and management ideology must be a central focus of future research and must be regarded as in dialogue with emerging technologies and behaviors. An intriguing issue, as blogging morphs into newer forms of social technology, is whether workers will be able to stay one step ahead of workplace policies, creating new opportunities for disruption of the labor process. Today's anonymous workbloggers could be tracked longitudinally to see how they take advantage of emerging tools, while also scanning emerging Internet-based social realms for new voices of resistance. In broadening the analysis, it may be interesting to move beyond the study of workblogging and related practices in purely Western contexts, and incorporating a more international perspective on what is essentially a global phenomenon.

CONCLUSION

From the employer's perspective, blogging has presented a form of trust-tension (Guerra et al., 2003), where free-flowing information is necessary to organizational health, yet lack of control

over how this information is used creates a sense of over-exposure and vulnerability. Drawing on critical management literature, this chapter has shown how organizations have coped with the anonymous workblogging phenomenon, revealing limitations of punitive anti-blogging policies and questioning blogging strategies that promote transparency between workers and employers.

Critics of corporate culture such as Hochschild (1997), Ross (2002) and, in the UK, Bunting (2004), have argued that the colonization of workers' emotions and creative impulses in the service of salaried time has led to overwork, time-scarcity, and neglected families and communities. Looking at workers in a high-tech environment who are simultaneously seduced by the company culture yet wary of its encroachment into their private space, Kunda (1992) adds an important and subtle dimension to this analysis, focusing on how white-collar workers engage in minor acts of resistance yet, in the absence of a compelling alternative, return to the organization as their principal source of affirmation. Thompson and Ackroyd (1995) have criticized Kunda for promoting a "Foucauldian turn" in organizational sociology that forecloses the possibility of resistance in the knowledge workplace. They advocate a revival of academic research into informal and subtle forms of resistance.

The mainstream media, in covering the high profile cases of fired bloggers, has often treated anonymous workblogging as a political phenomenon, characterizing bloggers as recalcitrant employees engaged in conscious acts of rebellion. However, recent studies of blogging have cautioned against regarding the workblogging phenomenon as a conscious act of defiance and have downplayed the idea of blogs as public forums for rhetoric and debate (Lenhart et al., 2006; Richards, 2007). Yet, analysis of the relationship between personal creative writing and political mobilization in the blogosphere reveals a subtle yet concrete process of ideological convergence around anti-corporate, anti-work, and generally iconoclastic values that represent a firm and sustained detachment by some bloggers and their readers from the labor process in which they are engaged.

The containment of blogging through periodic tightening of Internet surveillance and institution of blogging guidelines has stifled workplace and work-themed blogging. Furthermore, corporate blogging policies that cautiously welcome employee bloggers under a banner of mutual trust and openness, have promoted the idea that anonymous bloggers are morally questionable. However, as recent high-profile workblogging controversies have illustrated, anonymous blogging is a potentially disruptive, highly networked phenomenon that makes use of rapidly evolving Internet technologies to create new opportunities for dialogue and action.

Anonymous workblogging highlights a kind of trust-tension in organizations that require free-flowing information for their health, yet might be threatened by over-exposure in the blogosphere or the media. Efforts to suppress anonymous blogging by increasing surveillance and discouraging the practice through written policies have encountered ideological limitations, since they clash with corporate culture based on employee freedom and self-management. Some of these limitations have been surmounted by the powerful new corporate strategy of permitting blogging as an integral aspect of the corporate culture and encouraging employees to blog openly and candidly about their work. Yet, although this "corporate blogging" strategy has garnered vocal support from prominent employees of influential organizations and has been hailed as a moral victory over anonymous blogging, employer-sanctioned blogs fail to accommodate the continued need for unfettered critical distancing from the labor process. As newer technologies are ushered in, the viability of management philosophies that are based on openness and trust remains an intriguing question.

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ENDNOTE

[1] A collective noun commonly used to describe all the blogs in existence.

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