Educating Knowledge Managers:
A Competence-Based Approach

by

André Saito

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Supervisor: Prof. Dr. Katsuhiro Umemoto

School of Knowledge Science
Japan Advanced Institute of Science and Technology

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Abstract

Keywords: knowledge management competence, knowledge management education, knowledge manager, knowledge economy, knowledge society.

The emerging knowledge economy and society bring new challenges to organizations, managers and workers: the accelerating pace of innovation in products, services and processes; the growing importance of work that requires extensive education, experience and judgment; and the escalating complexity of knowledge, which becomes increasingly distributed and changeable, among others. The field of knowledge management (KM), however young, has attracted contributions from a wide range of disciplines seeking to provide answers to those challenges, and may be a good source of instruction to managers and workers willing to get prepared for them.

In this work, we propose a model of individual knowledge management competence to support the education of knowledge managers, understood as general managers capable of dealing with those challenges. A preliminary model was theoretically developed after an extensive review of literature in the KM field and on the concept of competence, and then validated and refined in two ways: first, a questionnaire survey of KM researchers and practitioners, and second, a content analysis of curricula from master's programs in KM. The model explains KM competence as specific combinations of presumed KM-related activities and the individual capabilities required to perform them. It also indicates that those activities and capabilities are strongly dependent on particular perspectives on knowledge and its management.

We describe four basic perspectives – information, human, computing, and strategy – that lead to very distinct ways to understand and practice KM. From an *information*-oriented perspective, knowledge is mostly seen as codified/codifiable content and transferable expertise/experience, and KM usually means to facilitate

access to information, expertise and so-called best practices. From a *human*-oriented perspective, knowledge is largely interpreted as social practice and collective sense making, and KM usually means to cultivate contexts and facilitate connections that improve practice and sense making. From a *computing*-oriented perspective, knowledge is typically regarded as objective and suited to computational approaches, and KM normally means to develop systems/methods that compute knowledge and to build computational models for decision making. Finally, from a *strategy*-oriented perspective: knowledge is interpreted at the organizational level as capability or asset, and KM typically means to prioritize knowledge valuable to the organization and to design and implement strategies and processes to acquire, create, use and protect it.

Those perspectives can be combined in myriad ways, and the model proposed suggests not a single definition of KM competence, but multiple profiles based on distinct understandings of what comprises KM. The study describes four typical profiles being developed in current KM education: the information manager, the learning facilitator, the knowledge systems developer and the KM manager. Finally, we conclude this work by suggesting other profiles that better focus on the managerial challenges in the knowledge economy and society, and propose ways to develop them through improved graduate programs.

To Mom and Dad,
my endless sources of love and wisdom

To Sandra,
who makes me believe in humankind

To Amanda and Leonardo,
the guiding light of my life

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Chapter 1: Introduction

The emerging knowledge economy and society brings new challenges to organizations, managers and workers: the accelerating pace of innovation in products, services and processes; the growing importance of work that requires extensive education, experience and judgment; and the escalating complexity of knowledge, which becomes increasingly distributed and mutable, among many others. The expanding knowledge management (KM) field has attracted contributions from a wide range of disciplines seeking to provide answers to those challenges, and may be a suitable source of instruction to managers and workers willing to get prepared for them.

In this work, we propose a model of individual knowledge management competence to support the education of knowledge managers, or general managers capable of dealing with those challenges. We first explore the KM field itself, identifying fundamentally distinct ways to understand knowledge and its management and suggesting that diverse contributions can be understood as combinations of four basic epistemological perspectives: information-, human-, computing-, and strategy-oriented. We examine the concept of competence as well, describing its two complementary aspects that emphasize either individual capability or expected performance, and translate it into the context of KM, proposing a model with three interacting elements: capability set, activity set, and KM perspective. We also investigate graduate KM education, detailing the varied ways in which the idea of KM competence is implemented, most often implicitly, in programs' curricula, and discussing the extent to which the current provision addresses the needs of knowledge managers. Finally, we conclude this work by suggesting profiles of KM competence that better focus on managerial challenges in the knowledge economy and society, and proposing ways to develop them through improved graduate programs.

In this first chapter we provide an introduction to the study, describing the context that motivates it, clarifying the research problem, stating our goals and research questions, and detailing the methodology adopted. We end it with an outline of the whole dissertation.

1.1 Background and problem setting

1.1.1 Challenges in the emerging knowledge society

The emergence of the knowledge economy has brought new challenges to organizations, managers and workers. As knowledge becomes more important than capital, land or labor in the creation of economic value, companies have to face an accelerating pace of innovation in products, services and processes. For organizations, that means a move to dynamic strategies and blurring boundaries. The constantly changing environment demands permanent strategic adaptation and the increasingly distributed nature of knowledge requires collaboration with external entities and flexible organizational structures. For managers, that means a fundamental change in managerial action. Endless emerging technologies, changes in regulation and new market players make strategizing a continuous activity, and the distinct features of knowledge work demand less command and control and more inspiration and cultivation. For workers, that means no smaller a deal. In such a context, they are compelled to learn continuously, expand their creativity, and collaborate more and better.

The new dynamics of the knowledge economy is quickly spreading to society. New tools for accessing, manipulating and communicating knowledge make it easier and faster to develop and ever more complex and inter-connected. More people know more things more quickly, with the end result of a growing number of specialists with little knowledge outside their field of expertise. People are forced to rely on others to understand areas they don’t know, to access knowledge they are not aware of, and to connect their own knowledge to the exploding collective semantic network. A new culture is emerging, based on values of openness, trustworthiness and generosity, where more and more knowledge is

made public and voluntary contribution to the intellectual commons becomes socially recognized. New models of social action are growing from the ubiquitous network of information, communication and interactive media, with virtual groups being mobilized, for instance, to react to natural catastrophes, to bring down wrongful politicians and news editors, and to advance social and environmental causes, among other purposes. Finally, a fundamentally new economic model based on distributed collaboration is gaining ground. Starting with significant successes in software development, the concept moved to other types of knowledge-intensive products and services, like books and encyclopedia, educational content, and communications, among others.

1.1.2 The growing knowledge management field

The idea that knowledge should be actively managed gained wide popularity in the mid 1990's, after works from Thomas Stewart on intellectual capital (1991, 1994), Ikujiro Nonaka on knowledge creation (1991, 1995), and Thomas Davenport, on managing knowledge (1997). At first, knowledge management received a strong technological connotation, becoming associated with the construction of repositories of codified knowledge and the implementation of information systems like corporate portals, document management systems, and groupware. The large number of failed initiatives, however, soon indicated the need to consider the human and social aspects of managing knowledge.

After a decade or so, knowledge management (KM) is on its way to become an established field. In its early years, many believed it would be a fad like many other management techniques that have appeared in the previous decades. In fact, KM has shown some characteristics typical of fads, like the exponential growth in publications from 1995 to 1999 and a sudden drop in 2000. But that drop occurred in the popular press only, particularly in the information technology-related literature. Academic publications have displayed a steady growth throughout the period (Ponzi, 2002). The vitality of the field may also be assumed through anecdotal evidence, like the several international academic conferences being held annually, the increase in academic journals dedicated to KM, the expansion of

Table 1-1: Academic activity in the field of knowledge management

International academic conferences held in 2006:

- 15th Conference on Information and Knowledge Management (CIKM '06), United States
- 7th European Conference on Knowledge Management (ECKM 2006), Hungary
- 6th International Conference on Knowledge Management (I-KNOW '06), Austria
- 6th International Conference on Practical Aspects of Knowledge Management (PAKM 2006), Austria
- 3rd International Conference on Knowledge Management (ICKM 2006), United Kingdom
- 3rd Asia-Pacific International Conference on Knowledge Management (KMAP 2006), Hong Kong.

Academic journals:

- Knowledge and Process Management (since 1994)
- Journal of Knowledge Management (since 1997)
- Journal of Information and Knowledge Management (since 2002)
- Knowledge Management Research and Practice (since 2003)
- International Journal of Knowledge Management (since 2005)
- International Journal of Knowledge and Learning (since 2005)
- Knowledge Management for Development Journal (since 2005)
- International Journal of Applied Knowledge Management (since 2006)
- Journal of Universal Knowledge Management (since 2006)
- International Journal of Knowledge Management Studies (since 2006)
- Interdisciplinary Journal of Information, Knowledge & Management (since 2006)

Handbooks, collections and encyclopedia:

- Easterby-Smith, M., & Lyles, M. A. (Eds.) (2003). *The Blackwell Handbook of organizational learning and knowledge management*. Malden, MA: Blackwell Publishing.
- Holsapple, C. W. (Ed.) (2003). *Handbook on knowledge management*, Vols. 1 and 2. Berlin: Springer.
- Nonaka, I. (Ed.) (2005). *Knowledge management: Critical perspectives on business and management*, Vols. I to III. London: Routledge.
- Schwartz, D. G. (Ed.) (2006). *Encyclopedia of knowledge management.* Hershey, PA: Idea Group Reference.

Textbooks:

- Jashapara, A. (2004). *Knowledge management: An integrated approach*. Harlow, England: Pearson Education.
- Becerra-Fernandez, I., Gonzalez, A., & Sabherwal, R. (2004). *Knowledge management: Challenges, solutions, and technologies*. Upper Saddle River, NJ: Pearson Education.
- Awad, E. M., & Ghaziri, H. M. (2004). *Knowledge management*. Upper Saddle River, NJ: Pearson Education.
- Dalkir, K. (2005). *Knowledge management in theory and practice*. Burlington, MA: Elsevier Butterworth-Heinemann.
- Hislop, D. (2005). *Knowledge management in organizations: A critical introduction*. Oxford: Oxford University Press.

graduate KM programs, the publication of KM textbooks, and the emergence of an established body of knowledge consolidated recently in handbooks, encyclopedias and collections (Table 1-1).

The main concerns of the KM field are closely associated with the challenges brought about by the emergence of the knowledge economy and society. As knowledge has arisen to prominence, scholars from varied existing disciplines made contributions to KM. It was from management, however, that the main thrust has come. Among the major topics discussed in the field are, for instance: organizational learning and the study of processes, factors and conditions that affect it, like organizational culture and the dynamics of social networks; the idea of knowledge as organizational capability and the study of its role in the construction and maintenance of competitive advantage; and innovation and related issues, like development of alliances and collaboration networks, knowledge acquisition and protection, and knowledge strategies. While very short, this list indicates that the field is seeking answers to those challenges.

As any young discipline, however, KM suffers from conceptual plurality and conflicting approaches. It is still far from having an established paradigm upon which incremental research can be conducted. A major concern, for instance, relates to the familiar dialectics between positivistic and interpretative approaches in the social sciences. In the field of KM, this antagonism is amplified due to the diversity in its disciplinary roots, which include management and many of its subfields (e.g., strategy, organization science, human resources, operations, information systems), economics, sociology, psychology, computer science, artificial intelligence, and library and information science, among others. Moreover, in the practice arena, where KM is actually adopted and exercised, the concept is broad enough to appeal to a wide range of professional groups, like information technology, human resources, accounting, marketing, and planning. That results in diverse interpretations that more often than not conflict each other, when they should in fact complement.

1.1.3 The competence movement

Interest in the concept of competence has grown in parallel with the advancement of the knowledge economy. Following a variety of interpretations, the use of such notion has increased in many areas and situations. In management, for instance, organizations seeking to improve employees' effectiveness have adopted a competency-based human resources management. Competency models – sets of particular skills and attributes associated with top performers in given functions – are used to select job candidates, to identify training needs and develop personnel, and to evaluate employees' performance and decide on pay and promotion.

In public policy, governmental agencies are seeking to increase employment through the promotion of skills and competences to be used in the labor market. One action is to improve vocational education and training through the adoption of competence-based approaches focusing on key issues in particular occupations, professions and careers. Another action is to facilitate the recognition of skills acquired away from formal education – for instance, through experiential learning in the workplace. Accreditation is done through the development of qualification standards based on occupational or sectoral competence profiles (Leney, 2004; European Commission, 2004). In general education, the idea of competence has been used to broaden and enhance educational objectives, as an alternative to the traditional use of subject matter as the primary schema for organizing learning in schools. In a higher-level perspective, some national and international bodies have promoted the identification of a set of broad and enduring key competences that are useful in a range of work and life situations. Those key competences can serve as a guide for lifelong learning in an advanced society, and will be used in national and international surveys of the educational achievement of populations (Rychen & Salganik, 2003).

Such a wide variety of approaches to competence evidence the usefulness of the concept, and also illustrate its two essential and complementary aspects. Some usages present competence as an ability or capacity to do something, while others

indicate an expectation regarding performance or proficiency. The approaches to competence focusing on education and development tend to stress the former aspect, concentrating on the cultivation of individual resources and characteristics that lead to proficiency. Those focusing on assessment and qualification tend to stress the later, concentrating on the observation of actual performance that demonstrate the command of those resources. While the emphasis in one or the other aspect may fit particular needs, it is the link between them that makes the concept really valuable.

1.1.4 Problem setting

Following this contextualization, we are able to frame the problem that motivates this study. In short, we accept that the knowledge economy and society pose new challenges to organizations, managers and workers, and that the KM field has attracted contributions from many disciplines that seek to address those challenges. We also believe that KM is a promising source of instruction for managers who want to get prepared for the mounting changes, but as a young discipline, it suffers from considerable diversity, ill-defined boundaries, and still lacks an accepted body of knowledge.

1.2 Objectives and research questions

In this study, we use the concept of competence to help clarify the boundaries and contents of the KM field and bridge research and practice through education. Our objective is to propose a model of competence in KM intended to support the education of knowledge managers. Here, knowledge manager is understood in the very generic sense of a manager who is able to deal with the challenges of the knowledge economy and society. Such a manager would typically perform in knowledge-intensive organizations, knowledge-intensive environments, and/or in the management of knowledge workers.

The research questions that guide our study are stated as follows.

Major research question

- What is individual knowledge management competence, from an educational perspective?

Subsidiary research questions

1. How can the field of knowledge management be described, given the present diversity of perspectives?
2. What are the essential elements of KM competence, and how are they related to each other?
3. What kind of competence is being developed in graduate KM education?

1.3 Methodology of the study

We have combined qualitative and quantitative methods in three steps.

First, we have theoretically developed a model of KM competence through an extensive review and analysis of literature in both KM and competence fields. We have identified key sources – journals, handbooks, edited volumes, conferences proceedings, etc. –, and reviewed them to map key authors and topics. We have then developed and iteratively refined many versions of the model, after discussions with our supervisor and colleagues and further reading and consideration of issues.

Second, we have sought to validate the model's elements through a questionnaire survey targeted at KM researchers and practitioners. We have developed propositions to be tested, designed and tested the survey instrument, applied the questionnaire through individual contact via e-mail, and analyzed data with cluster analysis and descriptive statistics.

Third, we have identified particular configurations of the model's elements through the analysis of existing KM programs. We have identified master's programs in KM and collected a variety of curriculum information – e.g., courses, work load, schedule, course descriptions, etc. When a description of KM competence was not available, we inferred it from such information. We have checked the model's consistency and described specific KM competence profiles that embody its typical instances occurring in current KM education.

1.4 Organization of the study

We organized this dissertation in six chapters.

In chapter 2, we present a review of the literature. We outline features of the knowledge economy and society along with the challenges they rise, present the main research topics in KM according to contributions from major disciplines, and provide an overview of the concept of competence.

In chapter 3, we theoretically develop a model of KM competence. We summarize some of the findings from chapter 2, complement them with a critique of definitions of knowledge, describe four major epistemological perspectives on KM, and introduce our proposed model.

In chapter 4, we present and discuss the results of the questionnaire survey to validate the proposed model. We detail the research design – development of propositions, questionnaire design/testing and sampling/data collection –, present results and discuss the major findings.

In chapter 5, we describe and discuss the current status of graduate KM education. We report our survey of existing KM programs, presenting a general profile and some key statistics, focus on master's programs and analyze them with the support of our model, and discuss the major findings.

Finally, in chapter 6, we present our general conclusions from this study. We provide a summary of major findings by answering the research questions, propose theoretical and practical implications and make suggestions for future research.

Chapter 2: Literature Review

2.1 Introduction

In the introduction chapter we argued that the knowledge economy and society introduce challenges to organizations, managers and workers, and assumed that the field of KM is aggregating contributions that seek to address those problems. We also suggested that the concept of competence may be useful as a framework to organize those contributions in order to support the education of knowledge managers.

In this chapter we present a review of existing literature related to those topics. We begin with a summary of previous studies on the knowledge economy and society, highlighting some of their main features and discussing major implications for organizations and managers. We then explore the breadth and depth of the KM field, seeking its boundaries and surveying its major contents. We identify several of the main disciplines contributing to it and describe some of the key topics discussed. Finally, we explain two complementary approaches to the concept of competence, one viewing it as individual qualities that indicate capacity for proficient action, and the other describing it as socially defined standards indicating expected performance.

2.2 The knowledge economy and society

The most evident aspect of the emerging knowledge society is the increasingly influential role of knowledge in the economy of developed countries. In those economies, knowledge has already supplanted capital, land and labor as a factor of production, which introduced fundamental changes in economic structure and competitive dynamics. Among the several significant structural changes are the establishment of a knowledge sector in the economy, responsible for the continuous production and dissemination of knowledge (Machlup, 1962; Bell,

1973), the consolidation of technology-based and other knowledge-intensive industries (Stehr, 2002; Foray, 2004), and the prominence of knowledge work compared to more traditional forms of labor (Drucker, 1993; Reich, 1991). In a knowledge economy, value is created mainly through new ideas on how to arrange resources, and knowledge and technology are more relevant than raw materials and cheap labor.

More critical than those structural changes, though, is the new dynamics of competition. Perhaps the essential feature of the knowledge economy is the accelerating pace of innovation in products, services and organizational practices, which follows what the economist Joseph Schumpeter called a process of "creative destruction". For him, economic change is driven by the succession of technologies and practices that destroy previous arrangements as more effective ones are created (Schumpeter, 1934). The search for higher than normal profits lead individuals and firms to seek unique new practices and technologies that give them a temporary monopoly in the market. This monopoly enables them to earn higher profits for a period, until their product is successfully imitated by a competitor or displaced from the market by yet another new product. New firms with new ideas, changing the definition of products and markets and not simply lowering prices of commodities, are the driving force behind economic change (Thurow, 1996; Cortright, 2001).

Organizational and managerial implications

The emphasis on knowledge brings about several implications for organizations and their management. The distinctive characteristics of knowledge workers pose a challenge to conventional managerial practice. Their level of autonomy, distinct interests and motivations, and considerable independence and mobility put them apart from the conventional workforce. Although there is no definite description of knowledge workers, they are usually characterized by high degrees of expertise, education, or experience, and their work is commonly associated with problem solving, judgment, and creativity. The uncertainty and variation involved in such work make it difficult to control and supervise directly,

and more indirect approaches that provide adequate conditions are usually more appropriate (Newell et al., 2002; Alvesson, 2004). Furthermore, knowledge work cannot be forced, it must contributed willingly. Knowledge workers tend to be motivated by intangible factors, like challenging work where they can learn and develop their skills or peer recognition for their expertise. Also, they are usually committed more to their professional network and personal career than to the employing organization. Thus, they tend to be more independent and show a higher degree of job mobility, posing challenges regarding knowledge retention and protection (Davenport, 2005).

Another challenge is that knowledge is increasingly distributed, not completely available in any single mind. Valuable knowledge results from contributions of many people, and a critical management task in a knowledge-based firm is to integrate knowledge from a range of specialists. A variety of coordination mechanisms is necessary to facilitate collaboration and knowledge sharing, and to promote the collective knowledge creation process. Such coordination must balance a series of trade-offs, like that between the need for common knowledge for better communication and diverse knowledge for deeper innovation, and that between the need for exploitation of existing knowledge and exploration of new knowledge (Grant, 1996; Nonaka and Takeuchi, 1995). In addition, the challenge may be accentuated by the variety of organizational arrangements currently adopted by innovative firms, like matrix and hyperlinked organizations, virtual and networked communities, cross-functional and distributed teams, inter-divisional and multi-national projects, contractors and contingent workers, etc. (Pettigrew et al., 2003; Miles et al., 1997; Herber et al., 2000; Barley & Kunda, 2004).

The distributed nature of knowledge also manifests itself at higher levels of organization. Very few firms can independently master the wide range of knowledge needed to compete in ever-changing innovative contexts. Thus, firms need to constantly scan the environment for valuable knowledge and develop agreements and partnerships to have access to it (Almeida et al., 2003). This requires the improvement of their absorptive capacity, or the ability to recognize

the value such knowledge, to assimilate it, and to apply it successfully (Cohen & Levinthal, 1990). Also, as the complexity and required resources for innovation continue to increase, such alliances progress to interorganizational networks, where knowledge emerges and flows through myriad modes of cooperation (Rosenkopf, 2000). Such networks may be eventually clustered in a geographic region, associated with a particular regional innovation system that usually involves supporting infrastructure and institutions, as well as a characteristic dynamics of interaction and development (Acs et al., 2002; de la Mothe & Paquet, 1998).

2.3 The knowledge management field

Broadly defined, knowledge management (KM) refers to a deliberate and consistent effort to improve the utilization, transfer and creation of knowledge in organizations. As a field of academic inquiry, it is the combination of a wide range of theories and constructs appropriated from various disciplines with some original models and concepts developed specifically to address such a problem.

2.3.1 Bibliometric studies

Knowledge management is well known to be a multidisciplinary field. The complexity of issues related to knowledge draw attention from many disciplines along its development. Several bibliometric studies have been carried out to map the evolution and intellectual structure of this emerging field (Ponzi, 2002; Subramani, Nerur & Mahapatra, 2003; Wolfe, 2003; Serenko & Bontis, 2004; Gu, 2004). In what is probably the most detailed bibliometric study on KM to date, Ponzi (2002) collected and analyzed publication data from 1991 to 2001. He describes the evolution of the field in three major stages (Figure 2-1).

In the first stage, from 1991 to 1995, core themes emerged through contributions mainly from management and organizational science. In the second, from 1996 to 1999, the field experienced an exponential growth in publications, due in part to the hugely popular work of Ikujiro Nonaka and Hirotaka Takeuchi,

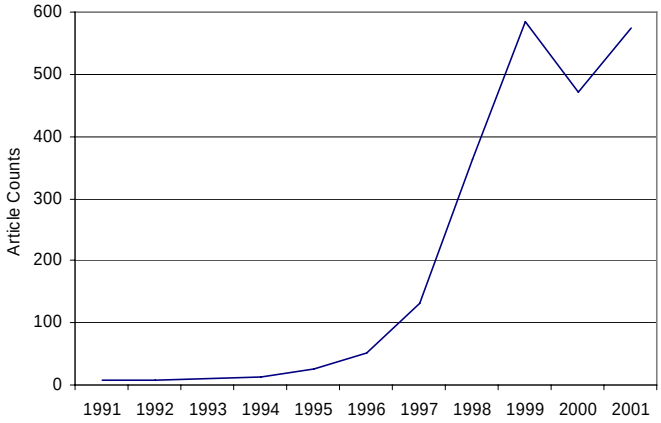

Figure 2-1: Publication in the KM field, from 1991-2001 (source: Ponzi, 2002, p. 34)

The Knowledge-Creating Company, brought out in 1995. The last stage is marked by a sudden drop in publications in 2000, and a rebound in 2001. Ponzi showed this drop-and-rebound to have happened in the popular press[1] only, with academic publications presenting a steady growth throughout the study period. We conjecture that there were two concurrent trends advancing KM. One, the popular press strongly advocating for KM in a fashion-like movement, as some have argued (Scarbrough & Swan, 2001; Swan, Robertson & Bresnen, 2003), and the other, a more consistent increase in the interest of the academic community in issues related to knowledge.

Ponzi also confirmed the multi-disciplinary nature of knowledge management. The number of disciplines contributing to the field grew from 3 in 1996 to 13 in 2001[2], with the most active[3] ones being computer science (32.6% of publications),

[1] *Academic* publications always present references at the end of articles, while *popular* ones never do it.

[2] Ponzi developed a classification scheme based on ISI's (Institute for Scientific Information, now Thomson Scientific) Subject Category Codes, where codes were associated to disciplines, fields and subfields (2002, p. 26).

[3] Activity is the number of publications. Disciplinary activity was determined by assigning monographs and articles to disciplines. In the case of articles, *journals* in which they were published were coded, not the articles themselves (Ponzi, 2002, p. 26).

business (25.3%), management science (13.1%), and library and information science (11.4%). The predominance of computer science-related (e.g. information systems, artificial intelligence) literature is consistent with other works (Scarbrough & Swan, 2001, 2003; Wolfe, 2003; Gu, 2004). Considering the academic literature alone, the most influential disciplines[4] were found to be management science (43.4% of citations), business (19.8%), organizational science (14.8%) and computer science (10.2%)[5]. It is interesting to note the strong influence of management-related areas in spite of their comparatively lower level of disciplinary activity.

Key themes in knowledge management research

The influence of business- and management-related ideas in knowledge management literature is also evidenced by studies seeking to identify the core themes in the field. A common way of doing that is by conducting a co-citation analysis of influential authors in the field[6] and examining the related discourse to identify key themes being addressed. The idea behind the method is that authors who have made seminal contributions to a field become associated to the concepts and constructs advanced by them. Since authors promoting related concepts are likely to be cited together, the clusters thus formed represent the field's core thematic areas. Ponzi (2002) also conducted such kind of study, identifying 54 seminal authors that led to three major constructs underlying the development of KM (Table 2-1).

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[4] Influence is the number of citations received. Disciplinary influence was determined by counting the number of times each work was cited in the source articles, and grouping those works according to disciplines. (Ponzi, 2002, p. 29).

[5] Examples of journals and magazines under each category (provided by the author): management science (*Strategic Management Journal*, *Academy of Management Review*, *California Management Review*, *Long Range Planning*), business (*Harvard Business Review*, *Fortune*, *Forbes*), organizational science (*Organization Science*, *Organization Studies*, *Organizational Dynamics*), computer science (*Decision Support Systems*, *Expert Systems with Applications*, *IBM Systems Journal*).

[6] Author co-citation analysis applies several statistical techniques to identify authors that tend to be cited together in the same paper. The usual techniques are factor analysis, cluster analysis and multi-dimensional scaling.

Table 2-1: Key themes in knowledge management research according to Ponzi (2002)

1. Creating a Knowledge-based Business Strategy Focus: knowledge as source of competitive advantage. Sample topics: combinative capabilities (Kogut & Zander, 1992), core competencies (Prahalad & Hamel, 1990), absorptive capacity (Cohen & Levinthal, 1990), knowledge-based theory of the firm (Grant, 1996), intelligent enterprise (Quinn, 1992).
2. Developing a Learning Organization Focus: organizational learning. Sample topics: organizational learning (Argyris & Schon, 1978), learning organization (Senge, 1990; Garvin, 1993), organizational culture (Schein, 1985), communities of practice (Brown & Duguid, 1991).
3. Managing Intellectual Capital Focus: measuring and managing intangible assets. Sample topics: intellectual capital (Stewart, 1997; Edvinsson & Malone, 1997; Sveiby, 1997).

A similar study was conducted by Subramani, Nerur and Mahapatra (2003). They compiled a list of 58 authors and assessed co-citation patterns in the period from 1990 to 2002 (Table 2-2). They suggest that research in knowledge management consists of eight domains: 1) Knowledge as Firm Capability; 2) Organizational Information Processing and IT support for KM; 3) Knowledge Communication, Transfer and Replication; 4) Situated Learning and Communities of Practice; 5) Practice of Knowledge Management; 6) Innovation and Change; 7) Philosophy of Knowledge; and 8) Organizational Learning and Learning Organizations.

Table 2-2: Key themes in knowledge management research according to Subramani et al. (2003)

1. Knowledge as a Firm Capability Focus: business strategy and the role of knowledge as 'firm capability' delivering competitive advantage. Sample topics: core competences of firms, combinative capabilities of firms, the resource-based view, social capital, knowledge articulation within firms, dynamic capabilities.

2. Organizational Information Processing and IT support for KM
Focus: how organizations process information and how information and communications technologies support that process.
Sample topics: organizational information processing, organizational memory, organizations as interpretive systems, managers' information processing behaviors, the structuring of organizations, information systems.

3. Knowledge Communication, Transfer and Replication
Focus: knowledge transfer processes in organizations, which involve a complex dynamics of reconstruction and recombination of knowledge.
Sample topics: stickiness of knowledge, the role of social networks.

4. Situated Learning and Communities of Practice
Focus: learning and knowledge sharing processes as situated and context-dependent social phenomena.
Sample topics: situated learning communities of practice.

5. Practice of Knowledge Management
Focus: informing managerial practice.
Sample topics: anecdotal accounts of KM initiatives that provide insights for practitioners, from authors like Thomas Davenport, Thomas Stewart, Peter Drucker, and James Brian Quinn.

6. Innovation and Change
Focus: the innovation process.
Sample topics: economic aspects of innovation, evolutionary perspective of economic change, absorptive capacity of organizations, the role of users in innovation.

7. Philosophy of Knowledge
Focus: the origin and nature of knowledge.
Sample topics: tacit knowledge, organizational knowledge, typologies of knowledge, organizational epistemology.

8. Organizational Learning and Learning Organizations
Focus: organizations as learning entities.
Sample topics: organizational learning, learning organization.

Appropriation of the KM discourse by distinct professional groups

One last study to be cited that make use of bibliometric techniques reports different interpretations of the knowledge management concept by distinct professional groups. In a series of publications, Scarbrough, Swan and Robertson describe KM as a management fashion and argue that diverse professional groups play an important role in its diffusion (Scarbrough & Swan, 2001, 2003; Swan & Scarbrough, 2002; Scarbrough, Robertson & Swan, 2005). According to them, the

KM discourse is a broad approach to management that has appeal to a wide range of professional groups, including information systems (IS), human resources (HR), accounting, and marketing practitioners, among others. As KM grew in popularity in the late 1990's, those professional groups were stimulated to debate and discuss the implications of KM for their practice, in an effort that both legitimated KM and sought legitimation for their own individual professions.

Swan & Scarbrough (2002) tracked the number of articles on KM published between 1990 and 2000 in popular and academic serials across different professional domains. They also analyzed the material's content in order to identify the key themes and discourses in KM. They found that KM has not diffused evenly among diverse professional groups. For instance, just over 41% of a total of 1,122 articles on KM were written by and for computer and IT/IS professionals, showing that this group has largely appropriated the KM discourse. For them, KM was related to capturing and codifying knowledge for wider share and reuse, and IT/IS had a central role in its effective implementation. The HR community, with around 5% of articles, reacted and advanced a view of KM based on human and organizational issues, emphasizing the importance of developing people, organizational processes and social communities. KM for them was related to issues like training and development, performance and rewards, and organizational culture. Other perspectives include that from the artificial intelligence (AI) community, who saw KM as a natural extension of knowledge engineering and knowledge representation techniques. For them, KM meant developing expert and knowledge-based systems, and using computers to deal with knowledge instead of information. Accountants were also challenged by KM and its argument for the importance of intellectual capital. They understood KM as a call for developing ways to assess and evaluate intangible assets like brands, patents, relationships and know-how.

Bibliometric studies suffer from some inherent methodological challenges. For instance, choosing databases is a critical decision, since none has the ideal mix of publications for any given study, and categorization schemes also vary among

them. Another crucial element is the criteria for selecting material. A common way of sorting relevant publications is searching for key phrases. The choice of phrases has important implications for an adequate analysis of findings and understanding of results. In spite of that, those studies are still a good source of insight for obtaining a general perspective of the field and its evolution, and an overview of its intellectual structure.

2.3.2 Disciplinary perspectives

2.3.2.1 Strategy

The growing importance of knowledge as an economic resource has drawn much attention to the topic in the field of strategy. Much has been written on the strategic role of knowledge, and many of those works strongly influenced the KM literature. Discussions usually center around topics like competences and capabilities, knowledge transfer and protection, innovation and knowledge creation, knowledge-based strategies, and an effort to develop a knowledge-based theory of the firm.

Knowledge as strategic resource

The fundamental question in the field of strategy is why firms in the same industry differ systematically in performance. In other words, scholars seek to explain why some firms are able to sustain profits above the industry's average. As a reaction to the paradigm dominant in the 1980's that explained competitive advantage as a function of the firm's environment, some authors focused instead on the firm's internal features. The resource-based view advanced by them explains superior performance as the result of a firm's unique bundle of *resources* and *capabilities*[7]. In order to provide competitive advantage, those resources and

[7] Resources are observable (but not necessarily tangible) assets that can be valued and traded, such as brands, patents, licenses, skilled personnel, trade contracts, and land. Capabilities are particular combinations of resources embedded in the organization and its processes; they are not directly observable (and hence necessarily intangible), cannot be valued, and are traded only as (cont.)

capabilities must be both valuable (i.e., to improve the firm's market position relative to competitors) and rare (i.e., available in short supply relative to demand). If, in addition, they are also inimitable (i.e., difficult to replicate) and non-substitutable (i.e., there are no alternatives for them), then the competitive advantage they provide is said to be sustainable (Barney, 1991; Wernerfelt, 1984; Peteraf, 1993). Strategic management, according to the resource-based view, corresponds to the acquisition, development and protection of resources and capabilities that provide sustainable competitive advantage.

If knowledge is an important resource, it must be considered in business strategy. Some scholars promoted the concept of knowledge strategies, or knowledge-based strategies. Based on the resource-based view and considering knowledge the most strategic resource, they proposed the development of strategies completely based on it. A prevalent topic is the natural tension between the *exploration* of new knowledge and the *exploitation* of existing knowledge (Zack, 1999; Ichijo, 2002). Other dimensions of a knowledge strategy are, e.g., the focus on knowledge internal or external to the firm (von Krogh, Nonaka & Aben, 2001), radical or incremental innovation (Bierly & Chakrabarti, 1996), and new or established markets (Chakravarthy, McEvily, Doz & Rau, 2003). The combination of those elements with distinct emphases on each will lead to specific knowledge strategies. Focusing on existing and new markets, for instance, Chakravarthy et al. (2003), suggest three basic strategies: protection, leverage (enter new markets with existing knowledge), and accumulation (build new competencies throughout the value chain). Von Krogh et al. (2001) combine the concept of knowledge domains with the idea of internal and external knowledge, proposing four basic strategies: leveraging (reusing knowledge internally), expanding (creating new knowledge in familiar domains), appropriating (entering domains by acquiring external knowledge), and probing (creating entirely new domains) strategies.

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part of an organizational unit. Examples of capabilities are American Airlines yield management system, Wal-Mart's cross docking system, and Dell's logistics system (Makadok, 2001).

Innovation and knowledge creation

A central issue in this literature relates to innovation and knowledge creation. In some industries, technological evolution and industry transformation compel firms to constantly revise and renew strategies and capabilities. Several models were developed to address such dynamic aspects of strategy. Teece, Pisano and Shuen (1997) proposed the concept of dynamic capabilities. According to them, the most reliable source of competitive advantage is in the managerial and organizational capacity to adapt, integrate and reconfigure resources and capabilities. Due to changing business environments, capabilities must be renewed through a process of continued innovation. This process is shaped by a firm's asset positions[8] and the evolution paths[9] it has followed.

Nelson and Winter (1982) proposed a related concept, now called the evolutionary perspective. They describe firms as a set of *routines*, a concept similar to that of competence or capability[10]. In a changing and uncertain environment, firms engage in an evolutionary process where they introduce variation in routines through external search or internal development, and manage the selection and retention of those that provide a better fit. Nonaka and Takeuchi (1995) proposed the concept of knowledge-creating company. Organization knowledge is created through the transformation and synthesis of tacit and explicit knowledge at individual, group and organizational levels. This process is guided by strategic leadership and facilitated through favorable shared contexts.

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[8] A firm's asset positions are the combinations of difficult-to-trade assets like technological and complementary assets, reputation, organizational structure, local institutions, relations with other firms and the market, etc. (Teece, Pisano & Shuen, 1997).

[9] Firms must follow certain paths of competence development. Current choices about domains of competence are constrained by past choices and will influence future ones. This is often referred to as path dependence (Teece, Pisano & Shuen, 1997; von Krogh & Grand, 2002).

[10] Routines are stable sets of coordinated action, and include a wide range of organizational practices, like technical procedures, production processes, investment policies, research and development activities, and business strategies (von Krogh & Grand, 2002). Some are explicit, like bureaucratic rules, while others are implicit in the organization's culture (Nelson & Winter, 1982, cited by Spender, 1996).

A knowledge-based theory of the firm

The growing importance of knowledge led some authors to advance a theory of the firm based on knowledge as the explaining factor, instead of the transaction costs used in previous models. A theory of the firm seeks to answer two main questions: why firms exist, and what determines their scale and scope (Conner & Prahalad, 1996; Coase, 1937). The essential concern of a knowledge-based theory of the firm seems to be the integration of diverse types of knowledge and knowing. Most authors contributing to the topic have addressed the issue in one way or another. For Grant (1996, 2002), knowledge is essentially individual, and the firm's function is to integrate the many types of individual specialist knowledge required to build its products and services. Knowledge integration requires a basis of common knowledge and a set of coordinating mechanisms[11]. Spender (1996, 2002), on the other hand, emphasizes knowledge that is essentially collective, and firms are described as dynamic, quasi-autonomous systems of knowledge production and application. For him, organizational knowledge emerges from interactions among a firm's members, and between the firm and the environment, and such knowledge is what allow other types of knowledge to be integrated.

Kogut and Zander (1992, 1996) consider knowledge as existing both in individuals and in the collective. For them, firms provide a social community of voluntaristic action whose organizing principles are not reducible to individuals. The key element of firms is its identity, which provides coherence and motivates individuals to cooperate. As a side effect, identity also limits innovation, as it rules out possible alternatives of development. Nonaka and Toyama (2002, 2005) propose that firms synthesize fundamental dualities like objective and subjective epistemologies, dialogues and practices, thinking and action. The explanation for differences among firms is in each firm's purpose and strategy, its visions of the future and its driving objectives developed by inspiring leadership.

[11] Grant (1996) argues that a firm needs common knowledge, in the form of language, symbolic communication, specialized knowledge, shared meaning, and recognition of individual domains. For this purpose, it uses a set of coordinating mechanisms, like rules and directives, sequencing, routines, and group problem solving and decision making.

The discussion of knowledge as an economic resource, as a strategic concern, and as a basis for a theory of the firm cannot be carried out without extensive debate on the nature of knowledge. Fundamental distinctions between different types of knowledge and knowing have also been considered: tacit and explicit knowing (Polanyi, 1962), knowing how and knowing that (Ryle, 1949), individual and social knowing (Bourdieu, 1977; Giddens, 1984). Different types of knowing involve different epistemologies, which gives way to entirely different conceptualizations of knowledge management.

2.3.2.2 Accounting

Thomas Stewart (1997) introduced the concept of intellectual capital offering a taxonomy for organizing intangible assets and advocating the importance of managing it. Three main types of intellectual capital were suggested: *human capital* (the talent of employees), *structural capital* (the aggregate non-human intellectual assets) and *relational capital* (the knowledge embedded in business networks). Since then, several techniques have been proposed to measure and describe non-financial assets that are not reported in traditional financial statements, but are critically important to the long-term success of an organization (Edvinsson & Malone, 1997; Bontis, 2002).

2.3.2.3 Organization science

A popular concern in the KM-related literature is that of knowledge transfer and protection. Interfirm knowledge transfer may be a way to access external knowledge (e.g., via alliances and collaboration networks), or a requirement to provide internal knowledge to an external party (e.g., when outsourcing operations). In many cases such transfer is intentional and desirable. The literature indicates a variety of factors affecting such transfer processes. For instance, proximity between partners and similarity of technological bases (Mowery, Oxley & Silverman, 1996), industry characteristics and national cultures (Appleyard, 2002), tacitness and ambiguity of knowledge to be transferred and absorptive capacity of the recipient (Fischer et al., 2002). Such interactions, however,

inevitably result in undesired knowledge transfer. Intrafirm knowledge transfer may be a way to leverage existing knowledge (e.g., by replicating organizational routines), or a stage in the knowledge creation process (e.g., when moving products from development to production). A well known dilemma in such cases is that, at the same time that the firm facilitates the internal flow of knowledge, it inevitably eases its dripping to outside the firm, thus compromising the sustainability of its advantage.

Organizational learning and knowledge management have converged recently. Although reminding of differences among both, Lyles and Easterby-Smith (2003) often refer to the field as OL/KM, thus treating it as one. Learning processes encompass both cognitive and behavioral change. Individual and groups learn by understanding and acting or by acting and then interpreting. Organizational learning is the process of change in individual and shared thought and action, which is affected and embedded in the institutions of the organization. When individual and group learning becomes institutionalized, organizational learning occurs and knowledge is embedded in non-human repositories such as routines, systems, structures, culture, and strategy (Vera & Crossan, 2003).

Another popular concept in KM is the notion of communities of practice (Wenger, 1998). The concept of practice connotes doing, but not just doing in and of itself. It is doing in a historical and social context that gives structure and meaning to what we do. In this sense, practice is always social practice. Such a concept of practice includes both the explicit and the tacit. Communities of practice are the prime context in which we can work out common sense through mutual engagement. We all have our own theories and ways of understanding the world, and our communities of practice are places where we develop, negotiate, and share them.

The concept of social networks have been used to study the relations between actors, such as individuals, groups of individuals, and firms. Networks are usually described by a set of nodes, representing those actors, connected by ties, representing the relationships between them (Van Wikj, Van Den Bosch & Volberda, 2003). Ties are usually described as being either weak (distant and

infrequent) or strong (close and frequent). Weak ties seem to be effective for searching knowledge and transferring non-complex, easy-to-codify knowledge, and strong ties, characterized by close interaction and communication, are necessary for transferring complex, difficult-to-codify knowledge (Hansen, 1999).

The idea of organizational sense making, proposed by Karl Weick (1995) has also been extensively cited in KM. It is described as "a continuous, social process in which individuals look at elapsed events, bracket packets of experience, and select particular points of reference to weave patterns of meaning (Choo, p. 80)." In social settings, shared meanings arise out of a process of negotiation that combines both participation in practice and its reification, where people simultaneously try to shape and react to the environments they face (Wenger, 1998, p. 135). According to such perspective, knowledge is essentially emergent, recreated at every moment in a continuous process of sense-making, and thus cannot be directly managed (Choo, 2006).

2.3.2.4 Human resources

HRM for managing knowledge work and knowledge workers

The growing importance of knowledge work and knowledge workers demands innovative human resources management (HRM) practices and policies. Compared to traditional forms of work, knowledge work is said to have a broader scope, be less predictable, and involve a greater degree of judgment from workers. Thus, it cannot be centrally designed as a set of procedures and cannot be directly managed. Furthermore, knowledge workers seem to have their experience and expertise in high regard, and are motivated mainly by factors like personal growth and peer recognition. Thus, they usually require a significant degree of job autonomy and flexibility, and need different incentive systems to get inspired and committed (Newell et al., 2002; Beaumont & Hunter, 2002).

HRM practices adapted for knowledge work and workers involve, among other things, innovative job design and adequate reward systems. Mohrman (2003) suggests new principles of work design based on the changing and interdependent nature of knowledge work. She proposes work designs that are

dynamic and emphasize systemic performance, focus on sequences of assignments instead of well-defined jobs, cut across functional, geographical and other types of boundaries, and provide experience and develop talent. Lawler (2003) reviews the impact of different reward systems on the motivation, attraction and retention of knowledge workers. Comparing pay systems based on a job's functions and responsibilities, a person's performance and achievements, and a person's skills and competencies, he argues that the last is more appropriate for knowledge work.

HRM issues in knowledge management

Human and social factors are crucial elements of knowledge management, and many authors argue that HRM practices and policies have an important role in employees' attitudes and behavior. They can affect issues like employee motivation and commitment, knowledge sharing behavior, and organizational culture, all of which are relevant for KM. An organization's reward system, for instance, is often taken as a significant element affecting employees' motivation, encouraging them to put effort on expected outcomes. Lawler (2003) shows how alternative systems have different impacts on employees' behavior. Job-based compensation[12] may contribute to easier control and organizational efficiency, but may also discourage risk-taking, learning, and collaboration. Skills-based compensation[13], on the other hand, may encourage development and improve flexibility, but hinders market comparison and employee assessment is difficult. Performance-based compensation[14] may stimulate better performance by clearly

[12] A person is paid for the tasks and responsibilities that her job involves, and people on the same job receive roughly the same pay. Job-based compensation is designed for bureaucratic organizations, where functions are clearly defined and control is exercised through a hierarchical structure.

[13] A person is paid for her knowledge and skills, and pay increases may come from learning instead of vertical promotions. Skills-based compensation is designed for modular and project-based organizations, where work is decentralized, involves multiple tasks, and is usually team-based.

[14] There is a variety of ways to pay for performance. It may be individual, team, unit or organization-based. Incentives may be permanent, like increases in salary or stock options, or onetime payments or bonuses, like sales commission or profit sharing.

connecting it with rewards, but defining criteria and establishing good measures may be a challenge.

The extent to which HRM practices and policies can create a knowledge-oriented organizational culture is subject to debate. The most likely relationship is a reciprocal influence between them. On the one hand, HRM derives from and is affected by the existing culture. On the other hand, HRM may also affect culture, by reinforcing cultural norms and routines that shape individual attitudes and behaviors. Pan and Scarbrough (1999) show how a chemical company, Buckman Laboratories, actively developed a knowledge-sharing culture through an organizational change program. They note the critical role played by the organization's leader, who strongly championed the process, and argue that adequate commitment and leadership by senior management is required for promoting culture change.

HRM may also contribute to the development of organizational capabilities and accumulation of human and social capital. Staffing decisions may contribute to enrich the portfolio of competencies available to the organization, e.g., through hiring people with strategic knowledge and skills or through contracting temporary and part-time workers for occasional needs. In the long-term, staffing policies affect employee commitment and patterns of mobility and retention, which have important implications in the capacity of organizations to build and sustain their capabilities (Lepak and Snell, 2003). Individual knowledge may be improved through training and development. However, more important than working on technical knowledge and skills is to build 'tacit competencies' like problem-sensing and creativity, learning and knowledge acquisition, and teamwork and collaboration (Jackson, Hitt & DeNisi, 2003). Perhaps such competencies are better developed through less conventional approaches like action and experiential learning, coaching and mentoring, and situated learning in communities of practice. Work design and career management that offer employees a variety of work experiences through, for instance, job rotation and temporary assignments, may provide the breadth of skills and experience required for building competitive advantage (Mohrman, 2003).

Alignment of HRM, KM and business strategies

Scarbrough and Carter (2000) refer to the distinction between codification and personalization KM strategies and strengthen the argument that HRM policies and practices should be consistent with KM and business strategies. According to Hansen, Nohria and Tierney (1999), codification refers to a KM strategy where knowledge is codified in databases to be accessed and used by anyone in the organization, and benefits from HRM practices like recruiting college graduates inclined to the reuse of existing knowledge, training people in groups through scalable means, and rewarding for using and contributing to databases. Personalization refers to a KM strategy where knowledge is tied to people and shared mainly through direct person-to-person contacts, and benefits from HRM practices like hiring MBAs who like problem-solving and can tolerate ambiguity, developing people through one-to-one mentoring, and rewarding for collaborating and sharing knowledge with others.

Bierly and Daly (2002) argue that firms that align their HRM practices with their particular knowledge strategy will be more successful in developing sustainable competitive advantage. In a previous study, Bierly and Chakrabarti (1996) categorize firms in four types according to their strategy for managing their knowledge base. Explorers are firms that excel at developing new, radical knowledge but are not strong at exploiting existing knowledge; exploiters are firms that successfully exploit existing knowledge areas but are not effective in generating radically new knowledge; bimodal learners are firms that excel at developing new, radical knowledge but are also strong at exploiting existing knowledge; and maintainers are firms that do not excel at developing new, radical knowledge and are not strong at exploiting existing knowledge. Following this set of generic knowledge strategies,

Bierly and Daly propose that an explorer knowledge strategy benefits from HRM practices that promote creativity and risk-taking, e.g., moderate external hiring, results-oriented appraisal, loose job definitions. An exploiter knowledge strategy benefits from HRM practices that promote flexibility, continual improvement, and the integration of tacit knowledge, e.g., internal hiring, teams,

formal training, short-term results-oriented appraisals, rewards for employee participation. A maintainer knowledge strategy benefits from HRM practices that promote stability and rapid socialization of new members, e.g., internal hiring, formal training, behavioral appraisals, narrow job definitions, clear career paths. And finally, a bimodal knowledge strategy benefits from HRM practices that promote managing complexity, creativity, and flexibility, e.g., flexible HRM system, teams, rewards and practices that promote open communications.

2.3.2.5 Information systems

Grover & Davenport (2001) carry out a pragmatic review of KM research and practice, and conclude that KM efforts have focused mainly on developing new IT applications to support the capture, storage, retrieval, and distribution of explicit knowledge. The most common type of initiative at the time was building repositories of specific types of knowledge for use in particular business functions. For instance, knowledge of best practices in operations and process management; knowledge on products, markets and customers in marketing and sales; knowledge of lessons learned in product development or other specific projects; competitive intelligence in strategic planning. Other common types of initiative included corporate portals that provide personalized access to multiple sources and repositories, directories of experts that facilitate access to knowledgeable people, data mining and visualization tools that derive knowledge from data, and knowledge-based systems that streamline decision making and access to specialized knowledge.

Besides the implementation of IT applications, specific roles and positions have been created to advance the KM agenda in organizations. Among the new functions assigned to them were designing knowledge architectures, facilitating collaboration and knowledge sharing, developing and managing knowledge content, building and maintaining knowledge applications, and redesigning knowledge work processes and activities.

They propose two frameworks to describe KM and propose research topics based on each of them. The first is a process framework relating knowledge

processes, the context in which they are inserted, and the agents involved. The main knowledge processes are generation, codification, transfer and realization, and they can be either deliberate of emergent. The main elements in the context are business strategy, organizational structure, people and culture, and technology, and they both influence and are influenced by knowledge processes. The main agents are said to be individuals, groups and organizations. They say that much research has been conducted on knowledge transfer, and that IS research has emphasized knowledge codification. Among their suggestions for research are studies on generation and realization aspects of KM; on the role of IT in knowledge transfer; on the impact of aligning strategy, technology and knowledge processes; on cultural barriers to knowledge processes; on the effectiveness of various codification methods; and on individual motivations for emergent and deliberate processes.

The second framework is a transactional perspective where knowledge is exchanged in a marketplace, with a pricing system facilitating transactions between buyers and sellers. Two kinds of buyers participate in such a market: individuals who seek knowledge to address particular needs, and the organization, which seeks to embed knowledge in products and services and benefits from appropriating individual knowledge. Efficiency in the knowledge market is achieved through seeking information symmetry (buyers and sellers have access to the same information), product standardization (buyers have a basis to compare offerings), homogeneity of customers (market is not segmented so products are valued evenly), large number of sellers (buyers have choices and sellers cannot monopolize), and common currency (currency of exchange is well understood). Among the research topics proposed are the role of IT in reducing information asymmetry on knowledge; factors affecting the currency of knowledge sharing; balance between organizational and individual ownership; relationships between market efficiency and workforce morale; and physical and virtual market mechanisms.

In a frequently cited review of KM and KM systems research, Alavi and Leidner (2001) endorse the view that organizational knowledge and KM are

complex and multi-faceted phenomena. Thus, they conclude that there can be no single or optimum approach to KM or KM systems development, and that a variety of perspectives is needed to properly address knowledge issues. Nonetheless, the authors still show a strong belief in the importance of IT for managing knowledge and try to advance the role of KM systems, although encouraging IS researchers to be aware of and build upon contributions from other fields.

Their main argument is to expand the scope of KM systems beyond the prevailing storing-codified-knowledge perspective of existing literature. They provide a so-called process view of KM, describing it as a set of four interdependent processes of knowledge creation, knowledge storage and retrieval, knowledge transfer, and knowledge application. For them, existing KM literature has emphasized the second process, storage and retrieval, and they seek to expand IT usage to the other processes. Although their argument is build around each of those four processes individually, they advise that knowledge processes are dynamically and intricately interrelated and must be considered as a whole.

A series of research questions for KM and KM systems were also raised. It is interesting to note that, although some technical issues were discussed, human and organizational ones seemed more relevant. For instance, the authors recall the significance of organizational culture and consider the impact of cultural factors on knowledge sharing behaviors; discuss the importance of shared context for effective knowledge transfer and ask how much context needs to be included in knowledge storage and retrieval; and also examine different types of links between individuals and groups, probing into how weak and strong ties affect the way knowledge is created and transferred. Along with those concerns, issues like locating and retrieving knowledge, improving the systems' quality, and maintaining the quality of knowledge, for instance, are somewhat downgraded.

2.3.2.6 Artificial intelligence

One of the important areas of knowledge management is knowledge capture and representation. The knowledge engineering methodologies for building expert

systems have applied knowledge acquisition techniques (e.g. interviewing, protocol analysis, simulation, personal construct theory, card sorting, etc.) for eliciting the tacit knowledge from domain experts. Traditionally, knowledge engineering was viewed as a process of extracting it from the expert's head and transporting it in computational form to a machine. Now, knowledge engineering consists of constructing different aspect models of human knowledge (Schreiber et al., 2000). Knowledge is to be modeled at a conceptual level, in a way independent of specific computational constructs and software implementations. An important result of modern knowledge engineering is that human expertise can be sensibly analyzed in terms of stable and generic categories, patterns, and structures of knowledge.

Additionally, knowledge discovery and data and text mining approaches could be used to inductively determine relationships and trends in these knowledge repositories for creating new knowledge. Data mining is a process that uses statistical, mathematical, artificial intelligence and machine learning techniques to extract and identify useful information and subsequent knowledge from large databases (Turban et al., 2005). Data mining uses several approaches (corresponding to the aim) to extract relevant relationships in data: classification, clustering, association, sequencing, regression, forecasting, etc. (Haskett, 2000b) these approaches are supported by a number of methods and techniques: statistical methods, decision trees, case-based reasoning, neural computing, intelligent agents, genetic algorithms, etc.

In order to represent this knowledge in those repositories, a knowledge taxonomy and knowledge mapping are typically constructed for serving as the frameworks on which to build these repositories. Knowledge ontologies are ways for representing acquired knowledge (rules, cases, scripts, frames/objects, semantic networks, etc.) are typically created in the AI field for building expert and other intelligent systems (Liebowitz, 2001). Ontologies offer a way to cope with heterogeneous representations of web resources. The domain model implicit in an ontology can be taken as a unifying structure for giving information a common representation and semantics. Ontologies were developed in artificial

intelligence to facilitate knowledge sharing and reuse. They have been studied by several artificial intelligence communities, including knowledge engineering, natural-language processing, and knowledge representation. More recently, the use of ontologies has also become widespread in fields such as intelligent information integration, cooperative information systems, information retrieval, electronic commerce, and knowledge management. (Davies et al., 2003)

2.3.2.7 Library and information science

Knowledge management seemed to be a natural extension to the field of library and information science (LIS). With a long tradition in the organization, storage, distribution, access and retrieval of information, librarians have been discussing the changes in the role of the information professional and proposing the professionalization of KM (Al-Hawamdeh, 2003; Todd & Southon, 2001). It has been said that the role of knowledge manager has long been performed by those in the library sciences (McInerney & LeFevre, 2000). As such, the development of educational programs focusing on KM has become a hot topic in LIS-related literature (Koenig, 1999; Loon & Al-Hawamdeh, 2002; Srikantaiah, 2004; Rehman & Chaudhry, 2005).

Among the topics of interest in LIS that are relevant to KM are the organization of information through classification systems and taxonomies and the development of information architectures (Bedford, 2004), the study of information needs and user information behavior (Choo, 2006), techniques like information audits (Henczel, 2004), and applications like content, document, and records management (Koenig & Srikantaiah, 2004).

2.3.3 Knowledge management practice

Implementing knowledge management

Existing KM implementation frameworks (Wiig, 1999; Soliman and Spooner, 2000; Rubenstein-Montano et al., 2001; O'Dell et al., 2003; Wong and Aspinwall, 2004a), which help practitioners design particular implementation strategies,

include a myriad of recommendations. These recommendations can be summarized in three topics: 1) securing a set of required conditions, 2) choosing and prioritizing a set of KM initiatives, and 3) establishing evaluation criteria.

First, among the elements that are often cited as *required conditions* for (or indicators of) successful KM programs, we can include senior management support, alignment with strategy and business requirements, consideration of organizational dynamics and culture, and involvement of key personnel and stakeholders (Wiig, 1999; O'Dell et al., 2003; Wong and Aspinwall, 2004b). Second, the actual implementation happens through a series of *KM initiatives* designed to support knowledge processes, usually balancing human- and technology-oriented approaches. A frequent recommendation is to prioritize initiatives according to a trade-off between opportunity (easy to carry out) and strategy (valued business results), and to implement them in stages, starting with pilot projects that provide lessons for further expansion (O'Dell et al., 2003; Wong and Aspinwall, 2004a). And finally, almost all frameworks mention the need for *evaluation criteria* to assess results and provide for accountability. This includes the need to identify expected business benefits and develop a business case, collect anecdotal evidence, and adopt performance indicators and metrics, both KM-specific and business-driven (Rubenstein-Montano et al., 2001; O'Dell et al., 2003; del-Rey-Chamorro, 2003).

Descriptions of implementation approaches include both top-down and bottom-up. The necessary considerations tend to be the same; only the order in which they are presented seems to be different. Top-down approaches usually start by securing the required conditions and establishing evaluation criteria, while bottom-up ones start with local initiatives that expand later by focusing on the other elements.

2.4 The concept of competence

Competence may be understood as the mobilization of psychosocial resources to meet social demands in a given context (Rychen & Salganik, 2003). The

concept has been used in a variety of fields like psychology, education, and management, receiving diverse and sometimes conflicting interpretations. The concept involves two distinct but complementary ideas, and different usages vary in the emphasis put in one or the other. One relates competence to someone's capacity for proficient action, and sees it as something that is intrinsic to the individual. The other defines it as a set of expected outcomes, and understands it as something that is socially established. The two ideas are synthesized in the notion of competent action.

2.4.1 Competence as a set of individual resources

Some authors explain competence as a personal quality, a set of resources that can be used for a given purpose. Competence then indicates the capacity or potential that an individual possess to perform well in a given domain. As such, competence is as an underlying individual attribute that is reasonably enduring and can be used in a variety of circumstances (Spencer and Spencer, 1993). In this sense, competence is usually described as a set of cognitive and psychological resources. The spelling 'competency' is commonly used to describe those resources.

Psychological approaches

Studies on competence in the field of psychology are usually interested in exploring the reasons for individual variation in performance, and much work has been done to explain the psychological sources of expertise. Competence is said to be the result of an individual's innate profile of intelligences and his learning and experience in a given domain. Humans are said to have a certain number of intelligences, which represent their biopsychological capacity to process information of particular kinds. Howard Gardner (1999) proposes eight types of such intelligences: mathematical, verbal, spatial, musical, bodily kinesthetic, interpersonal, intrapersonal, and naturalistic. Abilities are particular combinations of such intelligences that represent the potential behavior of an individual. While

Gardner identified only a handful of intelligences, there are a plethora of potential abilities.

Competencies are abilities that are realized through experience and practice. While abilities correspond to latent possibilities, most of which remaining unaccomplished in the course of life, competencies result from learning and experience in a specific domain. In other words, a competence are an outcome from the interaction between an individual's potential abilities and his actual experience in a domain (Connell, Sheridan & Gardner, 2003). It is interesting to note that competence, although involving both the individual and the domain, is still a construct that refers to something internal to the individual. An interesting account illustrating this point is offered by Connell et al.:

> … it is possible for four students in an algebra class to get a perfect score on an exam using four completely different competencies: (1) memorizing all the answers from a stolen answer key, (2) graphing the mathematical equations and solving the problems by reasoning from the visual diagrams, (3) manipulating the mathematical formulas directly using the rules of algebra, and (4) copying the answers from one of the other three students. … all four students will end up with the same assessment on the exam, although the underlying competencies being exhibited are qualitatively different (p. 133).

An important debate has been to what extent expertise depends on innate characteristics or can else be developed with learning and practice. Positions vary along a continuum between a complete dependence on innate abilities and the primacy of practice in enhancing performance. Ericsson (2003), for instance, maintains that practice can change human performance dramatically on a number of tasks. He argues that, if the definition of expertise is restricted to reliable superior performance, no innate requirements crucial to expert performance can be found, and there is no expertise that cannot be acquired with extended practice. Most researchers in psychology, however, either take the other extreme, arguing that innate abilities are essential for the development of expertise (Subotnik and Arnold, 1993), or take a middle-ground position, stating that both abilities and practice are important for the development of expertise (Sternberg, 1998).

Elena Grigorenko (2003) points to the central role of domain-specific knowledge in defining expertise. She relates studies on chess playing that concluded that what distinguishes experts from novices and grand masters from experts is not overall superior recall ability, but rather the extent and organization of their knowledge base (Chase and Simon, 1973, cited by Grigorenko, 2003). She argues that a vast and organized knowledge base and the problem schemas associated with it seem to be fundamental to many different kinds of expertise. Also, such schemas and the information contained within them cannot be easily acquired; the expert knowledge base must be built up through vast amounts of deliberate practice. Once acquired, however, it can be costly, since it may overpower the expert's ability to see novel aspects of experience and, thus, become entrenched in a point of view constrained by the existing knowledge base. True experts are expected to be able to adapt their knowledge bases to novel demands and situations.

Competency models

A branch of study focused on the job environment and work related situations, and is responsible for the strong adoption of the competence concept in industrial organizations. The main thrust of research into so-called competency models has been to distinguish between average and excellent workers, primarily for selection and appraisal purposes. The research was pioneered by David McClelland (1973), who found that traditional academic aptitude and knowledge content tests did not predict job performance or success in life, and were often biased against minorities. He advocated research methods that would correct such deficiencies, by identifying competency variables that would be based on observable behaviors, and which could properly distinguish two criterion samples of top and average performers. Such methods have been widely influential, stimulating many further studies and generating a large competency database.

Richard Boyatzis (1982) reanalyzed data from a number of competency studies of managers and found a set competencies that consistently distinguished superior managers across organizations and functions. His model of generic

managerial competencies is probably one the most widely used in human resources management. Encouraged by his success, Lyle and Signe Spencer (1993) expanded previous work to include entrepreneurial, technical and professional jobs from industry, government, military, health care, education and religious organizations. They developed a common framework that allowed comparison and combination of some 350 studies carried out over 20 years by more than 100 different researchers. The result was a dictionary of generic competencies that cover behavior in a wide range of jobs, and can be adapted for many applications (Table 2-3). The dictionary has been updated since then by McBer/Hay Group, a consulting company founded by McClelland and since then associated with this work.

Table 2-3: Summary of generic competencies.

ACHIEVEMENT AND ACTION

- **Achievement orientation (ACH)**
  Core: Does the person think about meeting and surpassing goals and taking calculated risks for measured gains?
- **Initiative (INT)**
  Core: Does the person think ahead of the present to act on future needs and opportunities?
- **Information seeking (INF)**
  Core: Does the person go beyond the obvious and seek out information?

HELPING AND HUMAN SERVICE

- **Interpersonal understanding (IU)**
  Core: Is the person aware of what others are feeling and thinking, but not saying?
- **Customer service orientation (CSO)**
  Core: Does the person act on behalf of the person being served?

IMPACT AND INFLUENCE

- **Impact and influence (IMP)**
  Core: Does the person use deliberate influence strategies or tactics?
- **Organizational awareness (OA)**
  Core: Is the person sensitive to the realities of organizational politics and structure?
- **Relationship building (RB)**
  Core: Does the person take effort to build a personal relationship?

MANAGERIAL

- **Developing others (DEV)**
  Core: Does the person work to develop the long-term characteristics (not just skills) of others?
- **Directiveness (DIR)**
  Core: Does the person set firm standards for behavior and hold people accountable to them?

- **Teamwork and cooperation (TW)**
  Core: Does the person act to facilitate the operation of a team of which he or she is a part?
- **Team leadership (TL)**
  Core: Does the person lead groups of people to work effectively together?

COGNITIVE

- **Analytical thinking (AT)**
  Core: Does the person understand cause-and-effect chains and relationships?
- **Conceptual thinking (CT)**
  Core: Does the person match patterns? Assemble many pieces into a coherent whole? Create new ways to look at things?

PERSONAL EFFECTIVENESS

- **Self-confidence (SCF)**
  Core: Does the person take on risky tasks or conflicts with those in power over that person?
- **Flexibility (FLX)**
  Core: Can the person change gears or drop the expected task when circumstances demand it?
- **Organizational commitment (OC)**
  Core: Does the person choose to act in accordance with authority, organizational standards, needs, and goals?

INTEGRITY

- **Integrity (ING)**
  Core: Does the person act in line with beliefs and values even when it is difficult to do so?

Source: Adapted from Spencer & Spencer (1993) and McBer's *Scaled Competency Dictionary 1996* appearing in Raven (2001).

The kind of competence described under this approach has often been called *personal* competence, due to the strong emphasis on relatively permanent individual characteristics, or *behavioral* competence, because of its method of relying on the analysis of behavioral events.

Elements that build competence

There is agreement among authors that competencies are combinations of three major kinds of resources: knowledge, skills and personal attributes (Cheetham & Chivers, 2005; Winterton, Delamare-Le Deist & Stringfellow, 2005). Knowledge in the competence literature is used in a sense narrower than that in the KM one, and refers to cognitive artifacts like concepts, models, theories, rules, principles, information, etc. This includes both knowledge acquired through

study or education (theoretical), like e.g. finance or medicine, and that developed through practice or experience (practical), like e.g. an understanding of the market or of types of patients. Skills refer to the ability to perform some tasks or activities consistently over a period of time. It is usually described by using verbs, while knowledge (in the above sense) emphasizes nouns. Skills cannot be codified and transferred as easily as knowledge (as above), and are usually acquired through repeated practice or training. The words *skills* and *competencies* are sometimes used interchangeably. Personal attributes include a variety of individual characteristics, like motives (e.g., achievement, status), traits (e.g., emotional stability, initiative), and values (e.g., independence, friendship). These qualities usually form the core of an individual's personality and tend to be more difficult to develop than the more superficial knowledge and skills. Many researchers found this type of competency to be the best predictors of performance (Spencer & Spencer, 1993).

2.4.2 Competence as a standard of expected performance

The notion of competence is only meaningful when an individual's action, behavior or performance is valued by another person, group or community. A complementary perspective on the concept describes it as a socially attributed quality, in the sense that it is not something intrinsic to the individual, but an attribute that an external person or group assigns to the person. As such, competence can be understood as a socially defined set of expectations about what constitutes competent performance. The primary focus shifts away from an individual's underlying capabilities, into the perceived results of his/her action, behavior, or decision with respect to the demands related to, for instance, a particular professional position, a social role, or a personal endeavor.

Occupational competence

Changes in the workplace and a growing need to secure an adequate supply of required skills led some governments to develop or revise national competence frameworks in the 1980's and 1990's. Those frameworks established skills

standards for a range of occupations, and were used to redesign the systems for vocational education and training and vocational qualification.

The National Vocational Qualifications (NVQs) developed in the UK was one of the pioneer systems, and provided guidelines for much subsequent work in other countries. The main thrusts of the NVQs policy were to develop performance-based qualifications and to uncouple assessment from training. Performance-based qualifications meant that competence was judged through job-specific outcomes, rather than through success in a knowledge-based examination. Assessment uncoupled from training meant that prior learning could be recognized and candidates could choose the preferred learning mode (Cheetham and Chivers, 2005; Eraut, 1994). In contrast with the personal-competence approach from the previous section, the NVQ adopted a *functional* perspective, focusing on tasks or functions that needed to be performed within the job role (Table 2).

Table 2-4: A competence profile in management accountancy

Management accountancy (Management Charter Initiative, 1991)

The key purposes of the professional management accountant are: to design, operate and manage financial and economic information and other systems to enhance value, effectiveness and efficiency and to enable managers to achieve controlled change within organizations, and thereby realize stakeholder objectives.

A. Provide management accounting services and systems

A1. Maintain management accounting services and systems
A2. Implement change in management accounting services and systems
A3. Conform to professional standards in the delivery of services
A4. Define the service requirements of users and initiate change
A5. Promote and enhance the provision of services
A6. Define and develop information and communications systems
A7. Plan the provision and promote the use of management accounting services and systems

B. Manage management accounting staff

B1. Create and maintain effective working relationships
B2. Plan, allocate and evaluate work carried out by management accounting staff
B3. Develop oneself professionally
B4. Recruit and select management accounting staff
B5. Develop management accounting staff
B6. Direct and motivate management accounting staff

C. Assure the quality of services and systems
C1. Conduct an internal audit
C2. Conduct an operational audit
C3. Formulate, implement and review financial policies and procedures

D. Plan and provide finance
D1. Plan, monitor and influence movements in working capital
D2. Manage short-term finance
D3. Establish an organization's taxation obligations
D4. Plan and arrange the financing of programmes and projects
D5. Build and integrate strategic financial plans

E. Utilize intelligence from external sources
E1. Analyse and interpret external intelligence
E2. Advise managers of the effect of external factors on programmes and projects
E3. Advise managers on the effect of external factors on strategy

Source: Adapted from Eraut (1994, p. 190). Units of competence for management accountancy, Level 4 of the National Vocational Qualification standard, UK.

Key competencies

A competing approach to competence sought more flexible, generic skills that could be easily transferred between various contexts, like different functions, organizations, or industries. Considering an even broader context, including the new demands of the knowledge economy and a growing call for lifelong learning, some approaches aimed at universal key competencies that would be useful for the widest range of individuals in the widest range of societies possible.

The Definition and Selection of Competences (DeSeCo) project, launched in 1997 and sponsored by the Organization for Economic Co-operation and Development (OECD), sought a solid theoretical and conceptual foundation to define and select a set of key competencies that: 1) contributed to valued outcomes for societies and individuals, 2) helped individuals meet important demands in a wide variety of contexts, and 3) were important for all individuals, not just for specialists. The purpose was to provide a basis for the continued development of statistical indicators of teaching and learning outcomes, and to offer a contribution to the debate on priorities in education curricula and training programs (OECD, 2002). The results were published in several reports, and present nine broad competencies grouped in three major clusters (Table 2-5).

Table 2-5: Key competences from DeSeCo

Category 1: Using Tools Interactively

A. Use language, symbols and texts interactively

Involves the effective use of spoken and written language skills, computation and other mathematical skills.

B. Use knowledge and information interactively

Involves the ability to recognize what is not known, to locate and access appropriate information, to evaluate the quality and value of information and its sources; and to organize knowledge and information.

C. Use technology interactively

Involves understanding of the nature and potential of technology, and their incorporation in one's common practices.

Category 2: Interacting in Heterogeneous Groups

A. Relate well to others

Involves the ability to respect and appreciate the values, beliefs, cultures and histories of others, and to create a welcoming environment. Requires empathy and effective management of emotions.

B. Co-operate, work in teams

Involves the ability to balance commitment to the group with one's own priorities, to share leadership, and to support others.

C. Manage and resolve conflicts

Involves the ability to approach conflict in a constructive manner, to consider the interests and needs of others, and to seek solutions in which both sides gain.

Category 3: Acting Autonomously

A. Act within the big picture

Involves the ability to understand and consider the wider context of one's actions and decisions and to identify direct and indirect consequences.

B. Form and conduct life plans and personal projects

Involves the ability to define projects and setting goals, to balance resources among multiple goals, and to monitor progress and make adjustments.

C. Defend and assert rights, interests, limits and needs

Involves the ability to understand one's own interests and rights, to construct arguments, and to suggest arrangements and alternative solutions.

Source: Adapted from Rychen (2003).

Scope and quality of competence

Professional competence is usually described according to at least two dimensions: scope and quality (Eraut, 1994). The scope dimension concerns what a person is competent in, the range of roles, tasks and situations for which his/her competence is established or may be reliably inferred. Definitions of scope range

from very broad (e.g., a competent citizen) to very narrow (e.g., a competent sales representative in a given company). They may also be generic (e.g., just naming a domain) or very detailed (e.g., describing every single task and conditions involved in a given activity). The quality dimension concerns judgments about the level of proficiency in a person's work, ranging in a continuum from novice, who is not yet competent in that particular task, to expert, who is acknowledged by colleagues as having progressed well beyond the level of average competence.

Professionals may improve their competence by changing the scope of their work, its quality, or both. They may, for instance, become more specialist, by moving into newly developed areas of professional work, or more generalist, by expanding activity to include additional ones. They may also be continuously developing the quality of their work in a number of areas, beyond the level of average competence to one of proficiency or expertise.

2.4.3 Competence and actual performance

Much of the recent interest in the concept of competence has been motivated by a concern with effectiveness and performance, be it in education, in the workplace, or in life in general. However, there has been much criticism on the widespread notion that the possession or attribution of competence is naturally associated with performance. One of the reasons is that competence is tightly linked to the context in which it is developed and used. Because of this, competence in one situation cannot be readily transferred to another. A second reason is that competence is dynamic and related to action. It involves the mobilization of resources to meet external demands, and can only be inferred through action, through observed behavior. Thus, competence needs to be related to action and context to be properly understood.

Capabilities, demands and context

Competence is inevitably attached to the context for which it is defined, whether it refers to individual capabilities or to social demands. If we consider a person's capabilities, for instance, that are countless ways the context can affect if

and how they are mobilized and manifested. The use of theoretical knowledge is necessarily dependent on the situation: the way it is perceived and interpreted affects what knowledge gets used and how. Moreover, any idea, model or theory, however general, must be adapted to the particularities of the circumstance. Skills and abilities are also influenced by context: affective and conative aspects, like feelings of belonging or commitment to a cause, may influence the quality of their performance. Even more established traits, like initiative or self-confidence, may vary according to circumstances: a person may show more initiative in areas that are particularly significant, or in which they have positive previous experience than otherwise (Eraut, 1994).

On the other hand, if we consider the social requirements for competence, it is obvious that expectations vary from place to place and over time. Raven (2001), for instance, contends that any attempt to identify generic descriptions of occupational activity is fundamentally misguided. As he persuasively argues,

> ... people having the same job title perform a huge range of very different functions. … One manager sets about creating a vibrant and innovative organization. Another plays the international stock market and sets about creating a façade that leads to confidence in – and therefore investment in – the company. Another intervenes in the political system to get laws mandating the use of the company's products or services onto the statue books. Another sets about creating a good impression on his or her superiors so as to obtain advancement in his or her career, and so on (p. 262).

In a similar way, it is often argued that job requirements for a given occupation vary according to sector, industry, organization, or even inside the same organization. In addition, the same position may have its demands changed over time, if new tools or practices are introduced, for instance. Thus, a person may be not considered competent in a new company, even if he has performed well in similar positions in other organizations; or he may have his competence questioned at some point, even after performing consistently for a long period.

A subtler and deeper relationship between capabilities, demands and context appears if we consider the broad scope of most organizational activities. The range of tasks that need to be undertaken in any single occupation is far too wide

for any one person to carry out. Thus, a group of people with different capabilities is required if the job as a whole is to be carried out effectively. In such a case, the performance of any person will depend heavily on those with whom they are working. The addition or subtraction of a member may radically change not only the characteristics of the group as a whole, but also the apparent qualities of all of the others within it. Job requirements and personal capabilities here are considered not individually, but collectively, and their matching depends on a mix of people with a dynamic balance of skills (Raven, 2001).

Professional practice

In a very influential work, Donald Schön (1983) reacted against the idea of competent professional practice as essentially the application of theoretical knowledge. He severely criticized what he called the 'technical rationality' – an epistemology of professional practice with a strong positivist orientation – based on two complementary arguments. First, there are severe limitations to what can be achieved by a purely positivist approach in the complexities of the real world. Second, the technical rationality model fails to take proper account of how professionals work in practice in order to achieve their desired goals. He offered a new epistemology of practice based on practical experience instead of theoretical knowledge, and 'reflection-in-action' as a method of investigation and learning.

According to Schön, the ordinary life of a professional practitioner is mainly based on 'knowing-in-action', a kind of knowing that is mostly tacit, nearly automatic, and does not necessarily stem from prior intellectual operation. This knowing is acquired through repeated practice and continued experience until it becomes skillful behavior. Action based on this kind of knowing does not consist of rules or plans, but of mainly of spontaneous, intuitive responses. This practical knowledge, however, does not always work. In some occasions there are surprises, unexpected outcomes, or just a feeling that something is not quite normal. Competent practitioners, then, begin a kind of on-the-spot inquiry he called 'reflection-in-action':

> … the performer 'reflects', not only in the sense of thinking about the action he has undertaken and the result he has achieved, but in the more precise sense of turning his thought back on the knowing-in-action implicit in his action. He reflects 'in action' in the sense that his thinking occurs within the boundaries of what I call an action-present – a stretch of time within which it is still possible to make a difference to the outcomes of action (Schön, 2001, p. 197).

Reflection is maintained while is action is taking place through what he called 'double vision' – a capacity both to concentrate on what is being done and at the same time observe it, as if it were from a distance.

Eraut (1994) discusses Schön's idea of reflection-in-action and proposes a related concept, which he calls 'performance period'. A key feature of the activity of many professionals is the need to deal with competing demands at work. For him, analysis of performance must take into account everything that happens at the moment of action, demanding attention of the professional. This provides a much needed contrast to the tendency to consider expertise solely in the context of individual problems, cases or tasks.

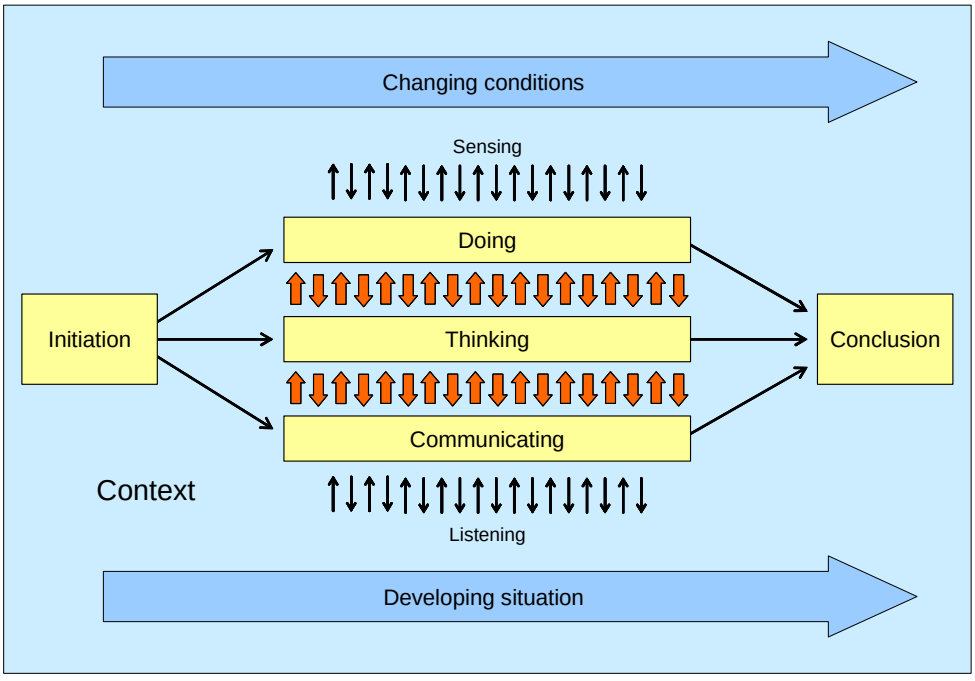


Figure 2-2: Performance period of professional activity (adapted from Eraut, 1994, p. 151)

In a performance period, all tasks and interactions are considered, particularly those related to aspects such as reading the situation, deciding what to do, changing one's plan, responding to unforeseen events, allocating time and managing the transition to other periods. The generic model is characterized by a context, a beginning, and an ending, by conditions, and by a developing situation (Figure 2-2). Plans may pre-exist, may be developed or modified during an initiation period, or the practitioner may simply decide to handle the situation in a routine way or even to improvise. There has to be a correct reading of the situation so appropriate action can be taken. The performance period is an ongoing process and suggests a dynamic model in which a constantly changing environment provides a changing input which leads to the constant modification of plans (Eraut, 1994).

2.5 Summary of the literature review

In this chapter, we have reviewed existing literature related to the knowledge economy and society, the field of knowledge management, and the concept of competence that are relevant to this study. We started with a discussion of previous analyses of the knowledge economy and society, listing some of their main features and considering some major implications for organizations and managers. Among key features of the knowledge economy and society are the growing importance of knowledge in the economy and society; the expansion of knowledge-intensive industries; the evolution of new organizational configurations; the rise of knowledge work and workers; the prominence of science and technology; the emergence of a new economic logic; and the revival of a fundamentally distinct mode of production. Among major implications for organizations and managers are the increasingly distributed nature of knowledge and the need for integrating it to create value; the growing relevance of knowledge workers and the particular demands of managing them; and the accelerating pace of innovation and the complexity of leading in a rapidly changing environment.

We also attempted to illustrate the breadth and depth of the KM field, seeking its boundaries and surveying its major contents. We listed several of the main

disciplines contributing to it and described some of the key topics discussed. Starting with strategy, the most influential one, the research focus has been typically related to the construction of competitive advantage based on knowledge and organizational capabilities. Accounting has focused on the management of intangible assets and measurement of intellectual capital. The field of organization studies has long investigated organizational learning, and has extensively discussed organizational and behavioral factors affecting knowledge sharing. Human resources management has explored the rise of knowledge work and the role of HRM in knowledge-intensive firms. Information systems has been very active from the beginning of the KM boom, presenting ways to support KM with technology and discussing the development and implementation of KM systems. Artificial intelligence has long studied knowledge-based systems and knowledge engineering, and has proposed several methods to support decision making. And finally, library science has long studied the organization of information and the improvement of its access and distribution. This overview of KM field is not comprehensive, since there are several other disciplines contributing with a variety of concepts and frameworks, but it is extensive enough to provide an idea of the extension of topics covered and how they can address the challenges of the knowledge economy and society.

Finally, we explained two complementary approaches to the concept of competence and described major studies representing each of them. In one of the approaches, competence is seen as the source of the individual capacity to perform, and consists of a set of psychological capabilities that lead to competence. Those capabilities are usually described as a combination of conceptual knowledge and experience (e.g., concepts, models, principles, heuristics, memories), skills and abilities (e.g., cognitive, affective, psychomotor skills), and personal attributes (e.g., attitudes, traits, values, motives). In the other approach, competence indicates a standard of expected performance as defined by concerned stakeholders, and consists of a set of activities and functions that must be performed at a specified proficiency level. That standard usually requires a definition of both scope (i.e., the roles and tasks involved in the activity) and

quality (i.e., the expected level of proficiency and assessment criteria to be used) of performance. Those two approaches are synthesized in the idea of competent action, when individual resources are realized into actual performance in particular contexts.

Chapter 3: Modeling Individual KM Competence

3.1 Introduction

In this chapter we propose a model of individual KM competence to be used in the education of knowledge managers. We define *knowledge manager* as a general manager prepared to deal with challenges in the knowledge economy and society, and *KM competence* as the competence required from such a manager. We assume that the breadth and depth of contributions to the KM field include the essential answers to those challenges, and describe KM competence in terms of those contributions. The model is a theoretical development based on a extensive literature survey on three main topics: 1) contributions to the KM field from a range of diverse disciplines, 2) descriptions of typical KM practices/techniques and cases of KM initiatives, and 3) discussions on function/roles in KM and previous studies on KM competence.

We organized this chapter into three sections. The first explains the theoretical background for the development of the model, proposing a working definition of the concept of competence and reviewing a set of disciplinary contributions to KM. The second discusses some key distinctions about knowledge and presents the major perspectives on KM, describing the particular stance on knowledge and its management from each one, and presenting some examples of typical concepts, models, and methods advanced by them. Finally, the third section details our proposed framework – identifying typical KM activities and the capabilities associated with them – and discusses its most relevant aspects. We conclude the chapter with a summary of its key points.

3.2 Theoretical background

This section presents the theoretical background that provides the context for developing our model. First, we review the concept of competence and introduce our working definition, then we outline the role of the knowledge manager based on challenges he/she must face, and finally we summarize some of the major contributions from a number of disciplines.

3.2.1 A working definition of competence

We have discussed earlier that the concept of competence has been characterized according to two opposing but complementary perspectives: one focusing inward, describing it as an underlying individual attribute, and the other focusing outward, explaining it as a socially attributed quality. In the first case, competence is seen as the source of the individual capacity to perform, and consists of a set of psychological capabilities that lead to competence. Those capabilities are usually described as a combination of conceptual knowledge and experience, skills and abilities, and personal attributes. In the second case, competence indicates a standard of expected performance as defined by concerned stakeholders, and consists of a set of activities and functions that must be performed at a specified proficiency level. That standard usually requires a definition of both scope and quality of performance.

Our working model of competence seeks to combine both perspectives. The characterization of competence in a given domain of activity, thus, requires two steps: 1) to define the scope and quality of *expected performance*, and 2) to specify required *individual capability* (Figure 3-1). We adopt here a developmental approach to competence, which has the purpose of developing individual capabilities required for effective performance. This is in contrast with a performance approach, which has the purpose of predicting future performance based on existing individual capabilities. The developmental approach is typically indicated for educational settings, while the performance one is usually adopted in the workplace environment.

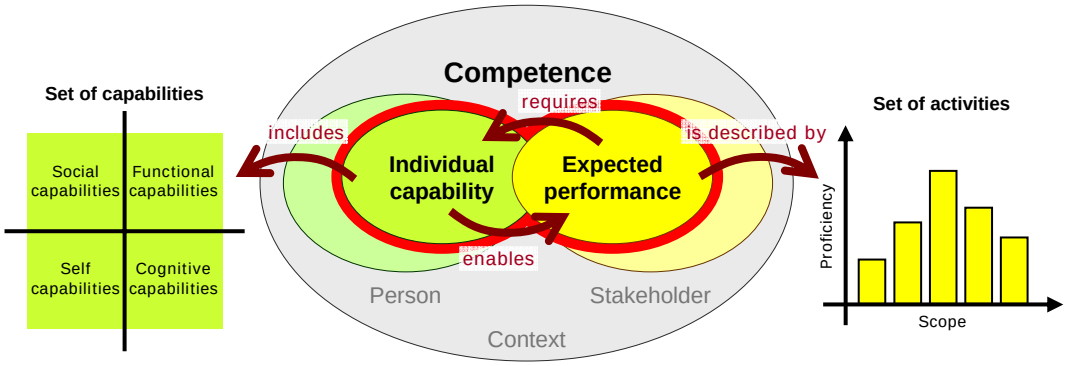


Figure 3-1: A working model of competence

The starting point for defining KM competence is to delimit the KM field. We need to determine the scope of the KM activity, to identify the activities involved in the management of knowledge. As an immature discipline, KM still suffers from undefined boundaries and conflicting perspectives. In the next subsection, we briefly summarize some of the main disciplinary contributions to KM in order to clarify the nature of KM as a domain of activity.

3.2.2 Disciplinary contributions to KM

In the previous chapter, we reviewed some major contributions to KM from a variety of disciplinary backgrounds and provided an overview of the broad nature of the field. Here we provide a brief summary of key points.

The management discipline provides possibly the broadest range of contributions. For instance, the field of strategy – home of the most cited authors in KM – discusses the importance of knowledge for competitive advantage and describes ways to build sustainable competitive strategies based on the acquisition and/or creation of knowledge. Accounting emphasizes the importance of intellectual capital and proposes ways to measure and control intangible assets. Organization science is interested in knowledge transfer issues under varied circumstances, and is also the source of organizational learning, a field that somewhat merged with KM. Human resources studies the nature of knowledge work and the management of knowledge workers in knowledge-intensive firms.

Other disciplines have also provided important contributions to KM. For instance, engineering emphasizes the role of knowledge in manufacturing, logistics and other operational processes and suggests ways to integrate knowledge and business processes. Information systems indicates how information and communication technology can support the management of knowledge in organizations and investigates the development and implementation of KM systems. Computer science has been long working on knowledge-based systems, knowledge representation and knowledge discovery. And library science deals with the organization, access and retrieval of information, which is essentially codified knowledge.

This review is extensive but not comprehensive, and there are several other disciplines contributing to KM. However, it provides a reasonable idea of the breadth and depth of the field.

3.3 Epistemological perspectives on KM

As we can see, a wide range of topics is being pursued under the name of KM, following a variety of methods. How can we define the scope of KM competence, in the face of such diversity? We can notice that contributions are distinct in some essential, fundamental way. Disciplines differ on their basic assumptions about knowledge and its processes, about what it means to manage it and the purpose of doing it. Having different assumptions, disciplines frame the problem of knowledge differently, leading to different questions and methods and, naturally, different answers.

In this section, we review some key distinctions on the nature of knowledge that are at the root of essentially distinct assumptions in contributions to KM. We focus particularly on the ideas of tacit knowing, knowing how and subjective knowing. We use these and other distinctions to propose four major perspectives on the management of knowledge: information-, human-, computing- and strategy-oriented KM.

3.3.1 Fundamental distinctions about knowledge

Our discussion on knowledge starts with tacit knowing, one of the most discussed topics in the field yet still barely understood. Knowledge is often said to be either explicit or tacit, the last being usually described as unarticulated, difficult-to-articulate, or even impossible-to-articulate knowledge. We suggest that such a definition, although not incorrect, is imprecise because it confuses two distinct conceptions – namely *knowing how* and *subjective knowing* – that makes discussion about knowledge more difficult than it could be.

In describing *tacit knowing*, we stick to Michael Polanyi's definition. For him, tacit knowing is a holistic, synthetic, integrated process of which we are not much aware. This lack of awareness occurs at two levels: one is the myriad details, parts and components that are used in the process. The other is the process of integration itself. One example may clarify this point; he cites the process of recognizing a familiar face. Such a knowing is tacit because our attention is the end result (the familiar face), not in the parts (the size, shape and color of the eyes, the tone of the skin, the length and color of the hair, etc.) nor in the process of integrating the parts (the cognitive process that combines all those details). According to this definition, tacit knowing can be made explicit to a certain extent if our attention moves to either the myriad details or the process of integrating them.

The most common source of confusion about knowledge, in our opinion, is the close correspondence between tacit knowing and *knowing how*, a concept well described by Gilbert Ryle. According to him, knowing how must be distinguished from *knowing that*. The later relates to understanding, comprehension, perception, interpretation; it is the usual meaning attributed to the word 'knowledge'. Thought and reason are the typical means by which knowing that is built. The former relates to action, behavior, activity, procedure, performance, and the word 'ability' is often used to refer to such kind of knowing. Activity and practice are the typical means through which knowing how is built (Table 3-1). Again, an example may clarify the point. For instance, the knowing of a person who has learnt many

business concepts, models and methods in an MBA program can be said to be mostly knowing that. On the other hand, the knowing of a person who has acted as manager for many years, having made decisions and experienced the challenges of day-to-day managerial activity, can be said to be mostly knowing how.

Table 3-1: Distinction between 'knowing that' and 'knowing how'

	Knowing that	**Knowing how**
Also called…	knowledge information content	competence ability skill
Relates to…	understanding interpretation perception	behavior performance action
Built through…	thinking reason study	doing experience practice

Another source of confusion is the correspondence between tacit knowing and *subjective knowing*. The distinction between objective and subjective knowledge is an old debate in philosophy. At one side of the debate are realism and positivism, branches that presume the existence of an objective reality, external to the knower and, in principle, common to everybody. Knowledge must derive from such reality, otherwise it can be regarded as mere opinion of belief. At the other side are idealism and interpretivism, which consider such ultimate reality unknowable, since all perception of it must be necessarily filtered by the knower's cognition. Knowledge, thus, is always an interpretation, dependent on prior knowledge and subject to cognitive biases. An implication relevant for KM is that, in the case of objectivity, knowledge closely corresponds to reality and thus is relatively independent of the knower. Knowledge assumes properties of an 'object': it can be observed, studied, analyzed, manipulated, moved, an so on, without losing its properties. In the case of subjectivity, knowledge cannot be separated from the knower, under the risk of losing its meaning and significance.

Thus, knowledge is always relative, conditioned, context-dependent and subject to interpretation.

Table 3-2: Distinction between objective and subjective knowing

	Objective knowing	**Subjective knowing**
Knowledge is…	based on facts and reality	always an interpretation
Aims to be…	universal general	particular specific
Relation to knower and context	independent	dependent

The distinctions between explicit and tacit knowing, knowing that and knowing how, and objective and subjective knowing, are the roots of distinct perspectives on knowledge and how it can be managed. They are summarized in Figure 3-2.

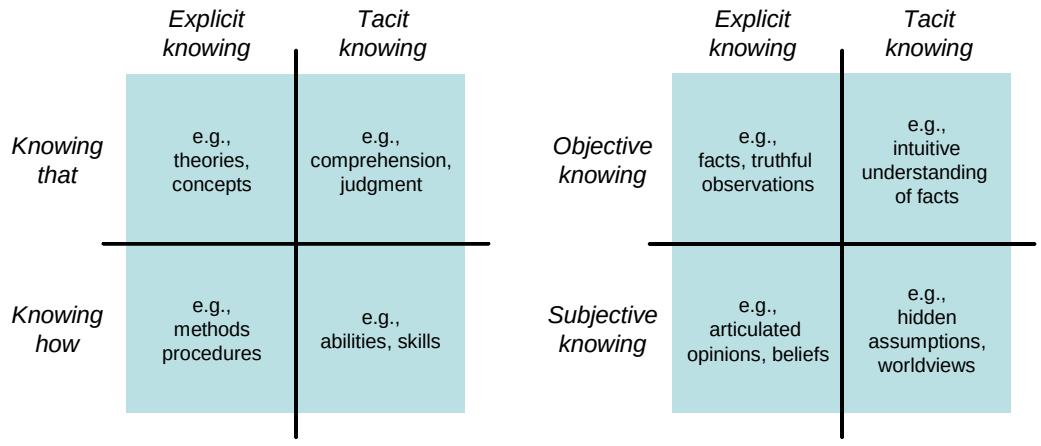


Figure 3-2: Comparing tacit knowing, knowing how and subjective knowing

3.3.2 Major perspectives on knowledge management

Along the review of main contributions to KM, we identified fundamental differences on how knowledge is defined and understood. We propose that those distinct epistemological[15] perspectives are the basis of an adequate description of the field. We suggest the existence of four major perspectives: information-, human-, computing- and strategy-oriented ones (Figure 3-3).

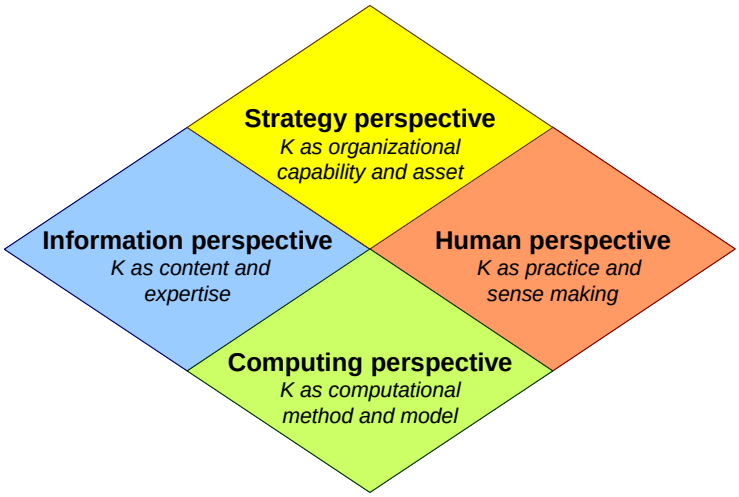


Figure 3-3: Four epistemological perspectives on KM

The first two perspectives, information- and human-oriented, have already been described and are widely accepted in the KM literature. They are sometimes called the technology and people approaches, codification and personalization, product and process, object and flow, objective and subjective approaches, among other terms. However, we believe that some of those earlier accounts are inaccurate and somewhat misleading. Based on the clarification just made about key aspects of knowledge, we propose to distinguish them in terms of objective

[15] The word epistemology as used here does not refer to the discipline that investigates the nature, origins and extent of human knowledge, but to particular instances of possibly distinct theories of knowledge. We assume that knowledge may be interpreted in various ways, not necessarily compatible among them; thus, different epistemic communities may have distinct assumptions of what constitutes knowledge and how it is acquired or constructed by individuals.

and subjective knowing (Figure 3-4). The information-oriented perspective thus focus on explicit content (objective knowing that) and codified technique (objective knowing how), while the human-oriented perspective emphasizes practice (subjective knowing how) and sense-making (subjective knowing that).

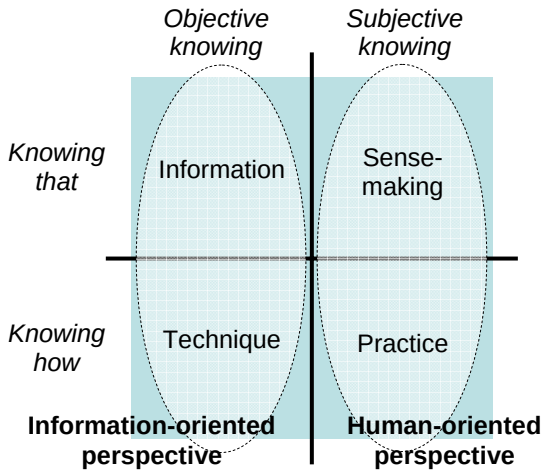


Figure 3-4: Information and human perspectives on KM based on objective and subjective knowing

The third perspective proposed, computing-oriented, is often confused with the information-oriented one. Based on their distinct epistemological assumptions, we argue that they are better considered separately; although an intersection can be noticed, the disciplines and research communities behind them are mostly distinct. The fourth and last perspective, strategy-oriented, has been typically used to legitimize the others. In fact, the other epistemological stances are adopted by this one according the context, making it a sort of meta approach. The key distinction in this case is not how knowledge is perceived, but to what purpose it is used; the value associated with knowledge has more emphasis than its nature.

3.3.2.1 Information-oriented KM: knowledge as content and expertise

This perspective tends to view knowledge as objective and explicit. Adopters usually disregard the subjective, contextual, constructed nature of knowledge and assume it as unproblematic – i.e., different people do not have difficulty in reaching common understanding about a certain piece of knowledge. Thus, knowledge can be easily codified, stored and moved around. The essence of knowledge management is often to make the most effective use of the knowledge available, either internal or external to the organization. A phrase commonly cited by proponents of this approach is "the right knowledge to the right person at the right place at the right time".

Being objective, knowledge is usually treated like a thing, a product, an asset. A common way to start a knowledge initiative according to this perspective is to make a knowledge audit. This involves making an inventory of existing knowledge – to map who knows what, or where knowledge is found and how it can be obtained –, and identifying current knowledge needs – what knowledge is needed where, by whom, for what, the current gaps and how they can be filled.

Knowledge management is often described as a series of knowledge processes, which closely resemble a production process – e.g., knowledge identification, acquisition/access, creation/production, organization, storage, distribution, utilization, and so on. Technology is the natural solution to improve those processes: portals to make knowledge easily available, document and content management systems to build knowledge repositories, communication systems to facilitate easy knowledge transfer and exchange. Adequate use of those systems require a good information policy: information rights (e.g., who can contributes what, who can access what), information roles (e.g., contributors, approvers, maintainers, editors, auditors), information life cycle (e.g., creation, development, update, retirement), and so on.

The information-oriented perspective, however, does not deal only with explicit knowledge. Advocates include tacit knowledge by either trying to codify

it – through routines and procedures, storytelling and narrative, multimedia recording, etc. – or by facilitating direct access to expertise – profiling experts and advertising them around the organization. Human issues are also considered, despite the strong emphasis on technology. Knowledge processes and systems are ultimately operated by people, which must be motivated and willing to contribute. The perspective includes human resources aspects, like incentives and compensation, performance assessment, and training and development.

3.3.2.2 Human-oriented KM: knowledge as practice and sense-making

This perspective, in contrast with the previous one, tend to see knowledge as mostly tacit and naturally difficult to be articulated or transferred. This is because it emphasizes either practice (knowing how), which is related to activity and actual experience, or sense-making (subjective knowing), which is situated knowledge subject to interpretation and dependent on a common background to be properly shared. Such knowledge cannot be directly managed, and knowledge management becomes the cultivation of favorable contexts in which it is practiced, shared, developed, constructed, negotiated, and so on.

Simply put, practice is the usual way of doing things. It's normally developed socially, in a group or community. Practices are reproduced through a process of socialization of new members, who are gradually introduced to the collectivity by senior members. The practice evolves along time, as new practices are tried and tested; their adoption being usually discussed and negotiated before it is commonly accepted. To be able to contribute and be heard, a person must be part of the collectivity. He or she must understand the context and conditions of practice, its values and culture. This is synthesized in a common identity that is the basis of knowledge construction and sharing. A key question for knowledge management is then to identify who are the groups and communities that hold the knowledge important to the organization. How healthy are those collectivities? How healthy is the dynamics of knowledge in them? How are practices

reproduced? How are new ones introduced, negotiated, disseminated? Is the collectivity alive, evolving, or stagnant, decadent?

Subjective knowledge is context-dependent and thus requires a common background to be properly shared. This is natural in the case of groups and communities as described above, but problematic in the case of exchanges between different collectivities. Different backgrounds make knowledge more difficult to be properly identified, understood, evaluated, assimilated. Thus, collaboration between distinct collectivities usually requires gatekeepers and boundary spanners, who understand and connect different epistemic or practice communities. The mapping of social networks and evaluation of social capital are relevant for this purpose. Relevant questions include: Are groups properly connected? Are connections too sparse? Too dense? What new combinations are needed? Furthermore, knowledge is usually not value free; it is commonly attached to interests of particular individuals and groups, which may lead to conflicts and disputes. The harmonization of such concerns are also part of the management of knowledge.

Technology is usually not considered crucial, but it is obviously useful for communication or support for group work. It can for instance facilitate the connection people, improve collaboration, assist group and community activity by providing tools to share documents and materials, coordinate activities, and so on.

3.3.2.3 Computing-oriented KM: knowledge as computational methods and models

This perspective is often merged with the information one, under the label *technological* approach. We argue, however, that their assumptions about knowledge differ in some important ways. The key distinction is that adopters of the computing-oriented perspective consider knowledge a computable entity or phenomenon. As described earlier, in the information-oriented perspective computers are used mainly to provide access, store, and distribute codified knowledge. The production and manipulation of knowledge are tasks left to humans. In the computing-oriented, computers themselves apply and generate

knowledge, demanding different methods and paradigms. Additionally, in contrast with the information-oriented, which deals mostly with explicit knowledge, the computing-oriented perspective computes knowledge in both explicit and tacit ways, as we discuss below.

Proponents of this perspective have already advanced myriad ways to compute knowledge. For instance, expert systems are capable to mimic logical reasoning. Developers apply methods to capture human knowledge and build engines to manipulate it. Case based reasoning is another way to mimic reasoning, but by analogy. It collects and accumulates a large number of cases and suggest solutions to new ones based on similar cases in the knowledge base. Neural networks process knowledge in a tacit way: a multitude of information pieces is processed concurrently and is combined in a way much like our brain processes – which allows them to learn from experience. Ontologies represent knowledge in a formal way, so that meaning is retained and computers can process not only information, but the also the meaning attached to it. Data mining, which employs many distinct techniques, can be used to identify patterns in voluminous data, creating useful knowledge at times. These and many other techniques are being used in sundry applications, in systems that mimic human thinking and are capable of solving problems, finding patterns, and making decisions.

A significantly distinct approach that fits a computing-orientation to KM seeks to build formal mathematical models of reality to support decision making in complex situations. Those models are used in optimization, simulations, forecasting, scenario analyses, and other situations where the modeling of complex systems and processes can provide additional insights about phenomena.

3.3.2.4 Strategy-oriented KM: knowledge as organizational capability and asset

The main concern of the strategy-oriented perspective is to build organizational capability. The purpose is to obtain sustainable competitive advantage, in the case of commercial organizations, or to improve the capacity to fulfill the organization’s mission, in the case of public and other non profit

organizations. The key feature of knowledge as understood by adopters of this perspective is that it transcends individuals. They emphasize knowledge at the organizational level and deal with both tacit and explicit knowledge. Tacit knowledge is usually considered at the organizational level, for instance, in the case of organizational capabilities. Explicit knowledge is objective knowledge that the organization must control, like, for instance, technologies and intellectual property, or knowledge about markets and customers. In both cases, it is the aggregate value of such knowledge that is being considered.

An important consideration about knowledge according to the strategy-oriented perspective is its value or purpose. Knowledge must contribute to the organization's mission or goal, and only the most valuable knowledge is considered. There is an inherent calculation of value, a prioritization of the knowledge available or to be pursued, since it is not possible to have all. Thus, the typical activity in this perspective is to work on knowledge strategies, sensing the environment's threats and opportunities, clarifying the organization's current and projected capabilities, and developing ways to acquire, create and protect the required knowledge. Typically, knowledge strategies deal with questions like: What knowledge does the organization need to survive and prosper? How can it improve existing capabilities and develop new ones? How can such knowledge be obtained? Internal development or external acquisition? Teams, taskforces, organizational restructuring? Alliances, collaborative partnerships, knowledge networks? Some topics and tools that deal with such issues are innovation management, scenario planning, and technological roadmapping, among others.

A deeper concern of this perspective relates to the implications of a knowledge-driven economy to organizations. Traditional economic and management theories have been developed for the industrial age and are becoming increasingly obsolete in the knowledge economy and society. Proponents of this perspective are seeking a new theory of the firm and new management theories based on knowledge, more adequate for the emerging age.

The characteristics of the four basic epistemological perspectives on KM are summarized in Table 3-3.

Table 3-3: Four epistemological perspectives on knowledge management

Information-oriented KM

- Knowledge as relevant content
  - KM as a information management, usually a set of knowledge processes (e.g. identify, organize, use)
  - Typical research topics: information organization; information needs and uses; information retrieval; KM systems; process-oriented KM
- Knowledge as replicable experience
  - KM as codification of expertise and experience of individuals and teams
  - Typical research topics: organizational memory; ways to capture tacit knowledge; management of expertise

Human-oriented KM

- Knowledge as social practice
  - KM as cultivation of shared contexts and collective engagement in action and practice
  - Typical research topics: context; identity; communities of practice; social capital; social networks
- Knowledge as sense-making
  - KM as inquiry, negotiation of meaning and organizational change
  - Typical research topics: enactment; organizational culture; interests and agency; power and conflict; symbolism and rhetoric; legitimacy

Computing-oriented KM

- Knowledge as intelligent computing
  - KM as computation of data and information
  - Typical research topics: knowledge discovery and data mining; intelligent agents; ontologies
- Knowledge as systems thinking
  - KM as modeling systems for decision making
  - Typical research topics: simulation, optimization, forecasting, complex systems

Strategy-oriented KM

- Knowledge as organizational capabilities
  - KM as knowledge creation, transfer and protection for building sustainable competitive advantage
  - Typical research topics: knowledge creation; dynamic capabilities; innovation management; regional clusters; collaboration; knowledge strategies
- Knowledge as the foundation of the organization
  - KM as knowledge-based managerial practice
  - Typical research topics: knowledge-based theory of the firm; resource-based view; evolutionary perspectives

3.3.3 KM activity conditioned by epistemological perspective

We conclude from the discussion on epistemological perspectives that the nature of KM depends on fundamental assumptions about what is knowledge and how it can be managed. Naturally, the scope of KM activity will also be determined by such presuppositions. Thus, from an information-oriented perspective, KM consists of activities like organizing and distributing information, codifying existing knowledge, designing and improving knowledge processes, and implementing a technological infrastructure that supports such activities, for instance. From a human-oriented perspective, KM includes activities like, e.g., cultivating groups and communities that maintain and develop practice, facilitating communication and collaboration, encouraging new connections and relationships, and nurturing contexts where such activities emerge and flourish.

From a computing-oriented perspective, KM involves activities like, e.g., using knowledge engineering techniques to manipulate knowledge, identifying patterns and relationships hidden in large amounts of data, building computational models of complex systems and processes, and developing systems that implement such methods and models. And finally, from a strategy-oriented perspective, KM comprises activities like, e.g., identifying and pursuing valuable knowledge, improving organizational absorptive capacity, scanning the environment for underlying trends, and building organizational structures and processes to support such activities.

3.4 Proposed model of individual KM competence

The understanding of the distinct epistemological perspectives helps us to determine the scope of the KM activity. We are now ready to explore the two elements of our working definition of competence in more detail: first, how expected performance translates into a set of typical KM activities, and second, how individual capability is represented by a set of KM capabilities. In this section we identify typical KM activities grouped according to perspectives on KM most likely support them, and suggest a list of typical KM capabilities

grouped into six categories: strategic, organizational, knowledge-oriented, technological, inter-personal and personal.

3.4.1 Identifying typical KM activities

We needed to identify typical activities in KM in order to better describe the performance expectation associated with KM competence. For that purpose, we collected data through a literature survey of KM practices and techniques. The major sources were accounts of actual KM initiatives, previous studies listing typical KM initiatives, and descriptions of KM implementation frameworks. It was a significant challenge to make sense of the multitude of practices and techniques, because they were described and analyzed from distinct points-of-view. Some of them focused on a particular *domain* (e.g., building knowledge about customers, developing competitive intelligence) or *purpose* (e.g., replicating best practices, facilitating access to expertise). Others emphasized specific *techniques* (e.g., developing yellow pages, building online communities) or *tools* (e.g., implementing corporate portals, building knowledge repositories).

The problem with such diverse levels of analysis is that, on the one hand, practices emphasizing a domain or purpose could be implemented in very different ways. For instance, building knowledge about customers could mean either to collect information on their preferences and habits for later analysis via data mining, or to store scripts of successful interactions in contact centers for service improvement via case-based reasoning. Replicating best practices could be implemented either through the codification and dissemination of practices via a knowledge repository, or through the stimulation of sharing and discussion of personal experiences. We can easily notice that such activities are completely different.

On the other hand, initiatives emphasizing tools or techniques could be aiming at significantly different purposes. For instance, corporate portals could emphasize either the centralized access to a wide variety of organizational information, or a converging point where a community of like-minded people shared information, discussed, and kept in touch. In the same way, yellow pages

might be implemented to support the selection of potential team members for new projects, or to facilitate the identification of people with similar interests. Usually, different purposes meant that those tools or techniques were implemented in very different ways.

We present in Table 3-4 some of the most relevant activities found. In the analysis of activities described in the literature, we sought to identify their essence and reach a balance between the domain/purpose and technique/tool points-of-view, trying to be as generic as possible, but not too generic so that they would loose their meaning. We also grouped activities according the most likely perspective supporting them.

Table 3-4: Typical KM activities grouped according to epistemological perspectives

Information-oriented

1. Conducting knowledge audits (i.e., knowledge needs and gaps)
2. Mapping existing knowledge and knowledge processes
3. Designing an information architecture and developing information policies
4. Implementing systems for content publication (e.g., portals, document/ content management)
5. Building knowledge repositories and online libraries
6. Facilitating knowledge transfer and sharing (e.g., best practices, lessons learned)
7. Facilitating access to expertise (i.e., profiling experts around the organization)
8. Capturing knowledge from experts, teams and experienced employees
9. Integrating knowledge capture, sharing and retrieval around business processes
10. Providing technological infrastructure for knowledge processes
11. Advocating the value of knowledge and KM
12. Creating new KM-related roles, positions and units
13. Adapting incentive, assessment and compensation systems for KM

Human-oriented

14. Promoting a knowledge-oriented culture
15. Cultivating communities of practice
16. Creating cross-functional teams and task forces
17. Training and developing personnel (e.g., workshops, mentoring, e-learning)
18. Adapting the physical space and infrastructure to facilitate knowledge creation
19. Mapping social networks (i.e., patterns of interaction between people)
20. Implementing systems for communication and collaboration (e.g., groupware, conferencing)

Computing-oriented

21. Developing and implementing systems for knowledge representation (e.g., ontology engineering, semantic web services)

22. Developing and implementing systems for decision support (e.g., OLAP, expert systems, case-based reasoning)
23. Developing and implementing systems for knowledge discovery (e.g., data and text mining, search and retrieval)

Strategy-oriented

24. Prioritizing strategic knowledge (e.g., knowledge vision, technology roadmap)
25. Managing the innovation process (e.g., R&D, product development)
26. Promoting and developing creativity and innovation
27. Creating new knowledge-based products and services
28. Developing alliances and partnerships for knowledge creation and transfer
29. Measuring the value of intangible assets (i.e., intellectual capital)
30. Managing intellectual property (e.g. patents, licenses, copyright)
31. Building knowledge on the competitive environment (i.e., competitive intelligence)
32. Developing approaches and strategies to implement KM
33. Evaluating the impact of KM initiatives

3.4.2 Identifying typical KM capabilities

We also needed to identify typical capabilities in KM in order to detail the elements of individual capability associated with KM competence. We followed a process similar to that of KM activities: we carried out a literature survey to collect data on KM capabilities and later analyzed and integrated it. The major sources were previous studies related to KM competence and discussions on the characteristics of roles and functions in KM.

Studies describing KM capabilities usually focus on roles associated with KM, or KM roles. The most prominent of such roles is that of the chief knowledge officer, or CKO, which received considerable attention in the late 1990s. The CKO is typically described as a senior executive in charge of steering the KM effort in an organization. He/she is responsible for activities like designing a vision to provide direction for KM, planning specific initiatives, securing organizational support for KM, and fostering a knowledge sharing culture, among others. The capabilities of a successful CKO would include features like leadership and strong communication skills, strategic vision and thinking, deep understanding of both KM and the business of the organization, and ability to foster and manage change, for instance.

Another KM role often described in the literature is that of the KM professional. Some authors advanced the idea of KM as a profession, and proceeded with the description of the profile of such a professional: its role and functions, desired skills and abilities, and body of knowledge to be assimilated. The KM professional would be responsible for KM efforts in organizations, and his/her capabilities would include leadership and management skills, a variety of information skills, familiarity with IT, communication skills, and analytical skills, among others. Although such descriptions of the KM professional and the CKO might sound similar, the first fits a more operational role, responsible for executing KM initiatives, while the second is more strategic, closer to the senior management of an organization.

Those two roles just described carry the implicit assumption that KM should be a distinct organizational function, much like finance and accounting, human resources or information technology. Other authors, however, describe KM roles that do not assume KM as a separate function centralizing KM activities, but as a distributed function carried out by people all over the organization. They would describe, for instance, the roles of project managers, knowledge engineers, knowledge champions, community leaders, evangelists, and so on. The wide variety of roles included an also wide variety in characteristics and desirable capabilities.

All those KM roles can be roughly grouped into three categories according to the strategic level of their function. Top management and the CKO are typical senior, strategic KM roles; knowledge managers, project managers, community managers may be considered as tactic, intermediary managerial KM roles; and at the operational level, responsible for particular techniques or more specific functions, there are a large variety of KM roles.

We compiled a list of capabilities described in many of those roles, mostly from strategic and managerial levels, since the operational-level roles are too varied to be aggregated. The biggest challenge in such a process was to reach the right level of abstraction in the description of capabilities. This is because a capability usually involves several layers of detail. For instance leadership skills

might be broken into a set of component skills like the ability to influence people, good communication skills, counseling and mentoring skills, problem solving and decision making skills, and so on. Any of those component skills might be further detailed into other skills. This recursive feature of capabilities makes their analysis difficult and complex. The capabilities collected were combined, relabeled, and grouped into groups and categories in search of a level of abstraction which would be meaningful and yet understandable. That is, it should be detailed enough to be meaningful, but not too detailed that it became crammed.

The result of this effort can be seen in Table 3-5. The capabilities are grouped into six categories, four of them loosely related to the four perspectives on KM. They are: strategic capabilities (strategy-oriented perspective), organizational (human-oriented), knowledge-oriented (information-oriented), technological (computing-oriented), inter-personal and personal. It is important to note that, although we sought for comprehensiveness, such a list can never be complete and the capabilities listed are only a sample of all the range of possible ones. We believe, however, that they are reasonable representatives of the breadth and depth of KM capabilities.

Table 3-5: Sample KM-related capabilities, grouped into six categories

Strategic

1. **Analyzing the organization's environment**
   Understands the external context (e.g. market, competitors, industry, regulations); identifies key issues relating to performance.
2. **Recognizing organization's capabilities**
   Comprehends the organizational structure; distinguishes core business processes; realizes how value is created within the organization.
3. **Developing a KM strategy**
   Identifies knowledge valuable to the organization; develops strategies and initiatives to acquire, create, transfer, and protect it.
4. **Demonstrating KM results**
   Associates KM benefits to organization's goals; gathers evidence of the impact of KM initiatives; establishes metrics and indicators.

Organizational

5. **Interpreting organization's culture**
   Recognizes the shared values, norms and assumptions that guide how people behave and interact in the organization; identifies levers of organizational change

6. **Managing organizational change**
   Defines approaches and strategies for change; involves and engages people; understands and deals with resistance; monitors and adjusts actions.
7. **Advocating KM**
   Creates and promotes a KM vision; educates on KM's benefits, principles and practices; advertises the value of KM; fosters a KM-oriented culture.
8. **Developing people and teams**
   Provides guidance, feedback and support; helps others to perform effectively; offers opportunities and facilitates the development of others.
9. **Adapting organizational structure and instruments**
   Creates new roles, functions, and units; develops incentive mechanisms; adjusts assessment and compensation systems; change physical space and infrastructure.
10. **Handling organizational politics**
    Recognizes divergent individual, group and organizational interests; understands relations of power and influence; reconciles conflicting interests; forms alliances and coalitions.
11. **Managing KM projects**
    Secures management support; plans outcomes, milestones and activities; manages people, resources and schedules; manages scope and risk; executes and controls.

Knowledge-oriented

12. **Understanding knowledge and its processes**
    Realizes the multi-faceted characteristics of knowledge; comprehends how it relates to individuals, groups, and the organization; recognizes and understands its varied processes.
13. **Managing knowledge repositories**
    Catalogues and organizes content; provides access and retrieval; defines policies and guidelines for access, publishing, and maintenance.
14. **Promoting collaboration**
    Identifies barriers to collaboration; selects adequate approaches and instruments to improve collaboration and facilitate knowledge sharing; develops knowledge sharing programs.
15. **Capturing experience and expertise**
    Selects appropriate approaches and instruments to elicit tacit knowledge from individuals and groups; applies varied knowledge representation techniques.
16. **Measuring and evaluating knowledge**
    Understands typologies of knowledge; quantifies knowledge with metrics and indicators; understands financial and accounting systems; applies methods to value knowledge.
17. **Improving business processes with KM**
    Maps business and knowledge processes; analyzes, integrates and improves processes; captures business rules and practices; measures efficiency and effectiveness.
18. **Designing an information architecture**
    Identifies information needs; maps internal and external resources; structures, organizes and integrates content; develops information policies and processes.

Technological

19. **Understanding the technological architecture and infrastructure**
    Understands the organization's hardware, software, network, and data infrastructure; understands the portfolio of applications and services.
20. **Recommending ICT and KM tools**
    Understands diverse information and communication technologies and KM tools; identifies needs and develops system requirements; assess alternatives and makes recommendations.

21. **Implementing KM systems**
    Understands alternatives for development (e.g. in-house; outsourcing; customizing); recognizes stages and milestones; identifies key stakeholders and critical success factors.
22. **Developing intelligent and knowledge-based applications**
    Understands knowledge-based systems and artificial intelligence; uses knowledge engineering to capture and represent knowledge; applies knowledge discovery and data mining techniques.

Interpersonal

23. **Communicating**
    Expresses ideas clearly and adequately; questions and listens attentively; communicates effectively in a variety of situations (e.g. in person, in groups, to audiences, in writing).
24. **Influencing**
    Uses a variety of approaches to cause impact and gain support; persuades and convinces at different levels (e.g. individuals, groups, organizations).
25. **Team working**
    Works cooperatively with others; gives and accepts help to/from others; contributes to group's effectiveness; builds team morale; resolves team conflict.
26. **Building relationships**
    Makes contacts inside and outside the organization; develops and maintains a variety of relationships that may be useful in the future.

Personal

27. **Conceptual and analytical thinking**
    Understands complex issues; sees the big picture; breaks problems into smaller parts; sees patterns and connections; identifies causal relationships; identifies key issues.
28. **Creativity and learning**
    Generates and develops creative and innovative ideas; accepts change; deals with ambiguity; learns from others and from own mistakes.
29. **Self-confidence**
    Believes in his/her own capacity; accepts challenges and assumes responsibilities; address difficult issues and circumstances; handles failures constructively.
30. **Accountability**
    Assumes responsibility for results; delivers on commitments; is credible and trustworthy.

3.4.3 Summary

The proposed model of KM competence contains three major elements. Two of them are directly related to our working definition of competence: a set of KM activities translates the expected performance associated with of KM competence, while a set of KM capabilities translates the individual capability associated with of KM competence. A third element describes four major perspectives on KM,

which determines the scope of the KM activity and consequently the set of activities comprising it.

The model is complemented with a list of typical KM activities and KM capabilities, the first grouped according to the four perspectives on KM, and the second grouped according to six categories. It is expected a correspondence between capabilities and activities: different profiles of activities will require correspondingly distinct profiles of capabilities.

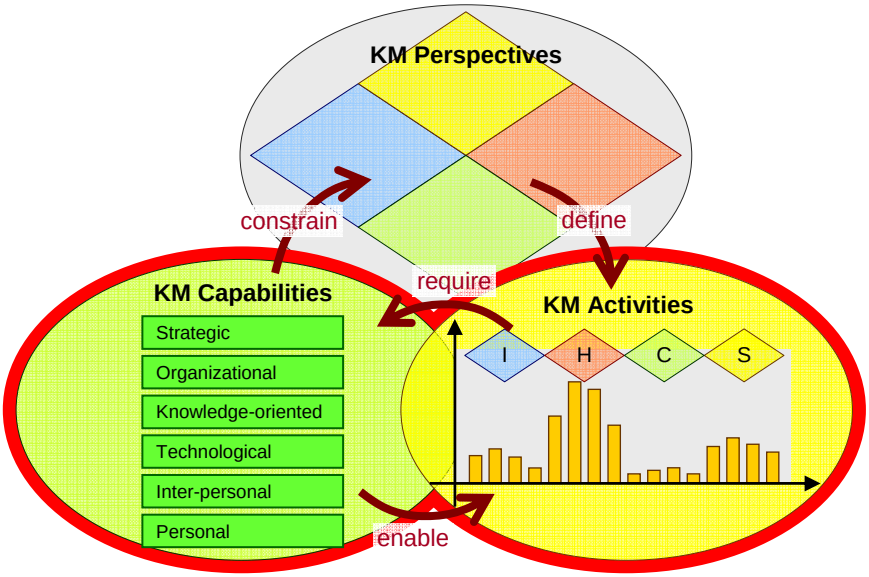


Figure 3-5: Proposed model of KM competence

3.5 Summary of the chapter

In this chapter, we proposed a model of KM competence, consisting of three main elements. The first two, *KM activities* and *KM capabilities*, show the correspondence between a set of presumed KM-related activities and a set of individual capabilities required for their effective performance. We also argued that fundamentally distinct assumptions about knowledge and its management influenced contributions to KM, and described four *epistemological perspectives* disputing the field: information-, human-, computing- and strategy-oriented. We

suggested that those perspectives strongly determine the way presumed KM activities in the model are defined, and thus comprise its critical last element.

We complemented the model with a list of typical KM activities, grouped according to the perspective which most likely support them, and proposed six categories of KM capabilities, labeled strategic, organizational, knowledge-oriented, technological, inter-personal and personal, along with a list of some typical examples.

Chapter 4: Survey of KM Researchers and Practitioners

4.1 Introduction

In the previous chapter we proposed a theoretical model of individual KM competence that explains the correspondence between presumed KM activities and the individual capabilities required to perform them, and indicates that they are both influenced by particular epistemological perspectives on KM. In this chapter we report a survey of KM researchers and practitioners that seeks to validate the existence of such perspectives and investigate the corresponding activities and capabilities valued by adopters of each of them.

We begin with an outline of the survey design, explaining how we developed and tested the questionnaire, defined the sample and selected potential participants, and collected and analyzed data. We follow with the survey results, first describing the characteristics of the perspectives identified, and then relating the relevant capabilities valued by each of them. We end with a discussion of the major findings, which include a missing strategy-oriented perspective, a refined understanding of perspectives and corresponding capabilities, and insights onto the relationships between perspectives, activities and capabilities.

4.2 Survey design

4.2.1 Objectives

We have designed and conducted this survey with three objectives in mind: 1) to verify the existence of particular epistemological perspectives on KM; 2) to identify some of the typical activities and corresponding capabilities associated with each of them; and 3) to seek elements common to all perspectives that can

provide a basis for integrating them. Those objectives can be translated into the following propositions:

1. There are four major perspectives on KM, namely information, human, computing and strategy.
    a. *Information* perspective: knowledge is mostly seen as codified/codifiable content and transferable expertise/experience, and KM usually means to facilitate access to information, expertise and so-called best practices.
    b. *Human* perspective: knowledge is largely interpreted as social practice and collective sense making, and KM usually means to cultivate contexts and facilitate connections that improve practice and sense making.
    c. *Computing* perspective: knowledge is typically regarded as objective and suited to computational approaches, and KM normally means to develop systems/methods that compute knowledge and to build computational models for decision making.
    d. *Strategy* perspective: knowledge is interpreted at the organizational level as capability or asset, and KM typically means to prioritize knowledge valuable to the organization and to design and implement strategies and processes to acquire, create, use and protect it.
2. Each perspective has a distinct combination of typical KM activities and valued individual capabilities.
3. There is a set of KM activities that is typical of all perspectives. There is also a set of individual capabilities that are valued by all perspectives.

4.2.2 Questionnaire design and testing

The main purpose of the questionnaire was to validate the four perspectives on KM and to identify the activities and capabilities associated with each of them.

Besides that, we have kept some principles in mind when designing the questionnaire. First, we aimed at respondents with long experience in KM – either as researchers or practitioners. This meant that they would be considerably busy people, with low availability and willingness to take part in the survey. Thus, we sought to keep the questionnaire as simple and easy to answer as possible: we opted for closed questions only and tried to keep their number small so that the questionnaire could be completed in around 15 to 30 minutes. And second, since we were looking for the respondents' own understanding of what constitutes KM, we provided no definition of concepts and intentionally left statements open to interpretation. We wanted to have the respondents' understanding of KM to become manifest in the answers given, and we sought to keep the questionnaire as comprehensive and representative of each approach as possible. However, we had to compromise between the desired comprehensiveness and the required simplicity.

The questionnaire had four major sections (reproduced in Appendix 1). The first two were the most important, exploring the typical KM activities in the first and the associated individual capabilities in the second. The first section was critical and aimed to verify the existence of distinct perspectives on KM. We listed twelve typical KM activities and asked respondents to choose six they would consider priorities in a generic KM effort. The number six was chosen because we planned to group responses into clusters. Too large a number of items and there would be too much overlap between too few clusters; too little a number and there would be too little overlap and too many clusters. Those twelve KM activities were taken from the list derived in the previous chapter; we selected the ones we judged the most relevant for KM and good representatives of each of the four perspectives (Table 4-1).

The second section of the questionnaire presented 36 individual capabilities related to KM, and respondents were asked to rate the degree of relevance of each of them for an effective performance in those six activities chosen in section one. In the same way, the capabilities were selected from those listed in Chapter 3, seeking a comprehensive coverage of the relevant ones and a balance among those

Table 4-1: List of typical KM activities proposed in the questionnaire[16]

I1	Organizing codified knowledge and making it available in repositories
I2	Mapping knowledge needs, users and owners, sources and flows
I3	Codifying knowledge from experts, teams and experienced employees
H1	Promoting knowledge sharing and transfer (best practices, expertise directory, etc.)
H2	Building teams and communities of practice
H3	Promoting creativity and learning
C1	Implementing publication and collaboration systems (portals, groupware, etc.)
C2	Implementing decision support systems (business intelligence, expert systems, etc.)
C3	Implementing knowledge discovery systems (search, data mining, etc.)
S1	Identifying strategic knowledge and developing strategies for KM
S2	Measuring and managing intangible assets (i.e. intellectual capital)
S3	Managing innovation and knowledge creation (R&D, alliances, startups, etc.)

particularly suited to specific perspectives. The list of capabilities were grouped according to six categories – strategic, organizational, knowledge-oriented, technological, interpersonal and personal (Table 4-2). The third section was added to probe on some educational concerns and is not directly linked to the objectives of the survey. We tried to estimate to what extent an education program can develop KM competence and to what extent the concept is universal or context-specific. Finally, the fourth and last section contained questions on respondents' characteristics, like field of study or practice, period of experience, and so on.

Table 4-2: List of typical individual capabilities proposed in the questionnaire

Strategic	
S1	Understanding the organization's environment (market, competitors, etc.)
S2	Understanding the organization's structure and core business processes
S3	Identifying strategic knowledge and providing direction for KM
S4	Developing approaches and strategies to advance KM practices

[16] The codes in the table indicate the perspective to which the activity is more closely associated with. [**In**] stands for Information, [**Hn**] for Human, [**Cn**] for Computing and [**Sn**] for Strategy. Those codes are for analytical purpose and were not presented to respondents.

S5 Evaluating and demonstrating results from KM initiatives
S6 Creating structures and processes for innovation and knowledge creation

Organizational
O1 Understanding the organization's culture and behavior (beliefs, habits, etc.)
O2 Promoting collaboration and creativity
O3 Managing teams and communities
O4 Developing people (coaching, mentoring, etc.)
O5 Initiating and managing organizational change (in structures, processes, etc.)
O6 Managing projects, from planning to execution

Knowledge-oriented
K1 Understanding the varied aspects of knowledge and its processes
K2 Finding, organizing and distributing relevant knowledge
K3 Mapping knowledge needs, sources and flows, owners and users
K4 Designing and managing knowledge repositories
K5 Codifying experience and expertise
K6 Assessing and measuring knowledge

Technological
T1 Understanding the technological infrastructure existing in the organization
T2 Understanding available KM technologies
T3 Using available KM technologies effectively
T4 Assessing needs and recommending KM technologies
T5 Developing and implementing KM technologies
T6 Administrating and maintaining KM technologies

Inter-personal
I1 Communicating effectively in a variety of situations
I2 Leading, influencing and gaining support
I3 Building relationships inside and outside the organization
I4 Collaborating and working in teams
I5 Negotiating and solving conflicts
I6 Handling politics and power relations

Personal
P1 Strongly believes in KM
P2 Initiative and pro-activeness
P3 Creativity and inventiveness
P4 Willingness to reflect and learn from experience
P5 Perseverance and resilience
P6 Trustworthiness and accountability

The questionnaire was extensively discussed with our supervisor and two colleagues. Other colleagues have provided feedback in several occasions. Along the process, we have carried out some major changes in design and many

revisions in the layout and wording of questions. We conducted a pilot test with four potential respondents and made several minor adjustments after the feedback obtained.

4.2.3 Sampling and data collection

The questionnaire was sent out to 84 KM researchers and practitioners. As mentioned before, we aimed at more experienced researchers and practitioners, since they are presumably more knowledgeable about the breadth and depth of the KM field. We also favored individual contact through personalized messages, instead of posting the questionnaire openly, in order to improve both quality and rate of response. We selected potential respondents by convenience: we targeted well-known authors of research papers on KM, faculty members and lecturers of KM degree programs, and high-profile practitioners – speakers in KM conferences, professionals featured in industry publications and prominent participants in KM mailing lists.

We balanced the sample between representatives from academia and industry, and also from each of the four perspectives on KM. Naturally such judgment about potential respondents is subjective and can be disputed, but we made our best effort to keep the sample evenly represented. Individual messages were sent to 84 potential respondents in early March and a follow-up message was sent two weeks later. Some participants forwarded the questionnaire to their acquaintances, and we cannot tell how exactly how many people were reached by it. From the initial 84 contacts, we received 36 responses, which means a response rate of 43%. Other 17 responses were received from forwarded questionnaires, providing 53 responses in total. Next, we present the results obtained.

4.3 Results

We received 53 responses in total, all of them valid and considered in the study. From that total, 28 respondents (53%) were practitioners and 24 (45%) academics, which show a satisfactory balance between perspectives from research

and practice in KM (Figure 4-1). Respondents in the sample were also significantly experienced, with 35 (66%) of them having 7 or more years of study/practice in KM. The majority of respondents concentrated in fields related to organization studies and human resources management (24 respondents or 45%) and computer science and information systems (17 respondents or 32%). The fields suggested in the questionnaire revealed to be quite insufficient to accommodate the diversity of respondents and many of them filled the option 'Others' with their own naming for their fields. Those responses were then reclassified by the author – for instance, the category computer science and information systems also include engineering and business process reengineering, while the category organization studies and human resources management includes education and communication. Those results should therefore be interpreted with care.

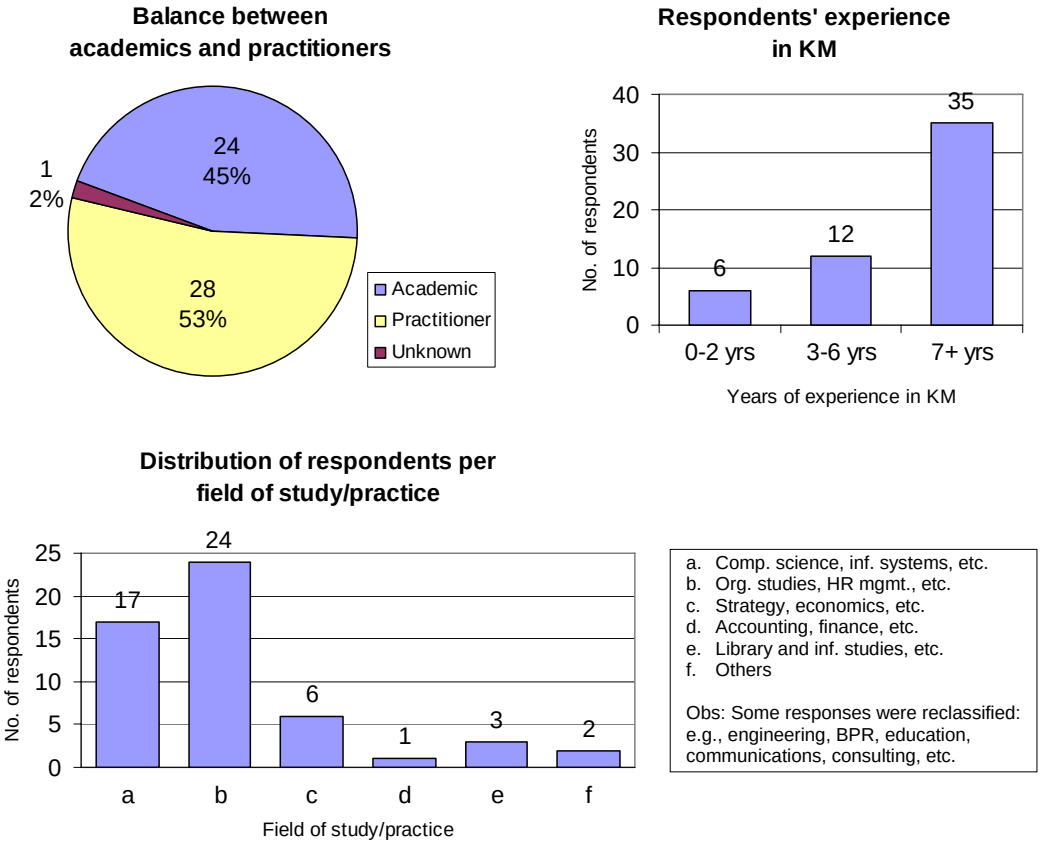


Figure 4-1: Profile of survey respondents (53 responses)

4.3.1 Perspectives on KM according to priority activities

The most important question in the survey asked respondents to choose six priority activities in KM in a list of twelve (see Table 4-1: List of typical KM activities proposed in the questionnaire). As we can see in the aggregate data for this question (Figure 4-2), two activities were considered a priority by more than two thirds of respondents, and three of them by less than one third of respondents. This may be indicative of what the core activities in KM are, or should be. The remainder seven activities were less differentiated, having been selected as a priority by around half the respondents.

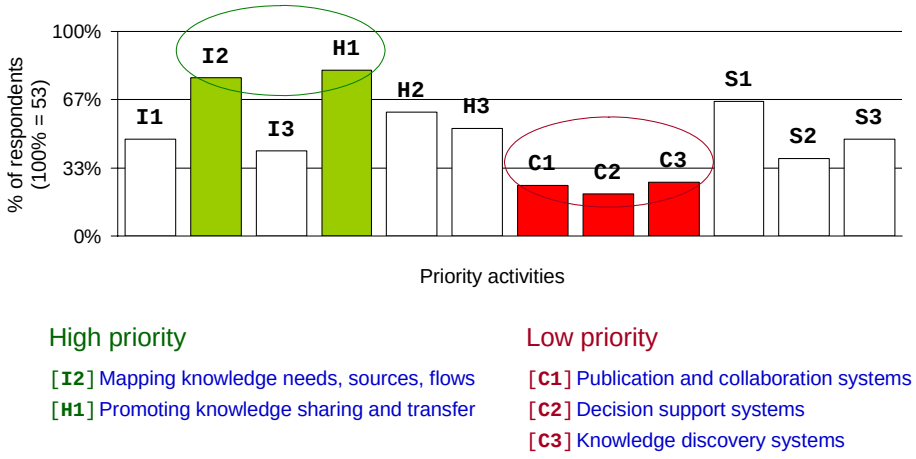


Figure 4-2: Aggregate count of priority activities

Cluster analysis

This question about priority activities was used to group respondents into clusters of similar responses, which were subsequently used to investigate most of the remaining questions. The analytical technique used was cluster analysis, an statistical procedure that measures the distance between individual responses and group the closest ones together. That are many alternative measures of distance and also several methods of grouping similar responses. The critical decision in cluster analysis is the choice of clustering method, since different methods tend to

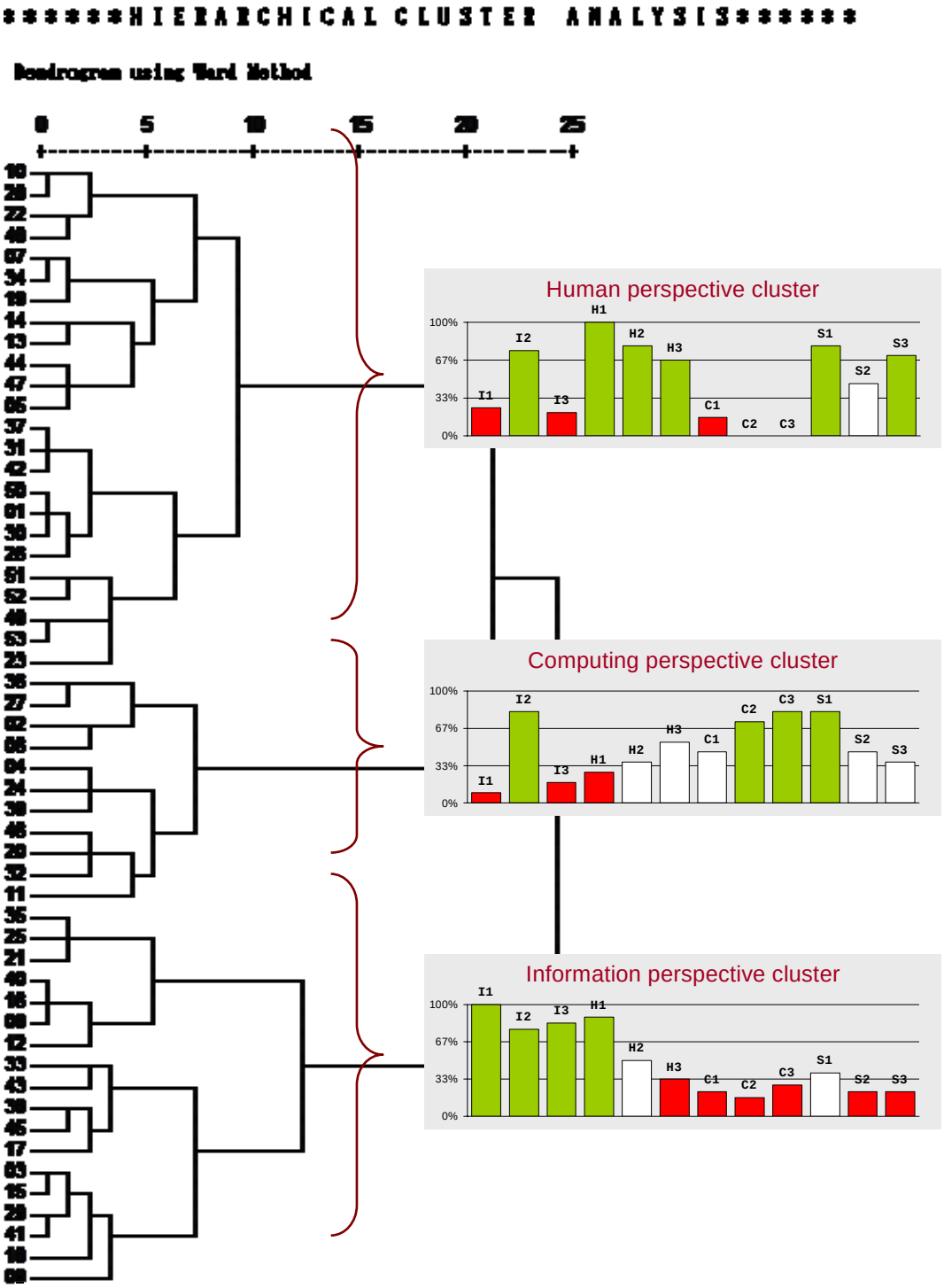


Figure 4-3: Clustering of activity profiles

find different types of cluster structures (Milligan, 1996). The choice of distance measure is also important, since their effectiveness vary according to the type of

data (Finch, 2005). We tested the data with several clustering methods, particularly *complete link*, *centroid* and *Ward*. We found the best results with the Ward method. We also tested the data with several distance measures, particularly *Jaccard*, *Russel/Rao* and *squared Euclidean*. The last one provided the best results. A dendrogram representing the clustering process with the Ward method and squared Euclidean distance measure is shown in Figure 4-3.

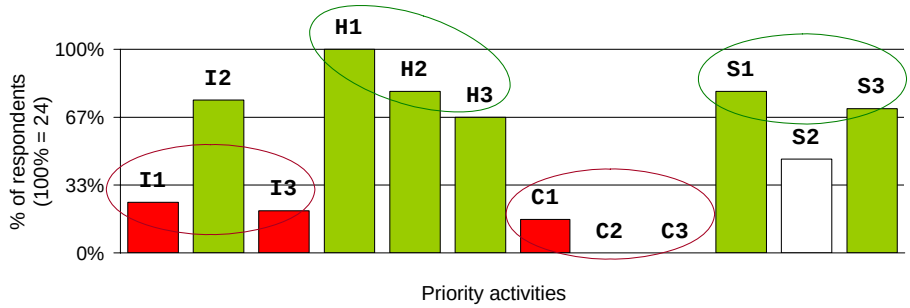
One critical decision in cluster analysis is how many clusters there are in the data. The clusters obtained should maximize internal coherence while maximizing distinctiveness between clusters. In the hierarchical cluster method, which groups data in a sequence of iterations, this basically means to decide at which point to stop the iterations. We considered that the data obtained in our survey could be adequately grouped into three clusters, as seen in Figure 4-3. The three resulting clusters were significantly distinct from each other and maintained a reasonable degree of similarity among responses grouped together, as we describe in the next subsection.

Human perspective cluster

The largest cluster contained 24 respondents, or 45% of the sample. As Figure 4-4 shows, most members of this cluster selected all three activities associated with the human perspective as priorities[17]. Many of them also selected as priorities two of the activities related to the strategy perspective (S1 and S3), and one from the information perspective (I2). A remarkable feature of this cluster is that no member has selected two of the activities associated with the computing perspective (C2 and C3), and the third one (C1) also had a low level of support. In the same way, two of the activities associated with the information perspective (I1 and I3) received a low level of support. The support for all three human-oriented activities and the rejection for the computing-oriented and information-oriented

[17] As a rule of thumb, we considered activities which were selected as priorities by more than two thirds of the members of the cluster as being 'supported' by it. Conversely, activities that were selected by less than one third of members were considered 'rejected' or 'not supported' by the cluster. Activities that ranged in-between – i.e., that were selected by more than one-third but less than two thirds of members – were considered 'neutral'.

ones, which represented objective views of knowledge, suggested us to label this cluster *human-oriented*.



High priority

[I2] Mapping knowledge needs, sources, flows
[H1] Promoting knowledge sharing and transfer
[H2] Building teams and communities of practice
[H3] Promoting creativity and learning
[S1] Developing knowledge strategies
[S3] Managing innovation/ knowledge creation

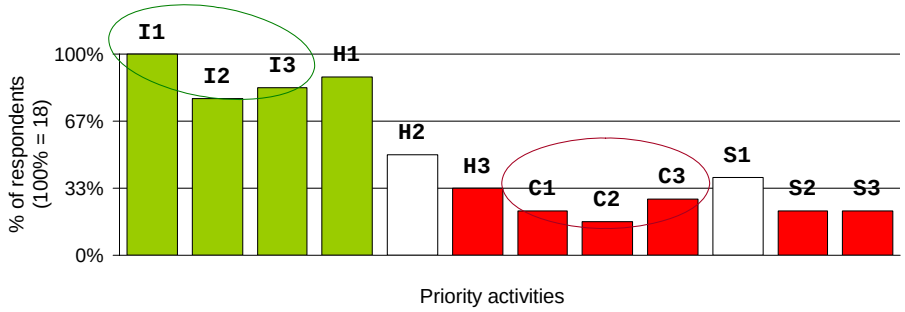
Low priority

[I1] Organizing knowledge in repositories
[I3] Codifying expertise and experience
[C1] Publication and collaboration systems
[C2] Decision support systems
[C3] Knowledge discovery systems

Figure 4-4: Priority activities according to the Human cluster

Information perspective cluster

The second largest cluster contained 18 respondents, or 34% of the sample. As can be seen in Figure 4-5, its members revealed a strong support for all three of the information-oriented activities, along with one of the human-oriented ones (H1). This suggested us to label this cluster *information-oriented*. It is interesting to note that all three computing-oriented activities received low support, which provides evidence that the information and the computing perspectives are indeed distinct. Additionally, strategy-oriented activities also received low support with two them below the one-third threshold (S2 and S3). We can see that activities related to the creation of knowledge (H3 and S3) received low support, which suggests that members of this cluster are mainly interested in the reuse of existing knowledge. This is further confirmed by the low priority received by computing-oriented activities related to knowledge discovery and decision making (C2 and C3).



High priority

[I1] Organizing knowledge in repositories
[I2] Mapping knowledge needs, sources, flows
[I3] Codifying expertise and experience
[H1] Promoting knowledge sharing and transfer

Low priority

[H3] Promoting creativity and learning
[C1] Publication and collaboration systems
[C2] Decision support systems
[C3] Knowledge discovery systems
[S2] Managing intangible assets
[S3] Managing innovation/ knowledge creation

Figure 4-5: Priority activities according to the Information cluster

Computing perspective cluster

The smallest cluster of the sample, and also the one with the lowest internal coherence (i.e., five activities were neither above the two-thirds nor below the one-third levels), contained 11 respondents, or 21% of the sample. This clustered gathered the respondents who favored the computing-oriented activities (C2 and C3)[18], as shown in Figure 4-6, which led us to label it *computing-oriented*. Members of this cluster showed a low support for information-oriented activities (I1 and I3, with I2 being an exception), which confirms our proposition that those two perspectives are distinct. Surprisingly to us, one strategy-oriented activity (S1) received strong support, as did one of the information-oriented activities (I2). In the discussion section we seek explanations for this finding.

[18] The other activity we listed as computing-oriented (C1, implementing publication and collaboration systems) was not actually representative of that perspective, as we realized later. At the time we designed the questionnaire, our understanding of the computing perspective concentrated on technological aspects of KM, an idea that the survey results do not support.

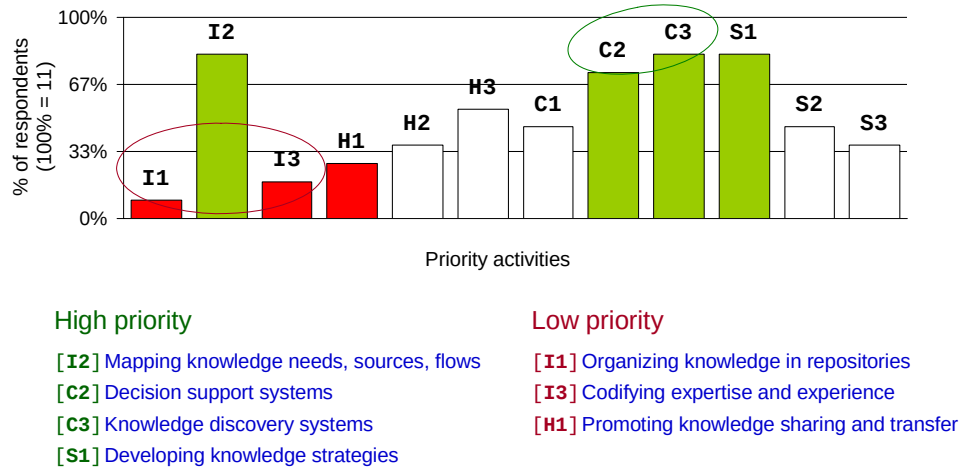


Figure 4-6: Priority activities according to the Computing cluster

Finally, Figure 4-7 shows some characteristics of respondents from each cluster. Expectedly, we can notice a predominance of people in fields related to organization studies in the human-oriented cluster, and to computer science in the computing cluster. Perhaps the most interesting feature is the high proportion of people with shorter experience in KM in the information-oriented cluster, compared to the other two.

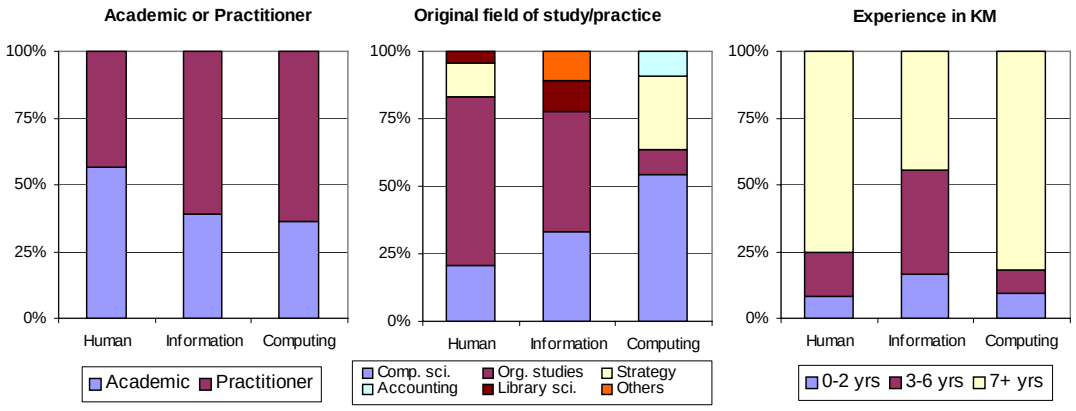


Figure 4-7: Profile of respondents according to cluster

4.3.2 Relevant capabilities according to perspectives on KM

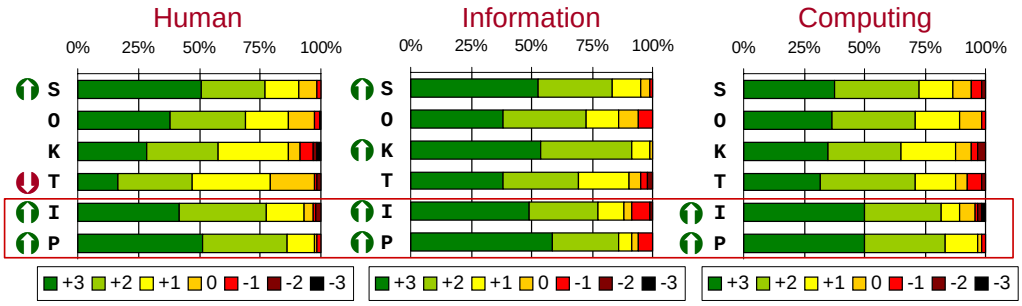
Section 2 of the questionnaire asked respondents to rate each of 36 capabilities (see Table 4-2: List of typical individual capabilities proposed in the questionnaire) between +3 (totally important) and -3 (totally unimportant), according to their importance for effective performance in the activities chosen in Section 1. We noticed that, in general, respondents were strongly approving of the capabilities listed. The aggregate average rating (of all capabilities, by all respondents) was +2.0, with 90% of responses in the positive side (+3: 42%, +2: 32% and +1: 16%). Although this might be encouraging, we interpreted it as a bias in the responses, and sought for a more adequate way to carry out the analysis. We developed a rule of thumb that helped to differentiate the responses and provided important insights from the responses. Although not statistically rigorous, this method provided a good indication of trends in how respondents interpret the concept of KM competence.

In order to facilitate analysis, each capability was classified into 'supported' (indicated with), 'rejected' (indicated with) or 'neutral' (blank), according to the following criteria:

1. Supported, if:
    a. the proportion of +3 and +2 responses were above 75%; or
    b. the proportion of +3 responses were above 50%.
2. Rejected, if:
    a. the proportion of +3 and +2 responses were below 50%; or
    b. the proportion of +3 responses were below 25%; or
    c. the proportion of -1, -2 and -3 responses were above 12%.
3. Neutral if none of the above.

According to that criteria, the approval of capabilities is not so evident as initially suggested. Figure 4-8 shows the aggregate rating of capabilities in each category, according to the combined responses from each of the three clusters. We can say that respondents from all clusters supported inter-personal and personal capabilities in general. Beyond that, only strategic capabilities were supported by those from the human- and information-oriented clusters and knowledge-oriented

capabilities by those from the information-oriented cluster. Organizational and technological capabilities in general were considered neutral, with the exception of technological capabilities being rejected by respondents from the human-oriented cluster. Also, we noticed that except for inter-personal and personal capabilities, respondents from the computing-oriented cluster were neutral towards all capabilities and those from the human-oriented cluster supported only the strategic ones.



S: Strategic, **O**: Organizational, **K**: Knowledge-oriented, **T**: Technological, **I**: Inter-personal, **P**: Personal

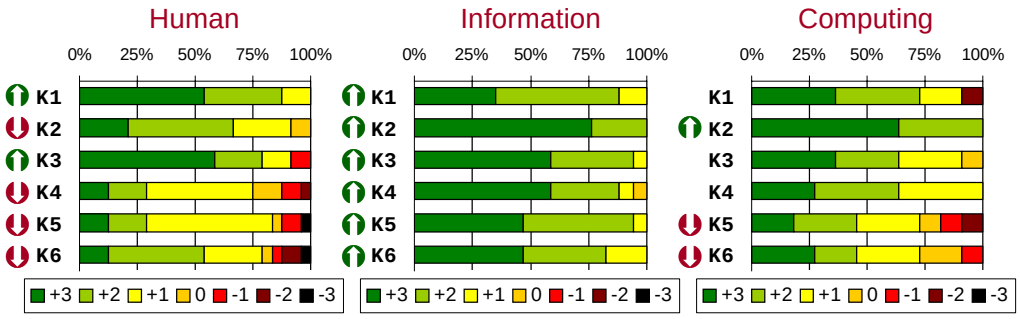
Figure 4-8: Aggregate importance of capability categories for each of the clusters

We now provide a more detailed account on how each capability was rated by members in each cluster, starting with the knowledge-oriented and technological ones, where the differences were more revealing.

Knowledge-oriented capabilities

Starting with the knowledge-oriented capabilities, we noticed that the information-oriented cluster supported all of them (Figure 4-9). The human-oriented cluster, however, rejected all but two (K1 and K3), and the computing-oriented rejected two (K5 and K6) and remained neutral in other three (K1, K3 and K4). This suggests that, while the capabilities listed may be well accepted and valued by people with an information-oriented perspective on KM, several of them are not relevant for those with either a human- or

computing-oriented perspective. It is important to note that this does not mean that human- or computing-oriented perspectives do not value the so-called knowledge-oriented capabilities. This only indicates that they do not consider relevant those capabilities we suggested under this label; eventually, other capabilities may be suggested under this category that have appeal to those perspectives.



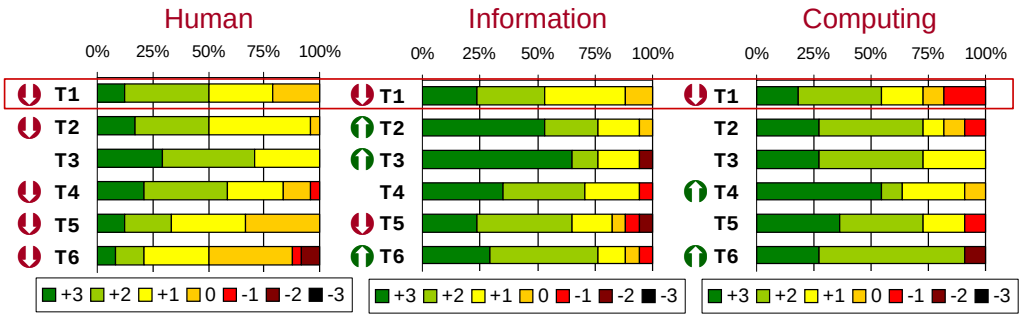
K1 Understanding the varied aspects of knowledge and its processes
K2 Finding, organizing and distributing relevant knowledge
K3 Mapping knowledge needs, sources and flows, owners and users
K4 Designing and managing knowledge repositories
K5 Codifying experience and expertise
K6 Assessing and measuring knowledge

Figure 4-9: Knowledge-oriented capabilities

Technological capabilities

The obvious finding about technological capabilities is the aversion of the human-oriented cluster for them: it rejects all but one (T3), about which it remains neutral (Figure 4-10). The information-oriented cluster, in contrast, supports three of them (T2, T3 and T6) and the computing-oriented two (T4 and T6). The relevance of technological capabilities for those clusters, however, need to be qualified. Results suggest that those with an information-oriented perspective on KM see themselves as users (T3) or, at most, administrators (T6) of technological tools, but not as developers or implementers (T5). The data from the computing-oriented cluster surprised us for their relative lack of support for

technological capabilities, which we initially strongly associated with the perspective they represent. The data suggests that they see themselves mostly as recommenders (T4) of technological tools, or maybe administrators (T6).

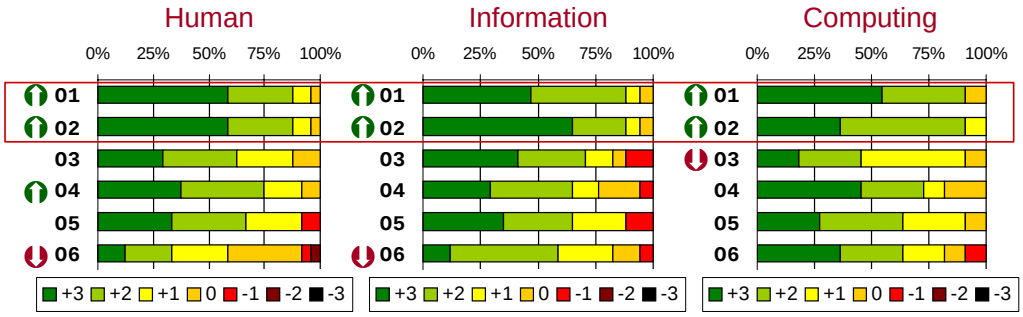


T1 Understanding the existing technological infrastructure
T2 Understanding available KM technologies
T3 Using available KM technologies effectively
T4 Assessing needs and recommending KM technologies
T5 Developing and implementing KM technologies
T6 Administrating and maintaining KM technologies

Figure 4-10: Technological capabilities

Organizational capabilities

Regarding what we labeled organizational capabilities, the importance of understanding the organization's culture and behavior (O1) and promoting collaboration and creativity (O2) was made clear with the support for them by all clusters (Figure 4-11). The major surprise comes from the human-oriented cluster, which remained neutral or rejected the other capabilities, with only a questionable support for developing people (T4). The same happened in the case of the information- and computing-oriented clusters, which made us question if the capabilities listed are actually relevant for KM competence. Again, this lack of support does not mean that so-called organizational capabilities are unimportant. It merely indicates that either the capabilities suggested are not the right ones, or that they were stated in the wrong way. Anyway, this is an issue to be further investigated.

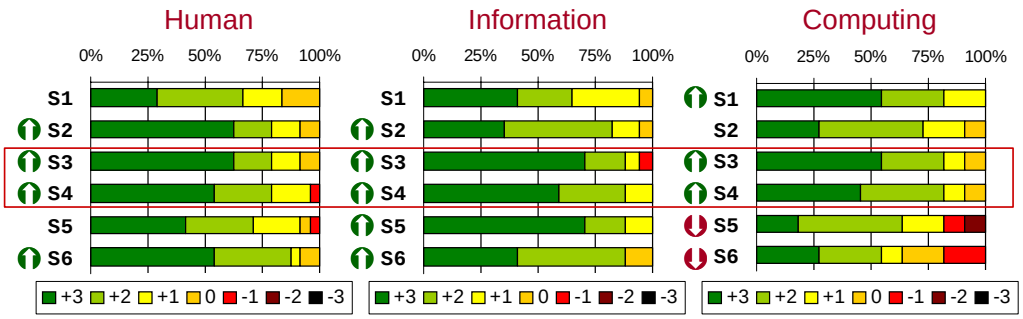


01 Understanding the organization's culture and behavior
02 Promoting collaboration and creativity
03 Managing teams and communities
04 Developing people
05 Initiating and managing organizational change
06 Managing projects, from planning to execution

Figure 4-11: Organizational capabilities

Strategic capabilities

The importance of some strategic capabilities is stressed here, with the identification of strategic knowledge (S3) and the development of strategies to advance KM (S4) being supported by all clusters (Figure 4-12). A surprising result is the support from the information-oriented cluster for most of the suggested capabilities, in contrast with their choice of priority activities which neglected those associated with the strategy-perspective (see Figure 4-5). This suggests that strategic *capabilities* may be unrelated to strategy-oriented *activities* as they were proposed in this study, despite the similarity in their naming. Another interesting result is the support from the computing-oriented cluster for understanding the organization's environment (S1). This contrasted with our assumption at the time the survey was conducted that the computing-oriented perspective was strongly related to the use of technology and thus mostly inattentive to strategic issues.

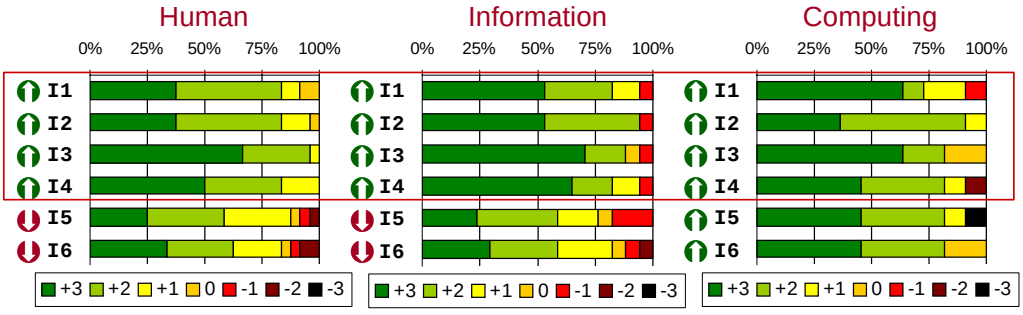


S1 Understanding the organization's environment
S2 Understanding the organization's structure and core processes
S3 Identifying strategic knowledge and providing direction for KM
S4 Developing approaches and strategies to advance KM practices
S5 Evaluating and demonstrating results from KM initiatives
S6 Creating structures and processes for innovation/knowledge creation

Figure 4-12: Strategic capabilities

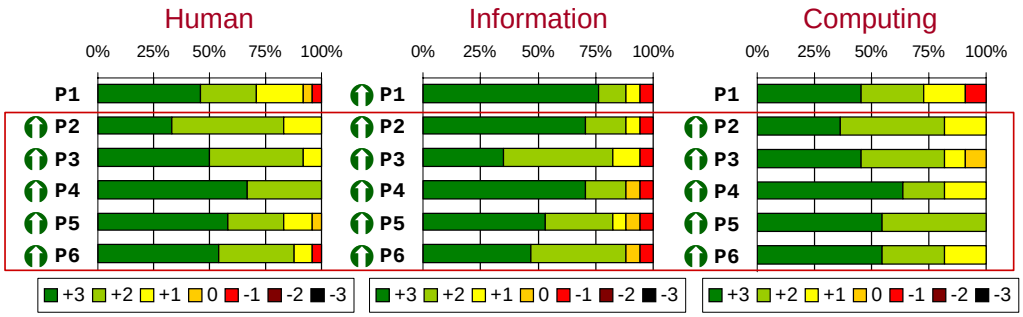
Inter-personal and personal capabilities

The inter-personal and personal capabilities are notable for the wide support they received from all clusters (Figure 4-13 and Figure 4-14). This is understandable, since they are very generic in nature and not related exclusively to KM. A very unexpected result for us, however, is the rejection by the



I1 Communicating effectively in a variety of situations
I2 Leading, influencing and gaining support
I3 Building relationships inside and outside the organization
I4 Collaborating and working in teams
I5 Negotiating and solving conflicts
I6 Handling politics and power relations

Figure 4-13: Inter-personal capabilities



P1 Strongly believes in KM
P2 Initiative and proactiveness
P3 Creativity and inventiveness
P4 Willingness to reflect and learn from experience
P5 Perseverance and resilience
P6 Trustworthiness and accountability

Figure 4-14: Personal capabilities

human-oriented cluster for conflict- and power-related capabilities (I5 and I6). We understand that most of the attention of the KM literature is focused on collaboration and knowledge sharing, but we assumed that conflict is intrinsic to organizational settings. Naturally, we expected that those with a human-oriented perspective on KM would acknowledge that.

4.3.3 Summary of findings

The most important result from the survey is that we had evidence of three of the suggested perspectives on KM. We found three clusters that adequately grouped similar choices on priority KM activities, and labeled them human-, information- and computing-oriented clusters for their correspondence with those perspectives. The human-oriented cluster, the largest one, favored activities related to collaboration and communication (+H1, +H2) and privileged creativity and innovation (+H3, +S3), disregarding activities related to more objective forms of knowledge (–I1, –I3, –C2, –C3). The information-oriented cluster highlighted the management of content (+I1) and the reuse of existing knowledge (+I3, +H1, -H3), not showing concern over the strategic use of knowledge (–S2, –S3) and, interestingly, over the use of technology too (–C1, –C2, –C3). The

computing-oriented cluster, the smallest and least homogeneous one, emphasized knowledge use and creation by advanced computational methods (+C2, +C3) and strategic thinking about knowledge (+S1), neglecting the management of content (–I1, –I3) and knowledge sharing and transfer (–H1).

Another important result is that we identified different patterns of preference for the KM capabilities suggested as relevant for KM. In general, capabilities under the strategic category (Sn) were well accepted by those in the human- and information-oriented clusters; capabilities under the knowledge-oriented category (Kn) were strongly supported by those in the information-oriented cluster; and capabilities under the technological category (Tn) were clearly rejected by those in the human-oriented cluster. A more detailed analysis, however, indicated that the suggested capabilities were in most cases appropriate for those in the information-oriented cluster, but not so much for those in the computing-oriented and even less for those in the human-oriented cluster. This suggests that these two perspectives would indicate capabilities other than those proposed in the questionnaire as more relevant for KM competence.

The last significant result is that there were indeed some elements common to all perspectives. One KM activity, *mapping knowledge needs, users and owners, sources and flows* (I2), were considered a priority in all clusters. Two other activities, on the contrary, were considered a priority by none of the clusters. Surprisingly, *implementing publication and collaboration systems* (C1) were not a priority in neither the computing-oriented nor the information-oriented cluster, and *measuring and managing intangible assets* (S2) were also overlooked by all. Regarding KM capabilities, two from the strategic category and two from the organizational one were widely supported by all. Among the strategic ones, *identifying strategic knowledge and providing direction for KM* (S3) and *developing approaches and strategies to advance KM practices* (S4) were considered relevant by all clusters. Among the organizational ones, *understanding the organization's culture and behavior* (O1) and *promoting collaboration and creativity* (O2) were considered important by all. Moreover, due to their generic

nature, capabilities suggested under the categories inter-personal (In) and personal (Pn) were also supported by all.

4.4 Implications

We now discuss three issues raised by the major findings: the absence of the strategy-oriented perspective, the essence of the perspectives, and the relationship between perspectives, activities and capabilities.

4.4.1 Explaining the missing strategy-oriented perspective

The most critical question we need to answer about our findings is: why there was no cluster representing a strategy-oriented perspective on KM? We have considered three possible explanations. The first is that researchers and practitioners with such a perspective on KM are quite small, if compared to those with other perspectives. Being small in number, the eventual representatives that did take part in the survey were too few to form a cluster of their own and were diluted among the other clusters. In that case, a larger and better sample can eventually be able to isolate them in a distinct cluster.

Another alternative explanation is that either the activities we have chosen to represent such a perspective or the wording we used to describe them were inadequate. Thus, although there were enough respondents with a hypothetical strategy-perspective on KM, the questionnaire failed to identify them because the options listed did not reflect their particular understanding of KM. Indeed, as we mentioned before, two of the suggested activities were selected by none of the clusters as priority, one of them expectedly representing the strategy-oriented perspective. In that case, a questionnaire listing KM activities that better represent that perspective can succeed in obtaining a separate cluster.

A third possible explanation is more complex, but, in essence, it implies that such a perspective on KM actually do not exist. Let us clarify what we mean. There are indeed researchers and practitioners who focus on issues we identified with a strategy-oriented perspective on KM: development of organizational

capabilities, innovation management and organizational knowledge creation, knowledge-based business strategies, and so on. The problem is that, although their work is seen by those from the other three perspectives as part of the KM field, they themselves understand KM as something limited to those three perspectives and do not include their own work in what they call KM. In other words, although such work do exist, they authors do not label it KM and do not consider themselves to be KM researchers or practitioners. In fact, in at least two cases, survey participants whom we expected to show a strategy-oriented view of KM submitted questionnaire with quite a different profile. This may have happened in a number of cases significant enough to exclude such a perspective from the data. If this is the case, the results obtained can be taken as valid.

4.4.2 Refining the characteristics of perspectives on KM

A second major implication from the survey results is the refinement of our understanding of each perspective and a better identification of appropriate activities and capabilities. We recognize that the definition of some perspectives were problematic when we conducted the survey. For instance, we related the computing-oriented perspective mostly to the use of technology. This assumption is shown in the list of KM activities chosen to represent it, which all used the word ‘systems’ in their description. Also, by considering basically the use of technology, we mistakenly associated the implementation of publication and collaboration systems with it, which the survey results clearly showed to be a mistake.

A proper understanding of the human perspective was also lacking, which is reflected on the poor support received for capabilities expectedly reflecting its understanding of KM. At the time the questionnaire was developed, we associated it basically with collaboration, knowledge sharing and communities of practice. Although such ideas are indeed related to a human-oriented perspective on KM, its essence is much deeper and subtler. We believe that – hopefully with a better understanding of it – capabilities like cultivating different types of *ba*, recognizing and understanding existing social networks, and connecting and integrating

distinct groups and communities, for instance, would have a stronger appeal to those with a human-oriented perspective on KM.

4.4.3 Relating perspectives, activities and capabilities

The last implication we want to discuss derives from the analysis of elements common to all perspectives. This have led us to revise some assumptions in our model of KM competence. First, we examine the relationship between perspectives on KM and KM activities. According to our model, one perspective naturally involves many activities. However, the survey findings suggest that one activity may also be interpreted according to several perspectives. In other words, if considered just by itself, the activity does not necessarily indicate the perspective on KM adopted. Take for instance the activity *mapping knowledge needs, users and owners, sources and flows* (I2), which was selected as priority by all clusters. At first sight, it might suggest that it is an activity that all activities consider relevant. But further thought, based on a deeper consideration on the assumptions of each perspective, suggests different scenarios for each of them. For instance, for those with a human-oriented perspective, that activity would probably emphasize the people who know or who need to know something, and such mapping might be accomplished through something akin to a social network analysis. For those with an information-oriented perspective, it would emphasize the information needs and potential sources for them, which would involve an instrument like, for instance, an information audit. And for those with a computing-oriented perspective, it would emphasize the topics and domains of knowledge and expertise available, and a tool likely to be used is ontologies. As we can see, the same description can be translated into very different activities. Which implies that the activity description itself, generic as it may be, does not directly define which perspective is being adopted.

Second, we review the relationship between capability categories and perspectives. The survey results suggest that categories used to group similar types of capabilities are also not directly related to perspectives on KM. When we initially grouped the capabilities under those labels, there was an arguable

relationship between them and the four perspectives. That is, the strategic capabilities involved many of those particularly suited for the strategy-oriented perspective; organizational capabilities, those particularly suited for a human-oriented perspective; knowledge-oriented ones, those particularly suited for an information-oriented perspective; and technological ones, those particularly suited with a computing-oriented perspective. This reasoning proved incorrect, as the case of strategic capabilities shows us. They were strongly supported by respondents in the information-oriented cluster, who, at the same time, regarded all the activities associated with a strategy-oriented perspective as a low priority. In other words, they valued strategic *capabilities* even though they were not concerned with strategy-driven KM *activities*.

And third, we examine the relationship between the capability categories and the capabilities it refers to. Our findings suggest that the category label provides little clue of the source of competence; it is the particular set of capabilities grouped under such a label that actually matters. In the survey, rejection for the capabilities listed under a category does not imply a rejection for the category in general – i.e., for all probable capabilities in it. For example, the computing-oriented cluster supported only one knowledge-oriented capability, was neutral towards other three, and rejected the remaining two. This might lead one to think that the computing-oriented cluster was indifferent to that category of capabilities, which is probably not true. The results might be different if we considered capabilities like, for instance, organizing knowledge into ontologies, using data mining techniques to discover knowledge, or building computational models of systems and processes. In the same way, the human-oriented cluster supported three of the organizational capabilities, but was neutral towards two – including managing teams and communities (O3) and initiating and managing organizational change (O5) – and rejected one. Again, the results might be different if we considered capabilities like those cited a few paragraphs earlier in this section, which could be reasonably grouped under the organizational capabilities category. In short, the results suggest that each perspective may translate capability categories in very particular ways.

4.5 Summary of the chapter

This chapter described the results of survey of KM researchers and practitioners carried out to validate key elements of the proposed model of KM competence. Its most important finding is a confirmation of the existence of distinct perspectives on KM. We identified and characterized KM competence profiles based on an information, a human, and a computing orientation towards KM. However, there was weak evidence of a strategy-oriented perspective on KM. We suggested that representatives of such an orientation towards KM are indeed small relative to others because, although influential and highly cited in the field, they are not as committed to KM and may prefer to be identified with other disciplines.

Two other significant findings are, first, that distinct KM perspectives do indicate different combinations of activities and capabilities and, second, that there is indeed a small set of capabilities that are considered relevant in all three perspectives. However, unexpected results in the selection of capabilities and further consideration of their theoretical implications prompted us to make three important refinements in the model.

First, we revised the initial descriptions of the human and the computing perspectives. The human-oriented had initially a strong managerialistic tone (e.g., ‘managing’ teams and communities, instead of cultivating or facilitating them), and the computing-oriented was too closely associated with the use of technology. Their characterizations were refined to include such findings.

Second, we contextualized the meaning of the proposed capability categories. For instance, the low level of support for organizational capabilities by the human perspective, or for knowledge-oriented capabilities by the computing perspective do not necessarily mean that they consider them less relevant. It may simply indicate that the specific capabilities listed under such labels are not those of particular significance for them.

And third, we realized the need to complement the list of capabilities with others more appropriate for the human and computing perspectives. In general,

the list was well accepted by those with an information perspective, but not as much by those with a human or computing perspective. In retrospect, that makes much sense, since many of the previous studies on KM competence, from which we took most of the initial capabilities that furnish the model were guided by an information-oriented perspective.

Chapter 5: KM Competence in Graduate KM Education

5.1 Introduction

In the previous chapters, we introduced a model of KM competence describing it as a particular combination of corresponding KM activities and capabilities, and confirmed that specific KM perspectives determine the way they are defined. In this chapter we seek to refine the model by investigating what kind of competence is being developed in current graduate KM education.

We start with an overview of KM education, describing current alternatives for those seeking instruction in the field and justifying our choice to focus on master's programs. Next, we explain the study design, including data collection and analytical methods, and detail the main results, reported according to the original field of the school or department offering the program. Finally, we discuss some major implications, commenting upon the biased approach of existing programs and the challenges for future development.

5.2 Overview of KM education

Before deciding to focus on master's programs in KM, we carried out a survey of current KM education to explore the alternatives available to those seeking instruction in the field. In November 2004, we compiled an initial list of programs from previous studies on KM education (Al-Hawamdeh, 2003; Ruth, 2003; Srikantaiah, 2004). There were references to a total of 46 graduate programs in knowledge management. Among these, 16 were not accessible and 4 had information available, but were not being offered anymore. We remained with 26 programs offered regularly, 2 at the doctoral level, 21 at the master's, and 3 at the diploma (Table 5-1).

Table 5-1: List of KM programs compiled in November 2004

	Regularly offered	Not accessible	Offered once	Total
Doctoral	2			2
Master's	21			21
Diploma	3			3
Total	26	16	4	46

Along the period of this study (2005-2006), we have conducted searches for additional programs in several occasions, using variations of the phrase ("knowledge management" OR KM) AND (master OR MSc OR M.Sc. OR M.A. OR doctoral OR doctorate OR PhD OR Ph.D.) in Google. We have also received several indications from friends and colleagues, and also found some by happenstance. Additionally, we have also collected information on training certifications in KM, usually offered by commercial organizations and with a clear practical purpose. In September 2006, we had identified a total of 4 doctoral programs, 40 master's, 6 diplomas, 1 bachelor's and 10 certifications (Table 5-2).

Table 5-2: Education and training in KM, offered in English, according to type of program

	US	UK	Australia	HK	Other	Total
Doctoral	2				2[a]	4
Master's	14	12	6	2	6[b]	40
Diploma	1	2	2		1[c]	6
Bachelor's			1			1
Certification	4	1		2	3[d]	10

Obs.: Data last checked in September 2006.

a: Japan, international consortium
b: Canada, Germany, Italy, Ireland, South Africa, Singapore
c: Taiwan
d: Austria, Netherlands, Sweden

We decided to focus on master's degrees only, because they usually address a broader and deeper content, if compared to certificate and diploma programs, and have a more established and consistent curriculum, if compared to doctoral

programs. Among the 40 master's programs identified, 28 were dedicated to KM, with the totality or majority of courses related to the subject, and 12 were degrees in other fields with KM as an area of concentration. Library and information science schools/departments were the most active in KM education, offering 14 of the programs. Those from computer science and information systems came second, with 11, and those from management, business and public administration third, with 8 programs. KM education is also being offered by engineering and education schools/departments, with 4 and 3 programs respectively (Table 5-3).

Table 5-3: Master's programs in KM according to field of coordinating school/department

	Master's in KM	Concentration in KM	Total
Library and information science	11	3	14
Computer science, information systems	7	4	11
Management, business, public administration	4	4	8
Engineering	3	1	4
Education	3	n/a	3
Total	28	12	40

Those programs vary significantly in structure and teaching mode. The duration range from two semesters to three years; attendance may be full-time or part-time; there are programs offered on campus, on line, or as a combination of both; classes may be concentrated in certain periods or distributed evenly along the semester; and course sequence may be chosen individually or must be followed in groups, in a cohort mode.

5.3 Analysis of master's programs in KM

5.3.1 Research design

In this study we sought to surface the assumptions on KM competence implicit in the curricula of master's programs in KM. We analyzed programs' objectives, structure, contents and teaching methods in order to infer the presumed

ideas about the nature of KM, its functions and activities, and the capabilities needed to perform it well.

Data collection

The core data used in the analysis were the programs' descriptions (objectives, organization, topics covered, delivery mode, duration, audience, requirements, etc.) and individual courses' information. We collected syllabuses whenever possible; they provided rich details about the course's goals, structure, contents, teaching methods, assignments, and reading material, among other things. When they were not available, we carried out the analysis based on the course descriptions usually provided in programs' brochures and other information material. All information used in the study is publicly available through the Internet.

Besides programs' descriptions and courses' syllabuses and summaries, we also gathered additional information to clarify the programs' context and background. Since the surfacing of hidden assumptions is not straightforward, we complemented data from each program with information about the institution and its structure (size, age, academic divisions and units, geographic distribution, etc.), the particular unit coordinating the program (faculty members, main research lines, programs offered, etc.), and eventual units collaborating in the program. All this provided valuable contextual information for the analysis of programs' curricula.

Analytical framework

In essence, the curriculum analysis of each program sought to answer these two questions: 1) which KM perspectives have guided the development of this program?, and 2) what kind of capabilities this program intends to develop?

We used KM perspectives as proxy for KM activities. As we have discussed previously, the KM perspective define the scope of the KM activity, or what is supposed to be performed under the guise of KM. It is implicit in the KM perspective a particular understanding of the roles and tasks associated with KM. Since there is a close correspondence between particular KM perspectives and

typical KM activities, we adopted the former as a shortcut to refer to the activity set element of our model of KM competence. Thus, for each course that comprises a given program, we assessed the correspondence between its contents/objectives and each of the four KM perspectives. The code used was:

0) Unidentified correspondence with this KM perspective
1) Moderate correspondence
2) Close correspondence

We also sought to identify what kind of capabilities each course was designed to develop. In a similar way, we used the six categories proposed in our model of KM competence (strategic, organizational, knowledge-oriented, technological, inter-personal, and personal) as a proxy to a cluster of related capabilities. It is important to keep in mind that those categories may be interpreted differently according to each KM perspective (actually this seems to be more often the case than the exception, as the survey in chapter 4 suggested). Again, we assessed to which extent each course supported the development of capabilities in each of the six categories. A similar code was used:

0) Unperceived relevance for developing capabilities in this category
1) Some relevance
2) Significant relevance

Table 5-4 illustrates how those criteria were used, showing the list of courses of a given program, whether syllabuses or summaries were used, and the code for each KM perspective and capability category.

Table 5-4: Example of curriculum analysis associating individual courses and KM perspectives and capabilities

Course title	Data	KM perspect.				KM capabilities					
		I	H	C	S	S	O	K	T	I	P
Knowledge Management: Philosophy and Roles	syl	2	2	0	2	2	2	2	1	0	0
Information Studies	syl	1	0	0	0	0	0	2	0	0	0
Knowledge Management: Tools and Technology	sum	1	0	1	0	0	0	0	2	0	0
The Business Context of HR Management	syl	0	1	0	0	0	2	0	0	0	0
Knowledge Management Systems	syl	1	0	2	0	0	0	0	2	0	0
Technology and Culture	syl	1	0	0	0	0	0	2	0	0	0
Research Methods	syl	0	0	0	0	0	0	2	0	0	0

Analyzing courses' syllabuses and summaries revealed to be a challenging and time-consuming task. Syllabuses varied from short one-page descriptions to several-page detailed accounts of course's content and dynamics. Summaries varied in length, accuracy, and even in meaningfulness. We looked for major topics and issues covered in each course, seeking to identify what kind of KM activity were being support and what kind of capability was trying to be developed. In many situations, available data was not adequate for an appropriate judgment.

5.3.2 Results

We analyzed 242 courses from 25 programs; we could not obtain course data from 3 of the master's, one from a LIS school and two from CS/IS schools. Results were strongly dependent on the quality of available material, so we indicate in Table 5-5 the proportion of analyses carried out based on syllabuses or summaries.

Table 5-5: Type of material used in curricula's analysis

	syllabus	**summary**	**none**	**total**
LIS	5	5	1	11
CS/IS	3	2	2	7
Management	3	1		4
Engineering	3			3
Education	1	2		3

We found a high level of similarity in programs from schools in the same field, especially in LIS and CS/IS, so their analysis was carried out together – which means that those programs were analyzed one right after the other. Figure 5-1 shows the aggregate KM competence profile of programs in the same field. LIS- and education-based programs tended to emphasize an information-oriented perspective, CS/IS- and engineering-based ones a computing orientation, and management-based ones, a human-oriented perspective.

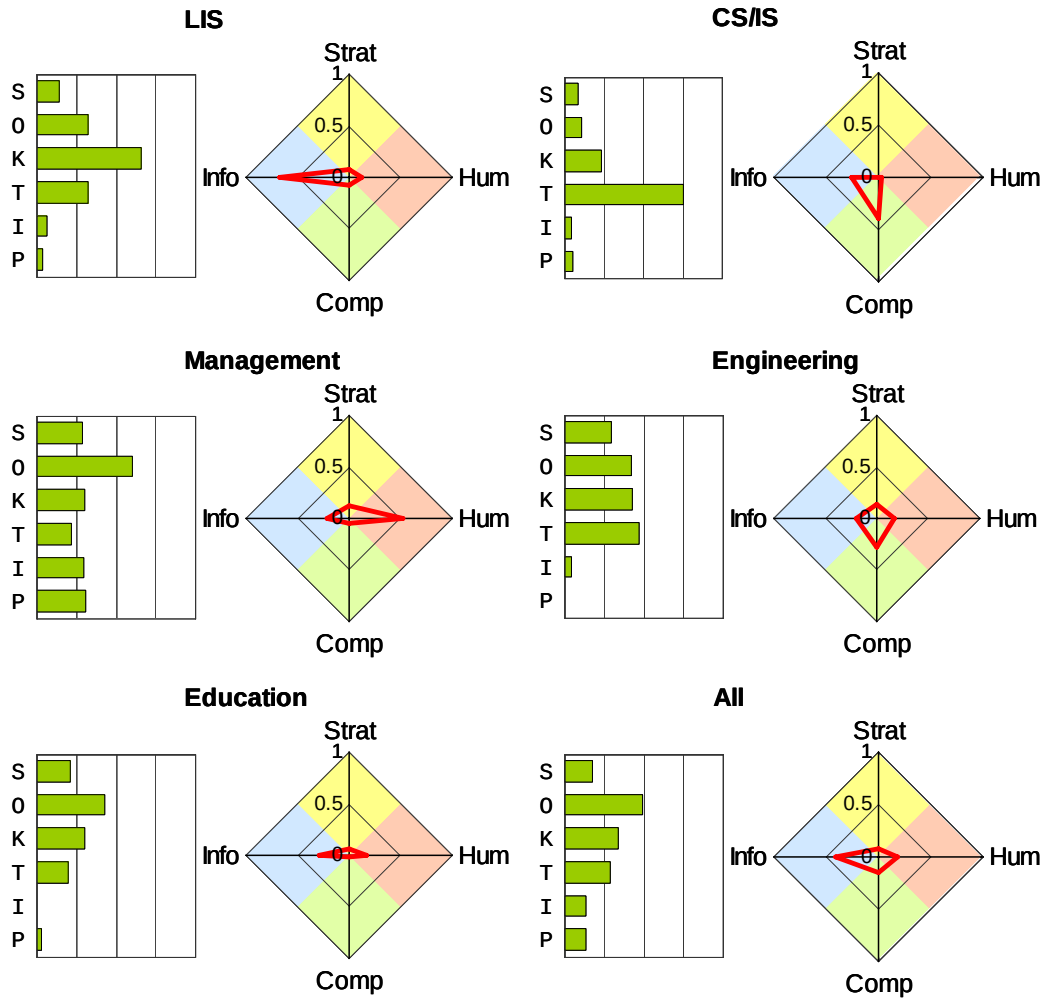


Figure 5-1: KM competence profiles in master's programs in KM, according to the field of coordinating school/department

KM programs coordinated by LIS schools and departments were the most numerous: 11 in a total of 28, or roughly 1/3. LIS schools have built on their tradition on information management to develop programs with a strong information-oriented perspective on KM (Figure 5-2). Typical topics taught in those programs include: information organization and architecture; user information needs and behavior; information access and retrieval; information sources; information policy; document and records management; competitive intelligence.

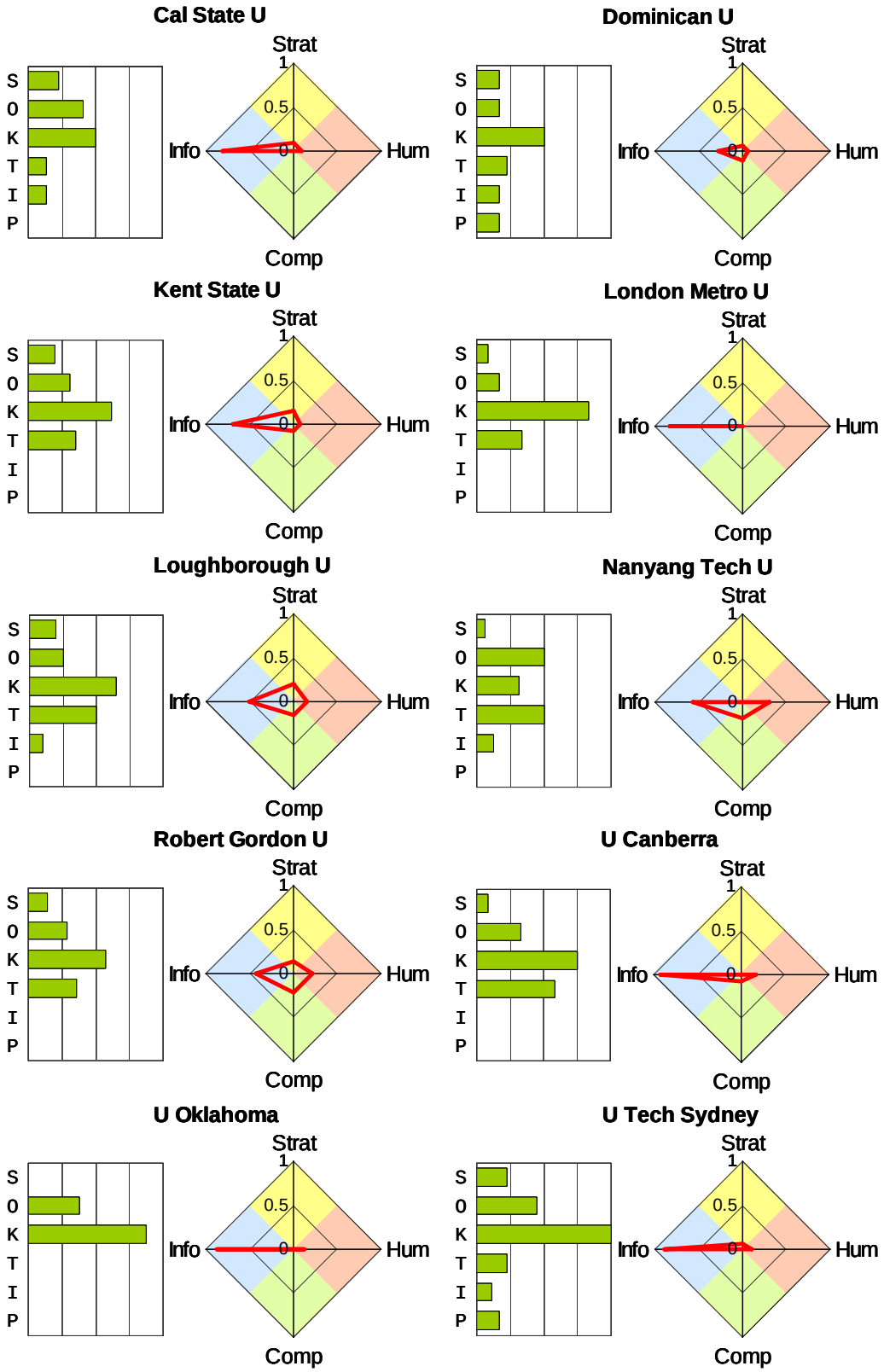


Figure 5-2: KM competence profiles in LIS-based programs

CS/IS-based programs were the second largest: 7 in a total of 28, or 1/4. CS/IS schools based on their background on information systems and knowledge engineering to develop programs emphasizing a computing-oriented perspective on KM (Figure 5-3). Topics covered include: database management and applications; knowledge discovery and data mining; systems analysis, design and development; knowledge representation and reasoning; enterprise and management systems.

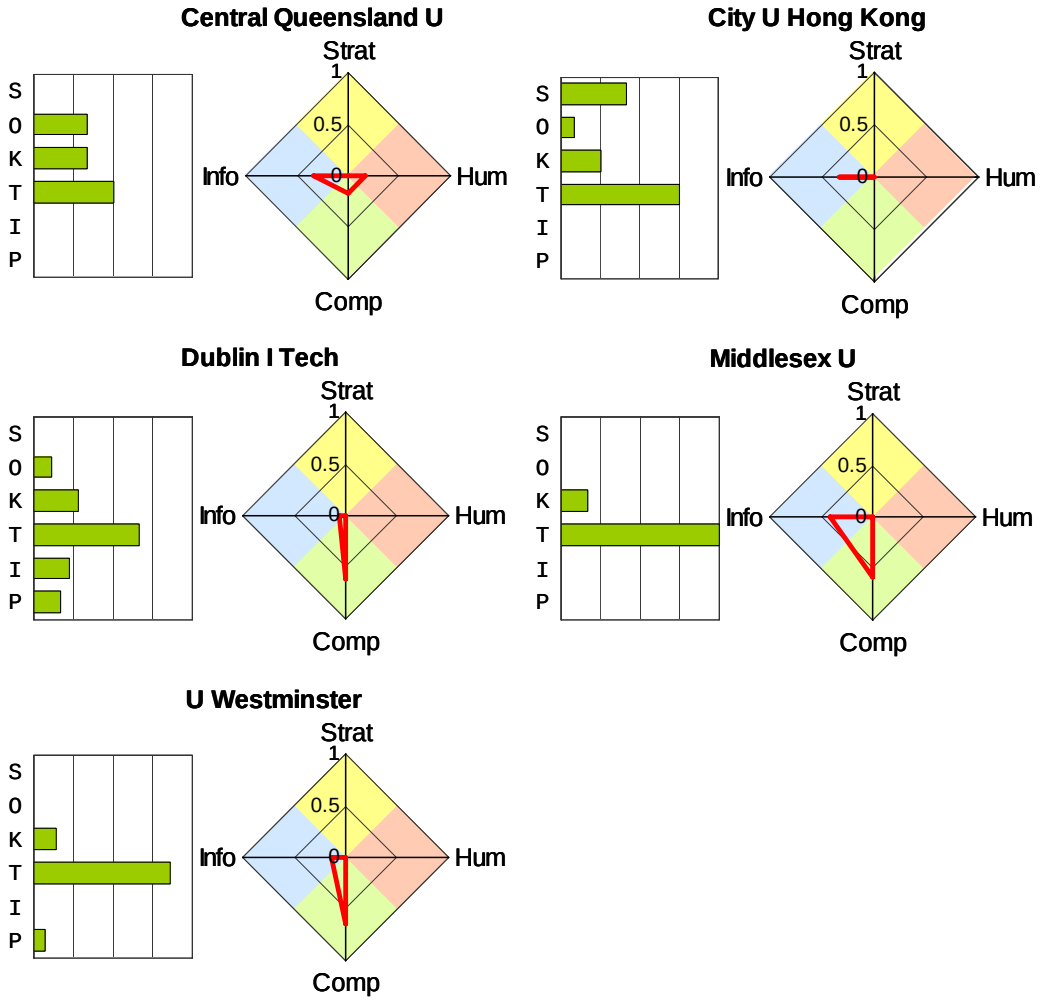


Figure 5-3: KM competence profiles in CS/IS-based programs

Management schools included business and public administration ones. Two of them developed programs emphasizing a human-oriented perspective, while

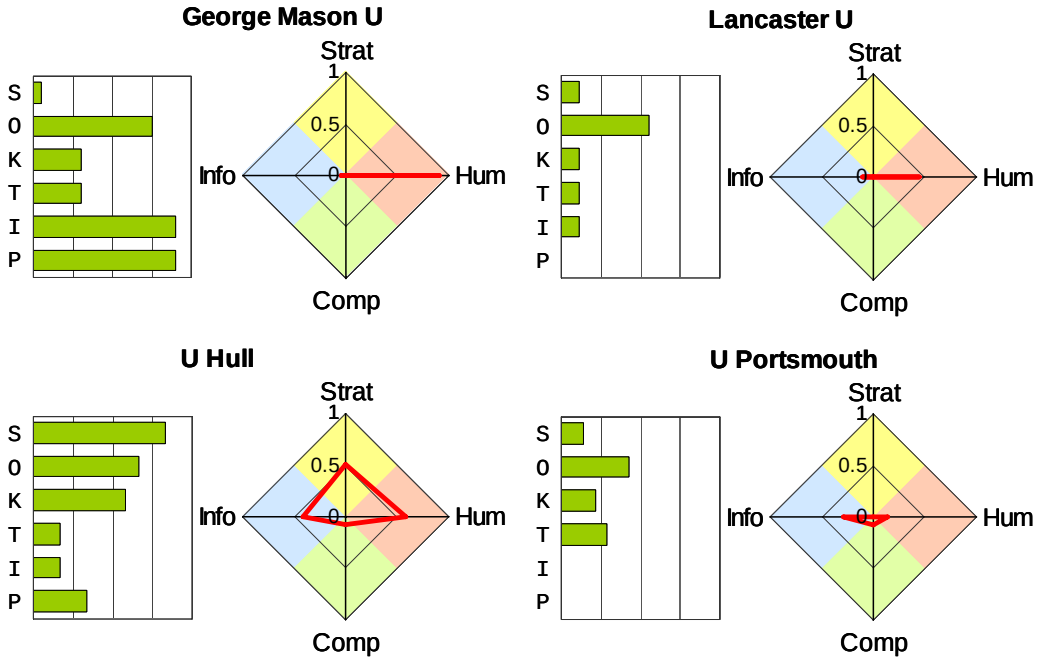


Figure 5-4: KM competence profiles in management-based programs

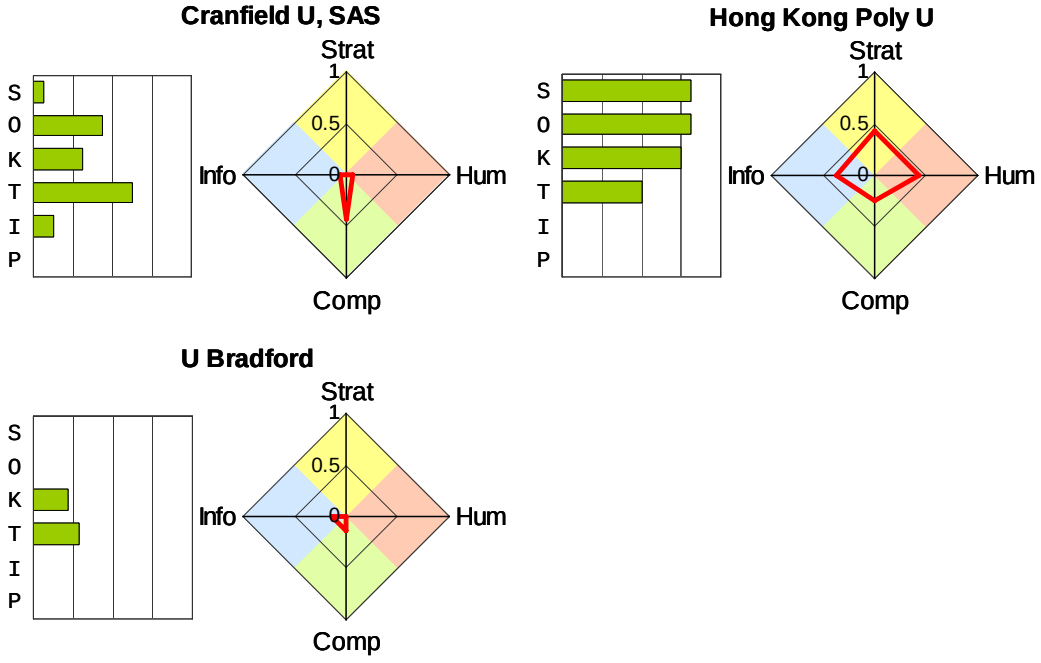


Figure 5-5: KM competence profiles in engineering-based programs

another managed to balance the information, human and strategy orientations (Figure 5-4). Among the topics common to most of those programs are: organizational analysis and design; organizational learning; organizational change; collaborative and team work.

Engineering schools showed little similarity between their programs. While one the schools designed a program with a good balance among KM perspectives, another emphasized a computing orientations, focusing on topics like: business process analysis; enterprise modeling; data management; enterprise computing; enterprise integration (Figure 5-5). The third school in the engineering field had a program on financial engineering that kept little relationship with KM.

Finally, schools of education also showed little similarity among their programs. One of them had a program with a good coverage of KM topics, like principles of KM; organizational culture and behavior; organizational change; KM systems and technologies; information systems (Figure 5-6). The other two focused their programs on education itself, one emphasizing e-learning and corporate training, and the other adult and lifelong learning.

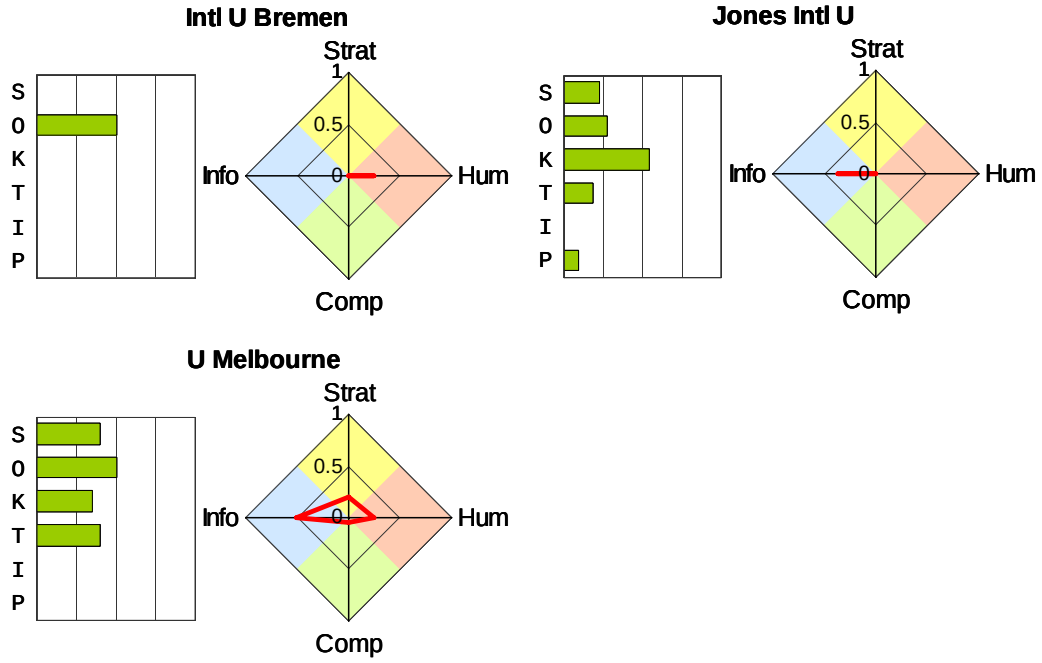


Figure 5-6: KM competence profiles in education-based programs

5.3.3 Summary of findings

The main finding is that there are indeed some typical profiles of KM competence being taught at master's programs in KM. We found and characterized four of them in the curricula's analysis: information manager, learning facilitator, knowledge systems developer and KM manager (Table 5-6). The *information manager* usually focus on activities like organizing information, providing information services and developing information policies. The *learning facilitator*, on the other hand, concentrates on fostering collaboration and team work, designing and conducting organizational interventions, and promoting individual learning. The *knowledge systems developer* gives priority to engineering knowledge, mining knowledge in data, and developing systems. And finally, the *KM manager* commonly works on planning and carrying out KM projects, aligning KM initiatives with business strategy, and implementing an infrastructure for KM.

Table 5-6: KM competence profiles being taught in master's programs in KM

The information manager (10 progrs.)

- Typical activities
  - Organizing and managing information resources
  - Providing information services
  - Designing and implementing KM systems
- Typical courses taught
  - Introduction to KM
  - Information Organization
  - Information Access & Retrieval
  - Information Sources & Services
  - Technologies for KM
  - KM and the Organization
- Sample programs
  - Kent State University
  - University of Oklahoma
  - Loughborough University
  - Nanyang Technological U.
  - U. of Technology Sydney

The learning facilitator (1 program)

- Typical activities
  - Fostering communication and collaboration

  - Designing and conducting organizational interventions
  - Promoting individual learning
- Typical courses taught
  - Organizational Learning
  - Organizational Analysis
  - Organizational Culture
  - Organizational Change
  - Technologies for KM
  - Group Dynamics
- Programs
  - George Mason University
  - Lancaster University (partially)

The systems developer (2 progrs.)

- Typical activities
  - Developing systems for decision support
  - Knowledge representation and engineering
  - Knowledge discovery and data mining
- Typical courses taught
  - KM and KM Systems
  - Systems Analysis & Design
  - Data Management
  - Management Systems
  - K Discovery & Data Mining
  - Knowledge Representation
- Programs
  - Middlesex University
  - University of Westminster
  - Dublin Inst. of Technology (partially)
  - Cranfield Univ., SAS (partially)
  - Cranfield Univ., DCMT (partially)

The KM manager (2 programs)

- Typical activities
  - Planning and conducting KM projects
  - Aligning KM initiatives with business strategy
  - Implementing KM infrastructure
- Typical courses taught
  - Introduction to KM
  - Strategic Management
  - Organizational Learning
  - Technologies for KM
  - KM Processes and Practice
  - Change Management
- Programs
  - Hong Kong Polytechnic U.
  - University of Hull (not longer available)
  - University of Melbourne (partially)

Another important finding is that there is a close correspondence between the original field of the school or department coordinating the program and the KM competence profile being taught. The clearest cases are those from the fields of library and information science, and computer science and information systems. Schools from the first all focused on the information manager profile, while those from the second typically emphasized that of the knowledge systems developer. Schools in the management, engineering, and education fields had a less clear typical profile, although some tendency may exist. Management schools may tend to focus on the learning facilitator, engineering ones on the knowledge systems developer, and education ones on something close to the information manager.

5.4 Implications

5.4.1 Defining the boundaries and essence of KM

The most obvious challenge in the study was to define the scope of KM, to decide what is part of KM and what is not. Although we tried to be as comprehensive and inclusive as possible, the inclusion of some topics into the KM discipline may be questioned. There are some topics that can be hardly considered as part of KM. For instance, to what extent financial engineering and e-business are related to KM? Although some relationship may be argued, it seems a misstatement to label a program on those topics a KM program. Other topics are surely associated with KM – e.g., lifelong learning, adult education, human resources management, process improvement, web design – and are often cited in the literature, but are they equivalent to KM, or should they be considered contributions to it? In the same way, to call a program focusing on those topics a KM program seems to be somewhat misleading.

Another issue related to the definition of KM is the prevalence of programs focusing on the information manager profile. From 28 master's in KM identified, 13, or around half, can be said to be developing such kind of KM competence. If we consider only the 15 master's more closely related to KM, we end up with 10 such programs, or 2/3 of the total. This contrasts with the results from the

questionnaire survey, where the human perspective represented roughly half of respondents. The dominance of KM programs focusing on the that profile is relevant because education is largely responsible for the reproduction of a discipline, and in the long term the field of KM may be restricted to information management.

5.4.2 Integrating KM perspectives and program's curriculum

Most programs have a clear bias towards one of the perspectives, mostly due to the background of the coordinating school and the faculty members designing and teaching the program. The lack of faculty from diverse fields of specialization available to teach the program seems to be the critical constraint in KM programs. Several schools addressed that issue by collaborating with one or more other schools/departments in the same university. The result in most cases, however, did not seem very satisfactory, for the collaboration was usually restricted to the provision of electives from other departments, without any adaptation to the particular aims of the program. The best cases of integration among perspectives seemed to be those whose program coordinator had a broad and deep understanding of KM, regardless of the field of the school he/she belonged to. We could observe that in the programs from a business school and a school of engineering.

Another important implication is the observation of different levels of integration among perspectives. We found some programs providing a relatively broader treatment of KM by introducing elements from other perspectives, but still within the original perspective as a background. The clearest example is of programs developing the information manager profile which included competitive intelligence or intellectual capital, for instance, in their curricula. Although those topics are related to an strategic orientation, their essence still is information management. A closer integration was achieved by programs focusing on the strategic management of KM initiatives. That provided a clearer alignment with a strategy-oriented perspective, but still seeing KM as a business function, separated from others like human resources, information technology or finance. Such an

approach to KM is linked with business strategy, but not yet focused on building organizational capability or managing innovation and knowledge creation, the essence of an strategy-oriented perspective.

A final comment regarding integration relates to the consistency of the program as a whole, or the coherence among courses that comprises it. Some programs, usually those involving a collaboration between different schools/departments, have a set of courses that show little relationship among them. A closer look into courses' design and contents indicate that they are self-contained and offered in an isolated way, without much reference to or relationship with other courses in the same program. Some programs, however, do show a good level of integration among courses, with each seeking to complement the others. The courses seem to have been designed with a common purpose in mind, with a very clear understanding of the desired profile of the future graduate. For instance, the program from California State University at Northridge was designed with the clear intention of providing education for information professionals, and the program at George Mason University focus on what they call the new professional or the reflective practitioner, a professional dedicated to organizational learning.

5.4.3 Clarifying the nature of KM capabilities

The correspondence between KM capabilities and perspectives is much more evident in the analysis of KM programs than in the questionnaire survey. Here, results show a clear pattern of emphasis on particular perspectives and greater relevance of certain capability categories. A preference for the information perspective shows a predominance of knowledge-oriented capabilities in the competence profiles. A preference for the computing perspective is associated with a stronger focus on technological capabilities, something that was not confirmed in the questionnaire survey. A preference for the human perspective corresponds to a greater emphasis on organizational capabilities. And the two programs which show a certain balance among perspectives also balance strategic, organizational and knowledge-oriented capabilities. This closer correspondence

between given perspectives and certain capability categories may indicate that either (1) capabilities needed for good performance in activities from a given perspective indeed concentrate on certain categories, or (2) it may simply reflect the background of the program's coordinator and instructors, which constrains the range of capabilities being developed. In any case, that correspondence indicates a rather functional approach to KM, instead of a more desirable interdisciplinary one.

Also, the analysis of individual courses' syllabuses and summaries confirmed the need to contextualize the meaning of capability categories, something that was already suggested in the questionnaire survey. For instance, strategic capabilities may mean the ability to plan and execute the provision of information services in the case of LIS-based programs, or of learning services in the case of education-based ones. Organizational capabilities may be related to organizational analysis and design in management-based programs, modeling of business processes in engineering-based programs, or assessing the impact of systems implementation in CS/IS-based programs. This suggests that the description of particular configurations of capabilities must go beyond the indication of the most relevant categories, but also provide clues on which specific kind of capabilities are needed.

And finally, we found evidence that the course's method of instruction is as important for the development of capabilities as the content itself. This was very much clear in the program from George Mason University, for instance, which adopted an experiential learning approach in all of its courses. Such an approach put a strong emphasis on the development of personal and inter-personal capabilities, regardless of the topic being studied. Another good example is that of one the more balanced programs, which include a very broad coverage of topics related to KM, from several perspectives. In this case however, there was little evidence of more active learning methods, and teaching seemed to be based simply on transfer of content. As we have already mentioned, *knowing that* is essentially different from *knowing how*, and understanding a subject does not correspond to being able to practice it.

5.5 Summary of the chapter

In this chapter, we carried out an analysis of master's programs in KM to identify the particular kind of KM competence being developed in them. Based on the content analysis of individual courses' syllabuses and summaries complemented with programs' contextual information, we found four typical profiles: the information manager, the learning facilitator, the knowledge systems developer, and the KM manager. We also found a correspondence between the original field of the school/department coordinating the program and the KM competence profile being developed. Thus, library and information science schools all focused on the information manager profile, and computer science and information systems schools typically concentrated on the knowledge systems developer one. In the case of management, engineering, and education schools, such a correspondence was less evident, but still hinted in the results.

Three major implications of this study were discussed. First, the existence of programs on topics extraneous to KM and the prevalence of the information manager profile indicate that defining the boundaries and essence of KM is challenging, but still critical for explaining the idea of KM competence. Some programs seem to adopt the term knowledge management without much appropriateness, while others do it properly, but focus strongly on a single KM perspective. In the former case, what is being taught does not seem related to KM, while in the later, it seems limited and partial.

Second, the attempt to integrate diverse perspectives by several programs confirm that such an integration is desirable, but not easy to carry out. It can range from the mere provision of electives from other schools, to the inclusion of approaches related to other perspectives but still based on the program's fundamental one, to the actual adoption of other perspectives. The coherence among individual courses comprising a program seems to contribute to successful integration.

And finally, some difficulties along the content analysis process indicate that attention to detail in the study of KM capabilities in needed. As already suggested

in the results of the questionnaire survey, the meaning of capability categories is highly contextual and additional information is needed for a proper description of particular configurations of capabilities. Also, in the case of educational programs, particular teaching methods is as relevant for determining KM capabilities as are the contents being taught.

Chapter 6: Conclusions

6.1 Introduction

In this chapter we present the overall conclusions of this study. First, the major findings are summarized through answers to the research questions. We then discuss the theoretical implications of such findings and present the refined version of the model of individual KM competence. Next, some implications for practice are considered, where we provide some suggestions for the education of knowledge managers and the improvement of current KM education. Finally, we conclude the study with suggestions for future research.

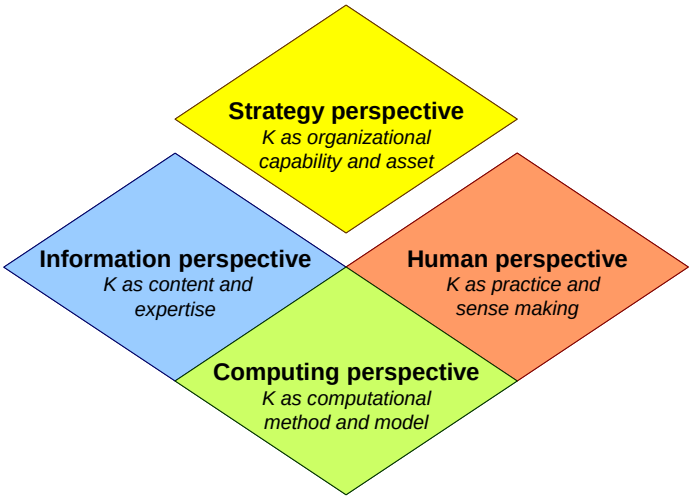
6.2 Answers to research questions

The major findings from previous chapters are summarized as follows, through answers to each of the subsidiary research questions and a synthesis in the answer to the major research question.

SRQ 1: How can the field of knowledge management be described, given the present diversity of perspectives?

The analysis of current research and practice in KM reveals fundamentally distinct assumptions about knowledge and its management. Such assumptions represent what we called particular *epistemological perspectives on KM*. Based on an extensive review of academic and industry literature on KM, we identified and described four major perspectives on KM: *information*-, *human*-, *computing*- and *strategy*-oriented (Figure 6-1). A questionnaire survey of KM researchers and practitioners and an analysis of master's programs in KM provided clear evidence of three of them (information-, human- and computing-oriented). Evidence on the strategy- oriented perspective was weak in both the questionnaire survey and KM programs' analysis. We suggested that representatives from this perspective are

relatively small in number and, though influential, have little commitment to the field.



- **Information-oriented KM:** facilitating access to codified/codifiable content and transfer of expertise and experience.
- **Human-oriented KM:** cultivating contexts and connections that improve collective practice and organizational sense making.
- **Computing-oriented KM:** developing systems/methods that compute knowledge and building computational models for decision making.
- **Strategy-oriented KM:** prioritizing valuable organizational knowledge and developing strategies and processes to acquire, create, use and protect it.

Figure 6-1: Major epistemological perspectives on KM

Researchers and practitioners from different backgrounds seem to be involved with KM in different ways. Some of them are highly influential but not strongly committed to the field, while others are strongly committed, but not as influential. For instance, the strategy-oriented discourse was highly influential from the very beginning of the KM movement, being often used to justify the importance of the field itself, and a human orientation gained relevance recently, after an excessive emphasis on technological aspects have become clear. However, those researchers and practitioners may prefer to be associated with fields like management, strategy, or innovation, for example, and be weakly committed to KM. On the other hand, those with information- and computing- oriented perspectives have

been strongly interested in KM since the very beginning, seeing it as a natural extension of their original disciplines. This may explain the greater number of KM programs created by schools in those fields.

SRQ 2: What are the essential elements of KM competence, and how are they related to each other?

The review of the competence literature suggested two complementary aspects of the concept: a definition of scope and quality of expected performance and the identification of personal attributes that indicate individual capability. We translated that into the two core aspects of KM competence: an *activity set* and a *capability set* (Figure 6-2). The first focus on KM-related functions and tasks that one is expected to effectively perform, while the second emphasizes one's knowledge, abilities and personal characteristics that indicate one's capacity for such performance. The search for typical KM activities and capabilities indicated the need for a third element: distinct *perspectives* on knowledge and its management that lead to very different ways to point out those most closely associated with KM.

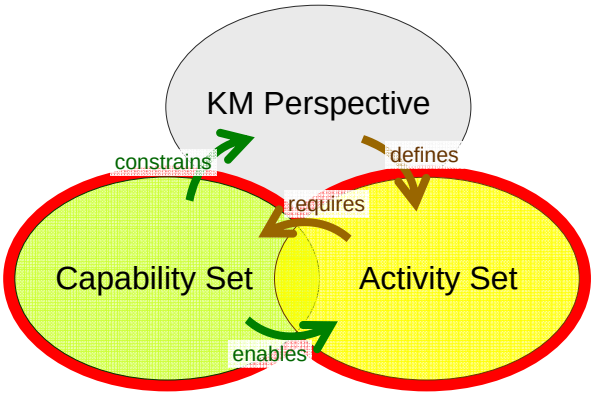


Figure 6-2: Essential elements of a model of KM competence

The relationship between those three elements can be described in two ways. From a competence development perspective, the activity set is taken as given and the aim is to identify the range of capabilities that one must develop in order to

carry out those activities. In this case, particular perspectives on KM influence how the activity set is defined. This could be observed in the questionnaire survey, where certain KM activities reflected specific KM perspectives and determined which capabilities were relevant or not.

From a performance assessment perspective, on the other hand, it is the capability set that is taken as given and the aim is to assess them so that future performance in a range of activities can be predicted. In this case, one's existing capability set constrains one's perspective on KM and the way activities are understood and enacted. This sort of relationship could be observed in the analysis of KM programs, where schools and departments from given fields developed programs that reflected their backgrounds. In this case, faculty members did not enact KM competence itself, but projected it in the programs' curricula.

Those three elements, however essential, provide only an indication of what is actually meant by KM competence. The exact meaning of the concept is achieved through particular combinations of corresponding KM activities and capabilities (Figure 6-3). The empirical data confirmed that some KM activities are most closely associated with certain KM perspectives. For instance, conducting knowledge audits, designing information architectures, and building knowledge repositories are mostly associated with an information-oriented perspective, while cultivating communities of practice, promoting creativity and learning, and facilitating collaboration are usually related to a human orientation.

The description of KM capabilities is more complex than that of activities. We proposed six categories to facilitate analysis and discussion: strategic, organizational, knowledge, technological, inter-personal and personal capabilities. However, which capabilities are actually listed in those categories strongly depend on KM perspectives. For instance, organizational capabilities may be mostly related to organizational culture and behavior, from a human perspective, or to organizational structure and business processes, from an information-oriented perspective. Knowledge-oriented capabilities may refer mainly to knowledge organization and distribution, from an information perspective, or to knowledge representation and discovery, from a computing orientation.

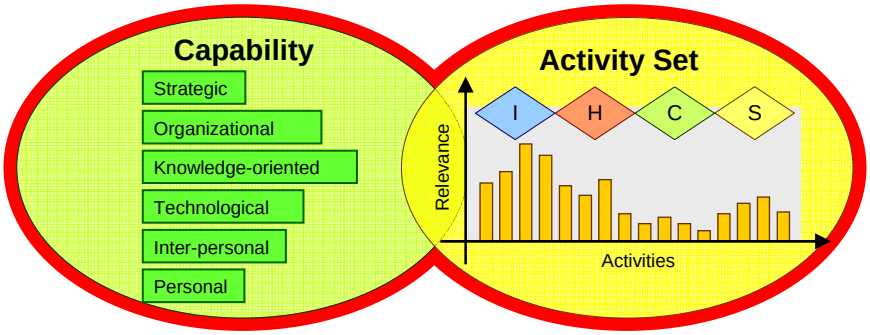


Figure 6-3: Particular combinations of corresponding KM activities and capabilities.

SRQ 3: What kind of competence is being developed in graduate KM education?

As we have mentioned, particular combinations of activities and capabilities indicate different ways to define and explain KM competence. Along the analysis of master's programs in KM, we identified four typical sets of corresponding KM activities and capabilities reflected in their curricula (Figure 6-4). The most popular one, being developed in 10 programs, emphasizes an information-oriented perspective and was labeled the *information manager* profile. Two others emphasize either the human- or the computing-oriented perspectives, and were labeled the *learning facilitator* and the *knowledge systems developer* profiles, respectively. A fourth set shows a somewhat balanced perspective on KM, with a certain emphasis on the strategy orientation and some disregard for the computing, and was labeled the profile of the *KM manager*.

Most of those profiles emphasize a single KM perspective, which provides a limited treatment of the field to programs' graduates. The more balanced one, that of the KM manager, was being developed in two programs only. However, one of them was recently discontinued and the other seemed to put an excessive emphasis on content delivery, instead of competence development. As we have discussed before, there is a fundamental distinction between knowing that and knowing how, and to understand one topic is very different from being able to

practice it. For instance, ‘understanding the concept of communities of practice’ and ‘being able to lead or participate effectively in them’ are different capabilities, requiring distinct kinds of conceptual knowledge, abilities and personal characteristics.

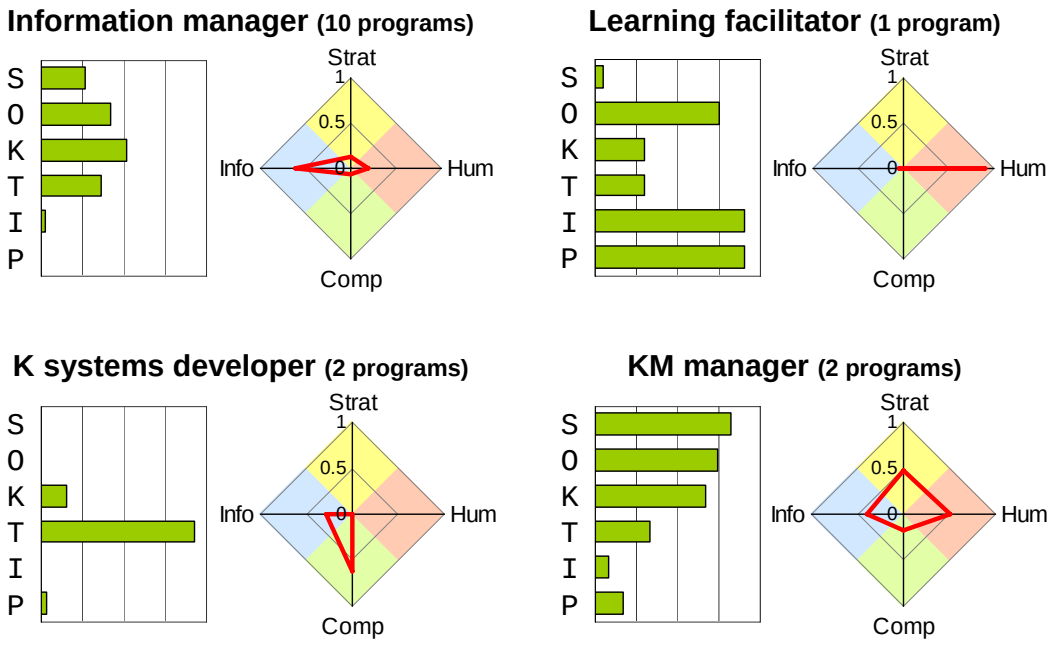


Figure 6-4: Profiles of KM competence presumed in master's KM programs

MRQ: What is individual knowledge management competence, from an educational perspective?

After responding to each of the subsidiary research questions, we are ready to answer the major research question that have guided this study. Following the empirical evidence collected in the questionnaire survey and the analysis of master's programs in KM, we conclude that there is no single way to define KM competence. Instead, there are several definitions of the concept, represented by particular combinations of KM-related activities and capabilities, each of them especially suited to specific functions, situations and contexts.

The most popular of such definitions associates KM competence with the management of information. This refers to activities like, e.g., organizing and facilitating access to information; developing and maintaining information architectures and policies; and improving knowledge processes like capture, storage and distribution. Among the capabilities usually related to this definition are, e.g., proficiency in information processes like access and retrieval, organization and storage, production and distribution; good understanding of user information behavior (i.e., how people search for, interact and use information); and appreciation for regulatory, policy, and other social implications of use of information.

The best attempt to integrate different KM perspectives define the concept as the ability to manage KM initiatives in organizations. This includes activities like, e.g., designing strategies for KM implementation; involving people and gaining support for KM; and providing measures of the value of KM. Among capabilities often cited as critical for such role are strong leadership skills; ability to communicate effectively in a wide variety of contexts and situations; and a good understanding of business and organizational needs and how KM can support them.

These results are somewhat inconsistent with our initial motivation of developing a concept of KM competence to support the education of knowledge managers. As we have mentioned in the introduction chapter, we define knowledge manager as a general manager prepared for the challenges raised by the knowledge economy and society, and the KM competence profiles identified do not seem to be compatible with that. We address this issue in the section of practical implications of this study.

6.3 Theoretical implications

6.3.1 A model of individual KM competence

The main theoretical implication of this study is a model of individual KM competence composed of three key elements: *assumptions*, *activities* and *abilities*.

On the one hand, the model suggests that fundamental assumptions on knowledge and its management characterize one's perspective on KM and define the activities typically associated with KM, therefore indicating the capabilities required for effective performance. On the other hand, it also explains that one's existing abilities enable the effective performance of certain KM-related activities and not others, while at the same time constraining the way one's interpret and define the field (Figure 6-5).

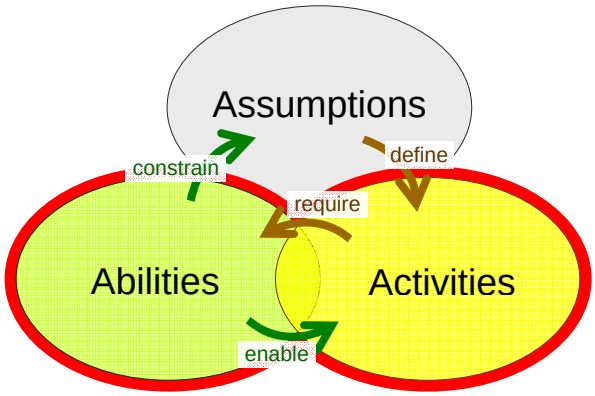


Figure 6-5: The 3A model of individual KM competence

Although those elements provide a reasonable explanation of the structure of KM competence and some of its dynamics, the actual value of the model derives from particular configurations of assumptions, activities and abilities that are especially suited to specific contexts and situations. The model suggests, then, that there is no single best definition of individual KM competence, but many context-specific ways to translate the concept. Such particular configurations can be represented by typical *KM competence profiles* like those shown in Figure 6-4 and Figure 6-8.

This model can explain two processes associated with KM competence. First, in educational settings, it explains the curriculum development process, by showing how assumptions on the nature of KM conditions the presumed set of activities that graduates should be prepared to perform, which in turn guides the design of an adequate curriculum that will seek to develop the required abilities.

Second, in workplace settings, it clarifies the competence assessment process, showing how one's assumptions on knowledge and its management are constrained by one's background and current abilities, which thus limit the range of activities that can be effectively performed and how they are most likely to be enacted.

6.3.2 A model of interacting KM perspectives

The key issue in defining KM competence is to determine the scope of the KM activity (the activity set). Since the perspectives on KM are such a critical element in that respect, we give it a more detailed treatment here.

In the empirical data, the relative prominence of each perspective was not very clear. While the questionnaire survey suggested a greater adoption of the human-oriented (roughly 50% human, 30% information, 20% computing), the KM programs showed a prevalence of the information-oriented (roughly 60% information, 20% computing, 10% human, 10% balanced). This led us to consider questions like: what is the essence of each perspective? How can they be better described? Does adoption of one perspective exclude others? Is there an overlap between perspectives? Can they be combined? Are there only four (or three), or should there be additional ones?

A closer analysis of KM programs' curricula and of literature reporting actual KM practice in organizations suggest a more complex picture. There is overlap between perspectives indeed: boundaries are fuzzy and they cannot be clearly separated. Any given individual cannot be properly labeled by only one KM perspective. One usually embraces a particular mix of elements from each perspective, providing a much richer and more diffuse understanding of the KM field. To better illustrate this phenomenon, we suggest that each perspective can be combined with any of the others, in varied ways and in different proportions.

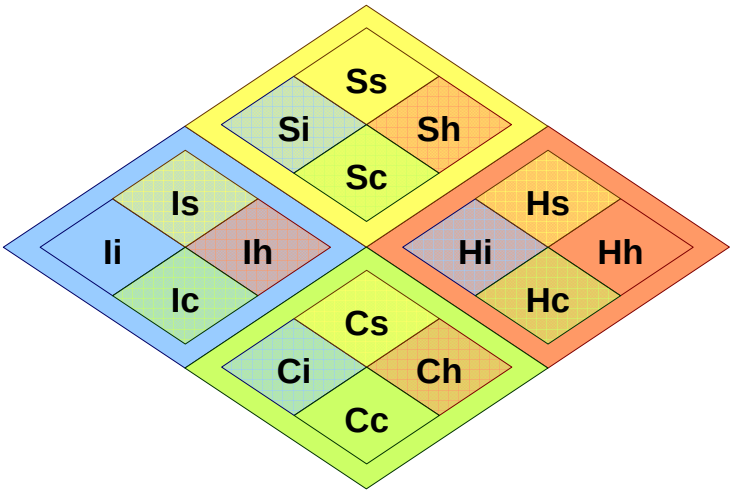


Figure 6-6: The fractal model of KM perspectives

The fractal model of KM perspectives in Figure 6-6 shows how each of them can be 'colored' by the others. A person usually has a basic, fundamental perspective (I, H, C, S) which is complemented with elements from others (i, h, c, s) as the person acquires more knowledge and experience in the field. Table 6-1 lists some examples of KM practices that indicate the kind of approach to KM that results from combining two perspectives.

Table 6-1: Sample KM practices combining perspectives

Information-oriented	
Ii	*Information organization and distribution, access and retrieval*
Ih	Codification of expertise and experience; expert directories; e-learning
Ic	Process-oriented information management
Is	Competitive intelligence; intellectual capital measurement
Human-oriented	
Hi	Online communities; electronic collaboration; cultural/behavioral issues in K sharing
Hh	*Cultivating practice; facilitating collaboration*
Hc	Social network analysis; soft systems for organizational learning
Hs	Competence management; management of knowledge work
Computing-oriented	
Ci	Ontology development and processing; search algorithms
Ch	Expertise profiling and mining; case-based reasoning in customer service
Cc	*Knowledge-based systems; knowledge discovery/data mining; intelligent agents*
Cs	Decision support systems; scenario analysis; simulations

Strategy-oriented
Si Knowledge strategies; roadmapping; KM strategies
Sh Capability building; knowledge networks; knowledge-based management
Sc Systems thinking; complexity management
Ss *Innovation management*

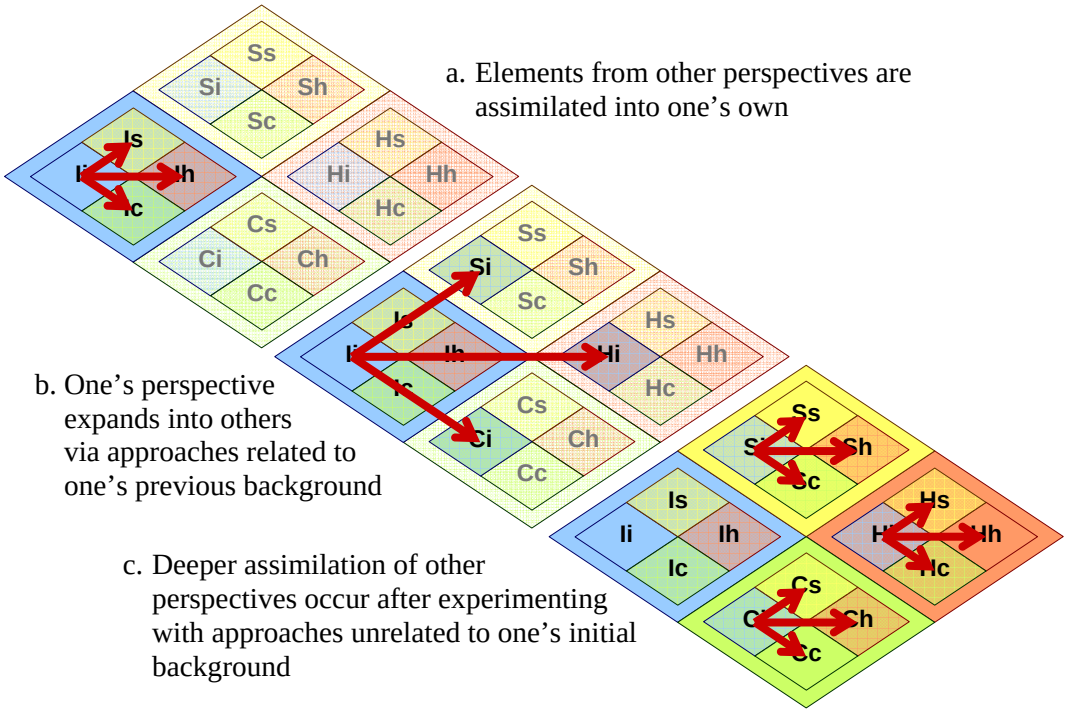


Figure 6-7: Dynamic evolution of KM perspectives

The evolution from one perspective to others tends to occur gradually. First the person adds elements from other perspectives but still keeps her own as the cornerstone of her view of KM (Figure 6-7a). As understanding and experience in the field grows, the person may experiment with other perspectives in a more fundamental way, trying approaches in other perspectives that are related to her own (Figure 6-7b). In rare occasions, a person may develop a thorough appreciation of all perspectives, adding elements from other perspectives that are not directly related to her own initial background (Figure 6-7c).

6.4 Practical implications

Before discussing the practical implications of this study, we would like to recall its main motivation. We suggested that a concept of KM competence was needed to support the education of knowledge managers for the challenges brought forth by the knowledge economy and society. Knowledge manager was defined as any general manager capable of working in knowledge-intensive functions and environments, and among those challenges, three were particularly mentioned: 1) the growing relevance of knowledge workers and the particular characteristics of managing them; 2) the increasingly distributed nature of knowledge and the need to integrate it to produce value; and 3) the accelerating pace of innovation and the complexity of leading in a rapidly changing environment.

Our study revealed that existing KM programs tend to emphasize a single perspective on KM, leading to limited conceptualizations of KM competence. The knowledge manager, as defined above, arguably demands a broader definition of KM competence, which suggests the need for graduate programs focusing on broader KM competence profiles, like those indicated in Figure 6-8.

Such KM competence profiles require programs that are strongly interdisciplinary. Several of the master's programs in KM studied were developed in collaboration between two or more academic units (schools, departments). Too often, however, one of the units assumed a prominently coordinating role, and collaboration was limited to the mere exchange of existing disciplines (i.e., elective courses offered by partner units). There are, however, some examples of joint work and curriculum integration that deserve praise, among them the program at Melbourne University and the development process at California State University.

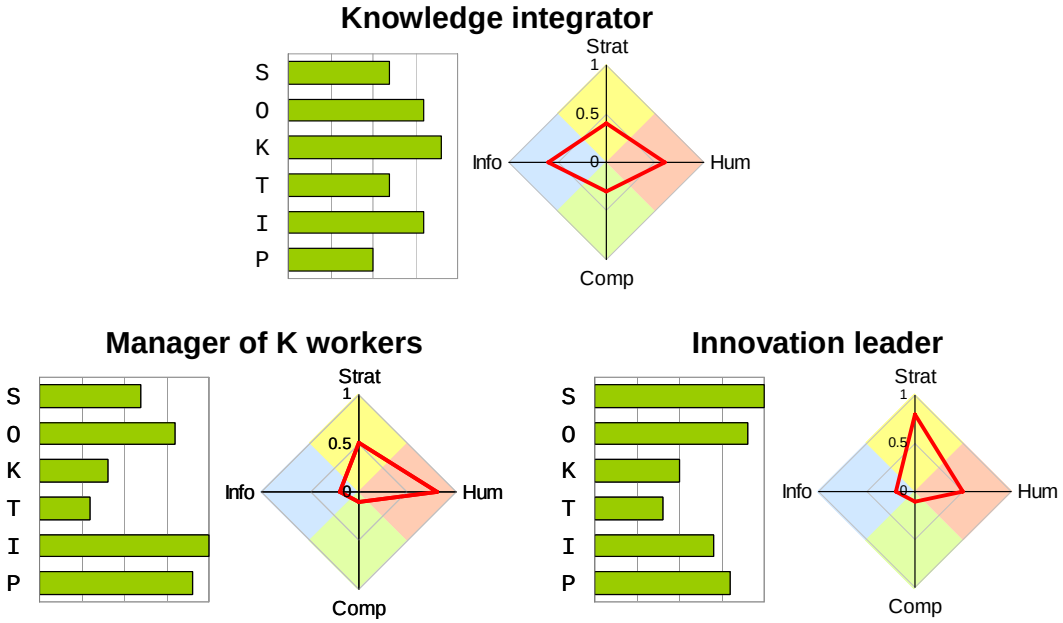


Figure 6-8: Suggested KM competence profiles for the knowledge manager

The level of collaboration required by the profiles suggested, however, may be even more demanding than that already present in current programs. For instance, the *knowledge integrator* profile would require the combination of programs like George Mason's and either of California State's, Kent State's or Technology Sydney's (see Appendix x for details). The manager of knowledge workers profile would require a combination of the curricula from Hull, Lancaster and George Mason. For the *innovation leader*, programs in other fields should be analyzed, since current KM education hardly addresses its needs.

Besides the need to integrate diverse disciplines contributing to KM, it is also necessary to pay attention to adequate methods of instruction that focus on competence development, instead of simply delivering content. Active methods like experiential learning used at George Mason, capstone projects adopted in several programs and interactive seminars with KM practitioners may help narrow the bridge between theory and practice.

6.5 Suggestions for future research

We suspect that the KM competence profiles suggested in Figure 6-8 may be already being partially developed in some specific graduate programs, like e.g. management in high-tech industries and innovation management. We intend to investigate such programs in search for insights on the development of KM competence.

This study focused on KM competence from an educational or developmental perspective. Also important is the study of KM competence from an assessment or performance perspective, where the emphasis is on actual effectiveness in KM. For such a study, we intend to investigate the behavior of practitioners with KM competence profiles similar to those suggested in Figure 6-8.

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Appendix 1: Questionnaire on KM competence

Competence in Knowledge Management

A study into experts' ideas of the concept

Conducted by the Social Systems Lab
Graduate School of Knowledge Science
Japan Advanced Institute of Science and Technology
1-1 Asahidai, Nomi, Ishikawa 923-1292 Japan
tel: +81-761-51-1699 ext.1870 fax: +81-761-51-1777

Introduction

You are being invited to participate in a study on *competence in knowledge management* (hereinafter KM competence). In this questionnaire we ask your opinion about several issues related to the concept. You were invited due to your experience and expertise in the field of KM, and your contribution is very much appreciated. We thank in advance for your precious time and effort in participating.

Instructions

The questionnaire contains closed questions only, and can be answered in around 20 minutes. It is divided into four sections; the 1st asks what you consider to be main activities in KM, the 2nd asks what are the relevant competencies that lead to effective performance in those activities, the 3rd proposes some considerations on the context of KM competence, and the 4th asks some information about you.

Please fill in your answers in the digital file containing the questionnaire and return it to Andre Saito (**asaito@jaist.ac.jp**) as an e-mail attachment. You may also print the questionnaire and send your answers via fax to **+81-761-51-1777**, if more convenient. Please return it by **March 27th, Monday**. If you do not receive a confirmation of receipt in one business day, please *resend it*, since it might have not reached destination. Thank you in advance for your participation.

Confidentiality

Your answers will be treated with strictest confidentiality. All responses will be processed exclusively by the primary researcher and presented always in the aggregated fashion.

Benefits

As an appreciation for your time and effort, we would like to provide you with a brief summary of the conceptual framework behind the study, and a summary of findings. Please let us know if you are willing or not to receive them at the end of the questionnaire.

It is our intention that this study will help to clarify the expectations toward KM practitioners. The framework of KM competence resulting from this study may be used by educational institutions in the development of courses and programs for aspiring KM professionals, or by employing organizations in the assessment and development of professionals involved in KM.

Contact

If you have any questions or comments on this study or the questionnaire, please contact:

Andre Saito, PhD student
tel: +81-761-51-1699 ext.1870 skype: andresaito
e-mail: asaito@jaist.ac.jp web: http://www.jaist.ac.jp/~asaito

Please return the questionnaire as an attached file to <asaito@jaist.ac.jp> by March 27th, Monday.
If more convenient, **fax** it to **+81-761-51-1777**.

Thank you very much for your cooperation.

Section 1

Competence in a domain, function or activity may defined as the ability to mobilize internal *resources* to meet the individual and/or social *demands* associated to that domain, function or activity. In this first section, we explore the *demands* associated with KM competence, by seeking to clarify the meaning of knowledge management and delimit the scope of its practice.

1) What do you consider to be the essence of knowledge management (KM)?
Please rate how relevant the following views of KM are to your idea of it, putting an X at the corresponding level, ranging from **-3 (completely irrelevant) to +3 (completely relevant)**.

Knowledge management is…	-3	-2	-1	0	+1	+2	+3
a. managing codified and codifiable knowledge (written material, audio and video, unstructured information, etc.)							
b. managing knowledge workers (i.e. those who perform mainly intellectual instead of manual work)							
c. managing knowledge-intensive firms (i.e. those highly dependent on intellectual work and assets)							
d. developing and utilizing knowledge technologies (search, data mining, ontologies, expert systems, etc.)							

2) Who would you consider to be the person or group *primarily* responsible for KM in an organization?
Please choose **only one** of the options, putting an X in the corresponding parentheses.

( ) a. Everyone involved with knowledge work
( ) b. All middle managers in charge of knowledge workers
( ) c. Organization's top management
( ) d. A person or team from an existing function (e.g. IT, HR, planning) related to KM
( ) e. A person or team in a role or function dedicated to KM
( ) f. Other (please describe): _____

3) Which of the following activities would you recommend, *in general*, as priorities for KM?
Please choose **only six (6)** of the options, putting an X in the corresponding brackets.

[ ] a. Organizing codified knowledge and making it available in repositories
[ ] b. Mapping knowledge needs, users and owners, sources and flows
[ ] c. Codifying knowledge from experts, teams and experienced employees
[ ] d. Promoting knowledge sharing and transfer (best practices, expertise directory, etc.)
[ ] e. Building teams and communities of practice
[ ] f. Promoting creativity and learning
[ ] g. Identifying strategic knowledge and developing strategies for KM
[ ] h. Measuring and managing intangible assets (i.e. intellectual capital)
[ ] i. Managing innovation and knowledge creation (R&D, alliances, startups, etc.)
[ ] j. Implementing publication and collaboration systems (portals, groupware, etc.)
[ ] k. Implementing decision support systems (business intelligence, expert systems, etc.)
[ ] l. Implementing knowledge discovery systems (search, data mining, etc.)
[ ] m. Other (please describe): _____

Please make sure you selected **only six (6)** of the options.

Section 2

After outlining the demands associated with KM competence, we explore in this second section the internal resources required to meet them. In other words, we look for the individual's *knowledge*, *skills* and *personal qualities* that lead to KM competence.

4) What would you consider to be the essential *knowledge*, *skills* and *personal qualities* that build KM competence?

   Following is a list of suggested items, grouped into six categories. Please rate the importance of each item for the establishment of KM competence, putting an X at the corresponding level, raging **from -3 (totally unimportant) to +3 (totally important)**.

   If any additional important items occur to you, please include them at the end of the section.

Strategic

Please rate each item between -3 (completely unimportant) and +3 (completely important)	-3	-2	-1	0	+1	+2	+3
1. Understanding the organization's environment (market, competitors, etc.)							
2. Understanding the organization's structure and core business processes							
3. Identifying strategic knowledge and providing direction for KM							
4. Developing approaches and strategies to advance KM practices							
5. Evaluating and demonstrating results from KM initiatives							
6. Creating structures and processes for innovation and knowledge creation							

Organizational

Please rate each item between -3 (completely unimportant) and +3 (completely important)	-3	-2	-1	0	+1	+2	+3
7. Understanding the organization's culture and behavior (beliefs, habits, etc.)							
8. Promoting collaboration and creativity							
9. Managing teams and communities							
10. Developing people (coaching, mentoring, etc.)							
11. Initiating and managing organizational change (in structures, processes, etc.)							
12. Managing projects, from planning to execution							

Knowledge-oriented

Please rate each item between -3 (completely unimportant) and +3 (completely important)	-3	-2	-1	0	+1	+2	+3
13. Understanding the varied aspects of knowledge and its processes							
14. Finding, organizing and distributing relevant knowledge							
15. Mapping knowledge needs, sources and flows, owners and users							
16. Designing and managing knowledge repositories							
17. Codifying experience and expertise							
18. Assessing and measuring knowledge							

Cont.

Section 2, Question 3 (cont.)

Technological

Please rate each item between -3 (completely unimportant) and +3 (completely important)	-3	-2	-1	0	+1	+2	+3
19. Understanding the technological infrastructure existing in the organization							
20. Understanding available KM technologies							
21. Using available KM technologies effectively							
22. Assessing needs and recommending KM technologies							
23. Developing and implementing KM technologies							
24. Administrating and maintaining KM technologies							

Social

Please rate each item between -3 (completely unimportant) and +3 (completely important)	-3	-2	-1	0	+1	+2	+3
25. Communicating effectively in a variety of situations							
26. Leading, influencing and gaining support							
27. Building relationships inside and outside the organization							
28. Collaborating and working in teams							
29. Negotiating and solving conflicts							
30. Handling politics and power relations							

Personal

Please rate each item between -3 (completely unimportant) and +3 (completely important)	-3	-2	-1	0	+1	+2	+3
31. Strongly believes in KM							
32. Initiative and proactiveness							
33. Creativity and inventiveness							
34. Willingness to reflect and learn from experience							
35. Perseverance and resilience							
36. Trustworthiness and accountability							

Others

If there are any items that you consider important for establishing KM competence, please include them, with a short description, in the space below.

Please rate each item between -3 (completely unimportant) and +3 (completely important)	-3	-2	-1	0	+1	+2	+3
37.							
38.							
39.							
40.							
41.							
42.							

Section 3

In this third section, we explore some issues on how KM competence is developed or enacted.

In the following questions, we present statements with which you may agree or not.
Please indicate you **level of agreement** by putting an X in the scale below each statement.

5) The development of KM competence depends on the acquisition of theoretical knowledge, involving the understanding of existing concepts, models, and methods.

strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
( )	( )	( )	( )	( )

6) The development of KM competence depends on the accumulation of practical experience and situated knowledge (e.g. particular ways of doing things, rules and habits shared by the group).

strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
( )	( )	( )	( )	( )

7) A person or group who is highly competent in KM in a given organization will demonstrate a similar level of competence in other organizations.

strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
( )	( )	( )	( )	( )

8) The level of specialization required to work effectively in a KM function demands specific education, in a way similar to occupations like information systems or finance.

strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
( )	( )	( )	( )	( )

9) The concept of KM competence does not apply to individuals but groups or organizations that collectively demonstrate such a competence.

strongly disagree	disagree	neither agree nor disagree	agree	strongly agree
( )	( )	( )	( )	( )

Section 4

Finally, please answer a few questions about you, so we can analyze how results vary according to different backgrounds.

10) How would you describe your experience in KM?
Please choose **only one** of the options, indicating that which is most significant.

( ) a. Mainly practical
(work or do consultancy in KM-related projects, train KM practitioners, etc.)

( ) b. Mainly academic
(i.e. research or teach KM-related topics in an academic setting)

11) How would you identify the *main* fields on which your work in KM is based?
Please choose **only one** of the options, indicating that which is most significant.

( ) a. Computer science, information systems and related areas

( ) b. Organization studies, human resource management and related areas

( ) c. Strategy, economics and related areas

( ) d. Accounting, finance and related areas

( ) e. Library and information studies and related areas

( ) f. Other (please describe): _____

12) For how many years have you been practicing or researching KM?

_____ years.

13) Please let us know the types of *KM-related* work you have experienced (mark **all that apply**).

[ ] a. Published academic papers
[ ] b. Authored or edited books
[ ] c. Taught graduate courses
[ ] d. Trained KM professionals
[ ] e. Participated in KM projects
[ ] f. Managed KM projects or teams
[ ] g. Undertook consultancy engagements
[ ] h. Other: _____

---------- end of the questionnaire ----------

Would you have comments on the questionnaire? Your feedback may help us refine our findings.

We would like to express our gratitude for your participation. If you would you like to receive the following, please mark with an X and provide an e-mail that we can use to send the material.

[ ] outline of the conceptual framework of KM competence supporting the survey

[ ] preliminary results of the survey

E-mail: _____

Thank you for participating!

Appendix 2: List of graduate programs in KM

Master's programs in KM, taught in English

Library and Information Science

- **California State University, Northridge – US**
  The Tseng College of Extended Learning
  Master of Knowledge Management
- **Dominican University – US**
  Graduate School of Library and Information Science
  M. Sc. in Knowledge Management
- **Kent State University – US**
  College of Communication and Information; School of Library and Information Science
  M. Sc. in Information Architecture and Knowledge Management
- **London Metropolitan University – UK**
  Dept. of Applied Social Sciences; Information Management Area
  M. Sc. in Information and Knowledge Management
- **Loughborough University – UK**
  Faculty of Science; Dept. of Information Science
  M. Sc. in Information and Knowledge Management
- **Nanyang Technological University – Singapore**
  School of Communication and Information; Division of Information Studies
  M. Sc. in Knowledge Management
- **Robert Gordon University – UK**
  Aberdeen Business School
  M. Sc. in Knowledge Management
- **Stellenbosch University – South Africa**
  Faculty of Arts; Dept. of Information Science
  M. Phil. in Information and Knowledge Management
- **University of Canberra – Australia**
  Division of Communication & Education; School of Information Management and Tourism
  Master of Knowledge Management
- **University of Oklahoma – US**
  College of Arts and Sciences; School of Library and Information Studies
  M. Sc. in Knowledge Management
- **University of Technology Sydney – Australia**
  Faculty of Humanities and Social Sciences; Information and Knowledge Management Area
  MA in Information and Knowledge Management

Computer science, Information Systems

- **Central Queensland University – Australia**
  Faculty of Business & Informatics; School of Information Technology
  Master of Knowledge Management
- **City University of Hong Kong – Hong Kong**
  Faculty of Business; Dept. of Information Systems
  M. Sc. in Electronic Business and Knowledge Management
- **Cranfield University, DCMT – UK**
  Defence College of Management and Technology; Dept. of Information Systems
  M. Sc. in Knowledge Management Systems
- **Dublin Institute of Technology – Ireland**
  School of Computing
  M. Sc. in Computing (Knowledge Management)
- **Middlesex University – UK**
  School of Computing Science
  M. Sc. in Knowledge Management
- **Northumbria University – UK**
  School of Computing, Engineering & Information Sciences
  M. Sc. in e-Knowledge Management
- **University of Westminster – UK**
  Harrow School of Computer Science
  M. Sc. in Information & Knowledge Management

Business, Management, Public Administration

- **George Mason University – US**
  School of Public Policy
  M. Sc. in New Professional Studies: Organization Development and Knowledge Management
- **Lancaster University – UK**
  Management School; Dept. of Organisation, Work & Technology
  MA in Human Resource & Knowledge Management
- **University of Hull – UK**
  Business School
  M. Sc. in Knowledge Management
- **University of Portsmouth – UK**
  Portmouth Business School
  M. Sc. in Knowledge Management

Engineering, Manufacturing

- **Cranfield University – UK**
  School of Applied Sciences; Manufacturing Dept.
  M. Sc. in Knowledge Management for Enterprise Development

- **Hong Kong Polytechnic University – Hong Kong**
  Faculty of Engineering; Dept. of Industrial & Systems Engineering
  M. Sc. in Knowledge Management
- **University of Bradford – UK**
  School of Engineering, Design & Technology
  M. Sc. in Financial Engineering and Knowledge Management

Education

- **International University Bremen – Germany**
  Jacobs Center for the Study of Lifelong Learning
  Executive Master Program in Lifelong Learning, Knowledge Management, and Institutional Change
- **Jones International University – US**
  no academic subunits
  MEd in Corporate Training and Knowledge Management
- **University of Melbourne – Australia**
  Faculty of Education, in collaboration with Faculty of Economics and Commerce and Faculty of Science
  Master of Knowledge Management

Master's programs with concentrations in KM, taught in English

Library and Information Science

1. **Florida State University – US**
   College of Information
   M. Sc. and MA in Information Studies, Knowledge Management concentration
2. **McGill University – Canada**
   Graduate School of Library and Information Studies
   Master of Library and Information Studies, Knowledge Management specialization
3. **University of Denver – US**
   College of Education
   Master of Library and Information Science, Knowledge Management concentration

Computer science, Information Systems

4. **Boston University – US**
   Metropolitan College (Continuing Education)
   M. Sc. in Computer Information Systems, Database and Knowledge Management concentration
5. **Knowledge Systems Institute – US**
   no academic subunits

M. Sc. in Computer and Information Sciences, Knowledge Management concentration

6. **Libera Università di Bolzano – Italy**
   Faculty of Computer Science
   M. Sc. in Computer Science, Information and Knowledge Management stream
7. **Monash University – Australia**
   Faculty of Information Technology
   Master of Information Management and Systems (MIMS), Knowledge Management specialization

Business, Management, Public Administration

8. **New York University – US**
   School of Continuing and Professional Studies
   M. Sc. in Management and Systems, Leadership and Knowledge Management concentration
9. **Victoria University – Australia**
   Faculty of Business and Law; School of Management
   Master of Business in Management Practice, Innovation and Knowledge Management specialization
10. **Walden University – US**
    School of Management
    Master of Business Administration (MBA), Knowledge/Learning Management specialization
11. **Walden University – US**
    School of Public Policy and Administration
    Master of Public Administration (MPA), Knowledge Management specialization

Engineering, Manufacturing

12. **George Washington University – US**
    School of Engineering and Applied Science; Dept. of Engineering Management and Systems Engineering
    M. Sc. in Engineering Management, Knowledge and Information Management (KIM) focus

Master's programs in KM, taught in languages other than English

German

1. **Fachhochschule Hannover – Germany**
   Master Informations- und Wissensmanagement (MWM)
2. **Technische Universität Chemnitz – Germany**
   Berufsbegleitender Masterstudiengang Wissensmanagement
3. **Universität Luzern – Switzerland**
   Master of Advanced Studies eLearning und Wissensmanagement

4. **Donau-Universität Krems – Austria**
   Professional M. Sc. Wissensmanagement

French

5. **Université Paris Sorbonne – France**
   Master professionnel Conseil editorial, mention Philosophie et Sociologie; Spécialité Analyse du social et gestion des connaissances
6. **Université de Bourgogne – France**
   Master Lettres, Langues, Culture, mention Métiers de l'Information; Spécialité professionnelle Gestion des connaissances
7. **Université de Technologie de Troyes – France**
   Master Science et Technologies, mention Professionelle; Spécialité Ingénierie des Connaissances et Management des Communautés (ICMC)

Italian

8. **Università degli Studi di Verona – Italy**
   Master Universitario in Business Intelligence e Knowledge Management
9. **Università Cattolica del Sacro Cuore – Italy**
   Master in Education & Knowledge Management

Spanish

10. **Universidad Autónoma de Madrid – Spain**
    Master en Gobierno del Conocimiento
11. **Universidad Politécnica de Madrid – Spain**
    Master en Gestión Integrada del Conocimiento, el Capital Intelectual y los Recursos Humanos
12. **Universidad Pontificia de Salamanca – Spain**
    Master en Gestión de la Información y el Conocimiento en Ciencias de la Salud
13. **Fundación Universitaria Iberoamericana – Spain**
    Máster en Recursos Humanos y Gestión del Conocimiento
14. **Universitat Oberta de Catalunya – Spain**
    Master Dirección y gestión de la información y el conocimiento en las organizaciones

Portuguese

15. **Universidade de Aveiro – Portugal**
    Mestrado in Innovation and Knowledge Management
16. **Universidade Federal de Santa Catarina – Brazil**
    Pós-Graduação em Engenharia e Gestão do Conhecimento
17. **Universidade Federal do Rio de Janeiro – Brazil**
    Master on Business and Knowledge Management
18. **Universidade Católica de Brasília – Brazil**
    Mestrado em Gestão do Conhecimento e da Tecnologia da Informação

19. **Pontifícia Universidade Católica, Paraná – Brazil**
    Pós-Graduação em Gestão Estratégica do Conhecimento, da Informação e da Tecnologia

Japanese

20. **Japan Advanced Institute of Science and Technology – Japan**
    Master in Knowledge Science

Appendix 3: Course descriptions of master's programs in KM

Master's degrees in knowledge management taught in English. Information last updated in September, 2006.

University of Hull, UK

- Business School
- M. Sc. in Knowledge Management
- http://www.hull.ac.uk/hubs/05/courses/msc/knowledgeman.htm
- Obs.: discontinued (last checked in 2006-11-13)

Summary

- Degree: M. Sc.
- Mode: on-campus or online
- Duration: 1 yr. full time, 2 yrs. part time
- Structure: 6 required (2 common to all masters) courses (20 credits each) + dissertation (60 credits)

Required courses

Knowledge Management: Models,Tools and Techniques

… aims to develop the student's operational and strategic capabilities and competencies in knowledge management. Students are introduced to the scope, range, depth and usefulness, (from a practitioner perspective), of the knowledge management processes, models, tools and techniques available today and how they may be best applied to lever and enhance organisational performance.

Systems Thinking

… is set within the context of knowledge management and provides students with a grounding in systems thinking in general, and Total Systems Integration in particular. Students are introduced to core systems concepts and taught to think about management problems and organisations in holistic terms, as systems of interdependent parts existing within dynamic environments. Adopting a holistic perspective will necessitate critical reflection on such matters as boundary definition, the role and participation of stakeholders and the ethical responsibilities of the interventionist.

Knowledge Management: Processes in Practice

… aims to develop within students, a competence and multi-disciplinary understanding of how knowledge management is applied in organisations to enhance individual, group, organisation and partnership-wide performance. This module takes the student to an advanced level of theory and practice by exploring the numerous and complex ways in which knowledge management is 'applied in practice' across a number of operational and strategic functions, and across different sectors of the global economy.

Organisational Development and Learning

… provides an exploration of the application of knowledge management principles and practice to organisational development processes, change management and organisational transformation. Students are exposed to the main approaches to organisational learning and development, and will have the opportunity to apply methodologies and techniques, critically reviewing the strengths and weaknesses of each approach as well as their fields of application.

Corporate Strategy (common to all M. Sc. programmes)

… explores the range of theoretical corporate strategy models available today before identifying the means by which corporate and knowledge strategies may be aligned to support organisational critical success factors. The importance of identifying, delivering and supporting both organisational and individual competencies and capabilities will be emphasised. In considering corporate strategy, the module explores the economic and financial rationale in terms of traditional capital investment and the importance, impact, measurement and management of non-financial indicators – intangible and knowledge assets.

Professional Skills Development (common to all M. Sc. programmes)

… introduces students to research in the context of business and management settings, and considers the practical and moral issues of conducting research. Additionally students critically review research methods and techniques required to carry out a rigorous research project.This module provides the opportunity for students to reflect upon their career development objectives, plan for the future, and to align their studies with personal objectives and create a unique study plan. Key knowledge worker skills will be introduced.

University of Portsmouth, UK

- Portmouth Business School (Dept. of Strategy and Business Systems)
- M. Sc. in Knowledge Management
- http://www.port.ac.uk/courses/coursetypes/postgraduate/MScKnowledgeManagement/

Summary

- Degree: M. Sc.
- Mode: on-campus
- Duration: 1 yr. full time, 2 yrs. part time
- Structure: 2 major courses + 5 others (information not clear)

Required courses

Managing Knowledge

this examines the concept of 'knowledge' and its relationship to learning, communities of practice and organizational life. The concept is considered from practical, philosophical and social viewpoints, and the idea of 'knowledge management' is subjected to a critical appraisal.

The Collaborative Working Environment

this unit focuses on the development and implementation of knowledge management tools and systems in the organisations. It will evaluate various systems for creating, capturing and codifying knowledge, and tools for sharing and collaboration work. It will

also address theoretical considerations of using the KM systems and their impact on organisations.

Intellectual Property Law

n/a.

TQM and Organizations

n/a.

Research Methods

n/a.

Risk Management or Information Strategy

n/a.

Knowledge Management Project

n/a.

Lancaster University, UK

- Management School (Dept. of Organisation, Work & Technology)
- M. A. in Human Resource & Knowledge Management
- http://www.lums.lancs.ac.uk/Postgraduate/MAHRMandKM/

Summary

- Degree: Master of Arts
- Mode: on-campus
- Duration: 1 yr. full time
- Structure: 9 required courses + dissertation

Required courses

Organisational Analysis I: The Politics of Contemporary Organisational Change

The approach of this course is to begin by considering the internal relationships of the contemporary organisation. The question is posed: what are organisations really like in terms of their internal relationships and how should we think of them? We assume that those interested in bringing about organisational change must consider what relationships are actually like if they are to have an influence on them or bring about change. The main objective of the first part of the course is to improve appreciation of the character of intra-organisational politics.

We then move to consider employment relationships more generally. The focus would be mainly on the institutions (often outside of work organisations themselves) through which conflict and dissent could be expressed and resolved. The main aim of this module is to shed light on the question of how and to what extent the internal politics of organisations has been changed and what they are like now.

Knowledge Management & Information Technology

This course will consider the area of knowledge work and the role of information technology in this process. Many organisations are now portrayed as becoming increasingly dependent on the exercise of specialist resources and on workers that ply their trade through their cognitive abilities and their specialist knowledge.

Knowledge intensive firms (KIF's) are characterised as comprising of a high proportion of qualified staff, who command high rewards, and who trade in knowledge itself through peer to peer collaboration. This course will first consider well known frameworks and conceptions of knowledge and technology. Following this we will contrast knowledge as being either an entity that can be possessed and traded, or as residing in an evolving, continuously renewed set of relations of persons, their actions and the world. Specifically we will discuss the role of information technology in the knowledge work process, as well as providing several different theoretical conceptions of knowledge working.

Sessions 7 & 8 examine how the use of Computer Supported Co-operative Work (CSCW) systems are implicated in the knowledge work process within the context of a multi-national pharmaceuticals company.

Human Resource Management I

The aims of this course are to introduce students to the theory and, perhaps more importantly, how this actually relates in practice. During the course we will investigate innovations in the management of human resources and the corresponding effects on employees. Analysis will be structured around the social, economic and political context in which HRM operates and how this affects day-to-day HR practice There is a particular emphasis on strategic HRM and its contradictions. The course is designed and delivered to allow those with a prior knowledge of HRM to develop further, whilst bringing those new to the topic up to speed.

Organisational Analysis II: Structural Transitions

This is a course which introduces the study of organisations and management problems from an organisational point of view, taking organisational structures and accounts of structure as its primary focus. We begin with the consideration of the formal organisation (and the role of management) which was developed in the first half of the twentieth century.

The main part of the course deals with the contemporary situation. It is argued that the present time is one of extraordinary change in organisations, and that this offers a considerable challenge to orthodox organisational theory. The material presented looks at what seems to be happening to organisations large and small, and examines key arguments which set out to explain such changes. Selected argument about change, from those grounded in specific hypotheses, to more general and theoretically based arguments, will be presented and assessed.

The Management of Organisational Change

The contemporary world is characterised by a range of social, political, economic, technological and organisational changes that challenge accepted understandings and practices. This course introduces contributions from the social sciences that are useful in thinking about change. The focus is upon the development of an account of change that steers between reformist tinkering and revolutionary upheaval.

As managers and others seek to engage with change it is important that taken for granted assumptions and simplistic solutions about organisational life are both articulated and rethought. Prevailing assumptions in the managerial literature are compared to contrasting approaches within organisation studies. The contention of the course is that the emerging socio-technical-politico-economic context necessitates a reflexive appreciation of the complexities and uncertainties of change and intervention.

Human Resource Management II: Advanced HRM

Advanced HRM builds upon the foundations of the Introduction to HRM. Using examples of concrete, everyday corporate HRM practices, the module explores some of the cultural and historical roots of contemporary HRM vocabularies and techniques. As any 'myth' (narrative, story, ideology, or whatever term might be applied) of social order, HRM too is based on cultural assumptions which need to be examined in order to understand how its field of practices is dynamically constituted. The course aims to offer a set of academic concepts for thinking, critically and reflexively, about HRM and world in which it plays a role. This should facilitate a deeper understanding of 'what is going on' in the workplace in order to understand the possibilities, and significantly, the limitations vis-à-vis the implementation of HRM.

Science & Organisation Studies

This is a course with practical goals as well as academic content. The main purposes are twofold: firstly, to make familiar some of the standard techniques of research relevant to the study of organisational settings (both qualitative and quantitative); but secondly to teach an understanding of research as a process of social communication, and not simply a matter of technique alone. Research is a specialised social process, one in which knowledge is created for specific purposes and for the benefit of identifiable audiences. The practical and technical skills of research are embedded in a matrix of social relations, and understanding this is important.

Students will be required to EITHER produce a research proposal - in which they outline and defend their initial ideas for their summer dissertation, OR write an essay evaluating the strengths and weaknesses of a particular research approach.

Research in Organisation Settings

This is a course with practical goals as well as academic content. The main purposes are twofold: firstly, to make familiar some of the standard techniques of research relevant to the study of information systems in organisational settings (both qualitative and quantitative); but secondly to teach an understanding of research as a process of social communication, and not simply a matter of technique alone. Research is a specialised social process, one in which knowledge is created for specific purposes and for the benefit of identifiable audiences. The practical and technical skills of research are embedded in a matrix of social relations, and understanding this is important.

In addition to the presentation of information about research designs and research practices presented in a standard lecture format, there will be also be two other activities. These are: (1) tutorials and design exercises (in which groups of students consider the problems involved in developing and implementing research projects on selected IS topics and discuss them in the class) and (2) research presentations. Students will be required to produce a research proposal - in which they outline and defend their initial ideas for their summer dissertation.

Quantitative & Survey Research Methods

The purpose of this course is to provide students with key quantitative techniques and their applications within the context of a questionnaire-based survey focusing on an aspect of management research. The main quantitative methods to be covered are: descriptive data analysis, statistical relationships (correlation and regression analysis), hypothesis testing, data reduction analysis (factor analysis) and data classification analysis (discriminant analysis).

The course will be taught via a mixture of lectures, computer workshops and a survey exercise including design, data collection, analysis, interpretation and presentation of results. Examples will be drawn from several research areas across the various

departments in the Management School. The computing laboratory sessions are aimed at introducing students to computer-aided data analysis using the relevant statistical packages.

George Mason University, US

- School of Public Policy
- M. Sc. in New Professional Studies: Organization Development and Knowledge Management (formerly Master of New Professional Studies: Organizational Learning)
- http://psol.gmu.edu/welcome.html

Summary

- Degree: M. Sc.
- Mode: on-campus (cohort)
- Duration: 1.5 yrs.
- Structure: 11 required courses (1 waived if student has prior experience) (39 credits)

Required courses

LRNG 602: Group Dynamics and Team Learning (3 credits)

Using unstructured learning environments, participants learn how to facilitate team learning for organizational effectiveness by engaging in meaningful group interaction. Explores various aspects of group dynamics such as power, perception, motivation, leadership, and decision making.

MNPS 700: The New Professionalism: Theory and Practice (3 credits)

Experiential exploration of contemporary and relevant ethical theories and their diverse applications to the professional studies field. Examines ethical relationship between professionals and clients, ethical accountability and responsibility, ethos of institutions, and professional's role in sustaining ethical standards. Explores philosophical and pedagogical assumptions in understanding professional management issues, and social and individual purposes of being a professional. Customized for each track; for detailed course content, contact appropriate program directors.

MNPS 702: The New Professional as Reflective Practitioner (3 credits)

Identifies central problems in epistemology. Examines how an epistemology appropriate to professional practice may be constructed, what is meant by "ways of knowing" and the "reflective practitioner," and implications for professional learning. Studies core issues of generalizability; objective knowledge and understanding; and how evidence, truth, and meaning affect the nature of organizational reality and the profes-sional's practice. Special attention to developing skills for "double-loop learning," and reflection in professional lives through journals, narrative, autobiography, and imaginative literature. Customized for each track; for detailed course content, contact appropriate program directors.

PUBP 501: Policy and Organizational Analysis (4 credits)

Prepares students to engage in systematic analysis, both qualitative and quantitative, and constitutes the basis for advanced analytical techniques. Emphasis on research design,

information acquisition, application of data analysis techniques, and presentation, including writing for professional and lay audiences.

PUBP 503: Culture, Organization, and Technology (4 credits)

Focuses on the influence of culture in societal, political, economic, and technological processes, nationally and internationally. Culture is seen as dynamic and interactional. Using case studies, students learn pertinent approaches to the study of culture, from the analysis of organization and social networks to that of belief systems and identities. Students also develop practical skills in observation, participation, and intervention.

LRNG 762: Strategic Knowledge Management (3 credits)

Deals with theory and practices of leveraging and sharing knowledge to develop more effective organizations. Focuses on knowledge and communities of practice, and includes use of collaborative technology in managing interactions.

LRNG 672: Organizational Learning Laboratory (3 credits)

Focuses on creating a learning and experimental environment to explore questions and concerns typically faced by managers in their effort to build learning organizations. Questions are analyzed using experiential learning and action research. Classroom group interactions and group projects simulate real-world organizations. The object is to acquire competence to diagnose and analyze organizations and develop skills to become better facilitators of organizational learning. Complements LRNG 601.

MNPS 703: Collaborative Technologies for Knowledge Sharing (3 credits)

Examines the enormous potential for enhancing the way organizations can learn, notably through the development of Internet literacy, and skills in using differing Internet navigation tools. Focuses on applying technology to real-world problems in different professional work-sites, and offers in-depth training in use and development of groupware applications. Customized for each track; for detailed course content, contact appropriate program directors.

PUBP 502: Governance and Policy Processes (4 credits)

Assesses governance processes in public and private organizational settings on the basis of economic and political standards such as efficiency, accountability, and responsiveness to societal needs in a rapidly changing global environment. Using cases, simulations, and fieldwork, students learn to evaluate the quality of institutional governance in specific venues and appraise implications for public policy.

MNPS 720: Learning Community (3 credits)

Prerequisites: candidates for the MNPS (organizational learning) degree only. Workshops, seminars, and reading groups involving at least 60 hours of contact time and culminating in a two-day retreat during which candidates for the MS in new professional studies (organizational learning) make presentations to class and faculty on research practica. Theme of this module is communication, collaboration, and interaction in organizations. After an initial one-and-a-half day workshop, MNPS candidates meet with all faculty once a month to give talks and presentations on application of ideas in their organizations, discuss issues in organizational learning, and provide feedback about using collaborative computing technology in the learning process.

LRNG 794: Professional Internship (may be waived if student has appropriate work experience)

n/a.

University of Melbourne, Australia

- Faculty of Education (Centre for Leadership and Organizational Learning), with Faculty of Economics and Commerce (Dept. of Management and Marketing) and Faculty of Science (Dept. of Information Systems)
- Master of Knowledge Management
- http://www.edfac.unimelb.edu.au/futurestudents/courses/postgraduate/Courses/knowlegdemanagement.html
- Obs.: Will be rested in 2007 and resumed in 2008.

Summary

- Degree: Master
- Mode: on-campus
- Duration: 1.5 yrs. full time, 3 yrs. part time
- Structure: 10 required courses (12.5 credits each) + project (25 credits)

Required courses

482-860, Principles of Knowledge Management

This subject introduces Knowledge Management (KM) as a growing field of organizational study and practice. It provides participants with basic frameworks, literatures and concepts of KM, and considers its scope and limitations. Unlike traditional approaches, this subject discusses the explicit/tacit knowledge distinction fundamental to KM and examines its origins. It offers a theoretical framework, derived from recent cognitive science, which helps students understand how expert knowledge is generated and why it is so hard to represent. The subject also introduces students to a range of tools to manage aspects of explicit and expert knowledge.

325-664, Strategic Management (or 325-672)

This subject examines how strategic analysis is applied to improve corporate performance. We consider sources of competitive advantage, in particular an organisations resources, capabilities and core competencies. We analyse the impact of industry choice and industry positioning. We explore a range of different strategic choices, including market positioning, integration, diversification, expansion, differentiation and outsourcing. We consider the process of strategy implementation and evaluation. The emphasis is on providing the tools to evaluate an organisations external internal sources of advantage and act to modify, enhance and leverage these advantages in the appropriate markets. These issues are placed within broader context of sound corporate governance and consideration of stakeholder issues.

325-672, Managing in Information Societies (or 325-664)

This subject examines the rise of the new information technologies and e-business within a wider organizational, social and historical context. It relates them to the emergence of "information-based" societies, where work, organizations and society are said to be changing. In particular, it examines some of the competing claims made about such developments and examines the actual impacts of new information technologies and e-business on a range of issues that may include work organization and behaviour, employee relations, relations between organizations and their consumers, and organizational strategy and structure. It also looks at the broader social and ethical implications for the wider society and globalisation.

482-866, Work Placement Project (25 credits)

Under the supervision of designated academic project supervisors, students are presented with an opportunity to combine fundamental and applied workplace research activities resulting in the development of knowledge management strategies within their respective organizations. Throughout the semester students are expected to develop and justify an appropriate conceptual framework which will guide their specific knowledge management projects in response to real organizational problems and needs. Students are required to work in a team based project manner for a portion of the project. This subject offers students the opportunity of demonstrating the rigorous application of their learning in an organizationally specific context.

325-492, Business Fundamentals for Knowledge Managers*

Obs.: Students may be exempted from this subject if they can demonstrate relevant prior learning. If an exemption is granted students may choose one elective from one of the three departments.

This subject is designed to provide students with an understanding of the complexity of enterprise management and to be able to apply this to leadership management issues. Topics covered will include: accounting and performance practices, finance, business systems, quality and innovation management, operations, markets, and the organisation at enterprise level. The subject will offer management practitioners the opportunity to understand the operations of the entire firm.

482-861, Creating Knowledge Cultures

Organizational cultures are often considered to be at the core of either hindering or advancing organizational change. The successful generation and transfer of organizational knowledge is a necessary prerequisite for organizational survival and growth. To understand these processes it is necessary to understand how humans acquire knowledge, i.e. how they learn, individually and collectively delimited by context, space and time. Students are introduced to the notion of organizational culture as cognitive process, and how this differs from mainstream conceptions of culture. Topics covered are notions of individual and organizational learning; communities -of-practice as repositories of expert knowledge; conceptions of knowledge transfer; structural implications to facilitate knowledge transfer; and proposals for generating a learning organization.

482-862, Contextualising Knowledge Management

This subject explores the notion that in order to understand the potential of knowledge as a force for change, it is crucial to have an appreciation of the organizational context, its arrangements and associated behaviours. This understanding will be realised through a study of organizational theory and behaviour. Studying the applied and fundamental relationships between people, machines , processes and systems is central to an appreciation for the pervasive nature of technology in modern society. This subject provides candidates with a critical understanding of technology as a construct and as selected cultures of practice that shape human behaviour, learning and knowledge.

482-863, Applying Knowledge Management

This subject combines the theoretical insights students have gained regarding the meaning, scope and limitations of KM with a realistic understanding of the various KM methodologies, strategies, processes and procedures. They are to develop and apply such methodologies as knowledge audits and knowledge maps; case-based reasoning; knowledge repositories and neutral nets. Various inhibitors and facilitators of KM projects are discussed and students develop their own Knowledge Management

frameworks to conduct (or develop further) KM projects in their own organizational contexts.

482-865, Developing Knowledge in the Systematic Enterprise

Systems theory and strategy are the foundation prniciples underpinning current thinking and organizational change practices. This subject provides a critical exploration of functionalist approaches to knowledge development and mapping. Specific practices to be examined include benchmarking, quality management, learning organizations, competency, communities of practice and strategy as viable methods for facilitating knowledge management and development. This subject affords students the opportunity of establishing their effectiveness in delivering innovation and creativity.

615-656, Knowledge Management Systems

This subject focuses on how a range of information technologies and analysis techniques are used by organizations to support knowledge management initiatives. Topics likely to be examined are: collaborative technologies and computer-supported cooperative work; corporate knowledge directories; process documentation; data warehouses and other repositories of organizational memory; business intelligence, including data-mining; process automation; workflow; and, document management. The emphasis of the subject is on the high-level design and rationale of these technology-based initiatives and their impact on organizational knowledge and its use.

615-652, Connected Technologies in Organisations

Connected information technologies such as intranets, extranets, mobile devices, and some forms of groupware, have in common that their adoption is influenced by whether other organisations or individuals also adopt the technology. These technologies raise challenges for IT management, especially in terms of their organisational implementation. This subject explores the processes associated with the introduction of connected technologies in organisational contexts from a managerial perspective. Topics discussed include various theoretical frameworks and models; intranet, groupware and mobile technology implementation; ubiquitous computing; implementation costs and benefits; and issues related to inter-operability and standardization.

615-662, Information Systems Change Management

The development and implementation of information systems is both a catalyst for, and a response to, organisational change. In this subject, the interrelationship between information systems and organisational change is examined from both theoretical and practical perspectives. Several change management theories and models are investigated in depth with an analysis of their applicability, benefits, risks and impacts. Topics discussed include the drivers of organisational change; the nature of change; the relationship of improvisation and innovation to change; strategies for managing change; and the difference between well-tested methods and popular fads for managing change.

International University Bremen, Germany

- Jacobs Center for the Study of Lifelong Learning
- Executive Master Program in Lifelong Learning, Knowledge Management, and Institutional Change
- http://www.iu-bremen.de/lki/

Summary

- Degree: Master
- Mode: on-campus + online elements
- Duration: 1 yr. full time, 1.5 yrs. part time
- Structure: 4 courses + 2 on-the-job projects + concluding seminar + thesis

Required courses

Module 1:The Institution: Conditions of change, innovation, and productivity

- What are the implications of an aging society for lifelong learning and institutional change?
- How to improve adult educational systems?
- What is the family's role in lifelong learning?
- How do organizations facilitate change?
- How can public policy and mass communication encourage lifelong learning?

Module 2: The Individual: Conditions of lifelong learning and development

- Is there development in adulthood?
- What CAN the adult learner do?
- What does the adult learner WANT to do?
- Do adults learn differently?
- No lifelong learning without health: what to know, how to behave?
- Biopsychosocial perspectives on the strengths and weaknesses of the adult learner

Module 3: Contexts, processes and incentives of lifelong learning

- Beyond the given: what is the potential of the adult learner?
- How to create an effective learning environment for adults?
- Employability: What are the key competencies of the adult employee?
- How to manage an aging work force?
- Best practices of lifelong learning: Societal and organizational examples

Module 4: Knowledge transfer and management as a key to organizational change

- How do older workers measure up? Do the costs outweigh performance?
- How to improve human capital accounting?
- Which programs achieve effective knowledge management and transfer?
- How can organizations manage knowledge and how does the mature workforce impact knowledge management?
- Can cost-benefit analysis be used to demonstrate the effectiveness of HR programs (and measures of organizational development)?
- How to finance lifelong learning?

Jones International University, US

- no academic subunits
- MEd in Corporate Training and Knowledge Management
- http://www.jonesinternational.edu/ourPrograms/specialization.php?prg=2&spc=14

Summary

- Degree: M. Ed.
- Mode: online
- Duration: n/a
- Structure: 12 required courses (3 credits each)

Required courses

EDU 500 Learning Theory: Developing Lifelong Learners

Learners develop a personally and professionally meaningful project that integrates the current science of learning and teaching. Students investigate learner-centered psychological principles as defined by the American Psychological Association (APA), including cognitive and metacognitive, motivational and affective, developmental and social, and individual differences factors. See the APA principles online at http://www.apa.org/ed/lcpnewtext.html.

EDU 522 Research Methods: Improving Learning Organizations

This course familiarizes you with the "process of knowing" used by professionals in the field of education. The goal is to help students become critical consumers of educational research through an understanding of alternative research approaches and the issues involved in each choice. It also focuses on two very important skills for a graduate student in education: using information (library and online) resources and writing a research paper. Additional emphasis will be given to ethical use of data, intellectual property, and student privacy issues.

EDU 531 Education Ethics and Social Responsibility

The notion of teachers in a democracy prevails as an understated concept within the United States educational system. The focus of teachers as stewards of the profession is center to the mentorship, social responsibility and ethical decisions used by teachers. Attention will be given to such topics as defining values, ethics, and social responsibility relevant to students' school environment, and evaluating policies governing organizational ethics and social responsibility. The course will also examine and provide applied theory to support and incorporate the teacher as a leader and the associated social responsibility. Additionally, the course examines how teaching in a democracy varies within environments.

EDU 542 Strategic Planning for Educators

The ability to plan an institution's operations with consideration of multiple constituents' perspectives is a fundamental necessity in today's educational environment. This course provides a broad overview of the basic concepts needed in any strategic planning position. Students will develop an understanding of "big picture" goals and perspectives, write mission statements, and identify areas of instructional focus to ensure that strategic plans address the needs of all students. Students will also gain experience using new technologies to resolve related strategic planning issues such as resource allocation and time management. Additionally, the course will incorporate the study of state and district governmental subsidies to enhance strategic plans for the school, such as mill levies or grants. Finally, students will explore current models for strategic planning and decision making, including site-based management, school-community councils, and teacher leadership teams.

EDU 544 Business Management for Learning Organizations

The ability to utilize relevant financial data in a learning organization is a management fundamental. Likewise, resources encompass more than money and include faculty,

materials, facilities, and time. This class introduces concepts, standards, and practices needed for resource management. You will develop the skills needed to finance an institution, strategies to increase an institution's budget, and techniques to access other resources within and outside an institution. Special attention will be given to using technologies in the scheduling and management of the school, such as Standard and Poors,® system of financial analysis and student performance.

EDU 630 Needs Assessment for Learning Environments

Understanding the learning needs, expectations, and resource limitations of an organization is key to designing an effective e-learning environment. This course provides a systematic study that demonstrates the use of a variety of data sources to evaluate educational products and services. You will determine the nature of problems in specific areas and select the appropriate timely, cost-effective response.

EDU 653 Assessment Strategies to Improve Adult Learning

How do you measure the success of an e-learning program? In this course, you learn the assessment and measurement of student outcomes. Assessment and evaluation models, strategies, tools, and techniques are investigated to determine their particular strengths and weaknesses with respect to e-learning.

EDU 621 Managing e-Learning

Trends such as globalization, telecommuting, shorter product development cycles, and the emergence of the Internet have lead to the rise of e-learning, or the networked distribution of formal instruction. This course provides students with a fundamental understanding of the benefit and limitations of e-learning. You will engage in hands-on activities and participate in peer dialogs to explore and assess the process from both the learner's and developer's perspective. You will also master the skills needed to manage the end-to-end process of assessing, designing, developing, delivering, and evaluating e-learning programs.

EDU 622 e-Learning and Knowledge Management Technology

Training professionals working at "net speed" must develop the educational, organizational, and business skills necessary to locate and evaluate instructional technology and knowledge management tools. This course provides students with the theoretical knowledge and practical skills needed to evaluate off-the-shelf programs. You will create your own program using tools for authoring courses and building knowledge management solutions.

EDU 623 Knowledge Management and Workplace Learning

The field of training and development is evolving. While once event based and isolated, it is now process based and integrated with daily workflows. This course provides you with a foundation in the theoretical and practical knowledge needed to integrate knowledge management into workplace learning. Participating in hands-on activities, case studies, and peer dialogs, students gain hands-on knowledge management experience. You will explore how combining technology, organizational structures, and cognitive-based strategies can help organizations gain knowledge from employee experience.

EDU 624 Leading the Future of Corporate Learning Services

This course will allow you to master the skills and tools needed to manage and market corporate learning services. You will explore a range of models for organizing learning services with an emphasis on the role of performance consulting. Using case studies and peer dialog, you compare and contrast the implications of traditional training programs with newer human-performance technology (HPT) interventions. Special attention is

given to linking training to business goals, planning and marketing learning services, conducting a return on investment and cost benefit analysis, and budgeting.

EDU 669 Capstone: The Professional Adult Educator

Learners develop projects that integrate the knowledge and skills they have gained during their M.Ed. coursework. The project helps learners develop their professional and personal competence by addressing the authentic needs of their learning communities. (This course is eight weeks long).

Hong Kong Polytechnic University, Hong Kong

- Faculty of Engineering (Dept. of Industrial & Systems Engineering)
- M. Sc. in Knowledge Management
- http://www.ise.polyu.edu.hk/km/content/km_subject.htm

Summary

- Degree: M. Sc. (30 credits)
- Mode: online
- Duration: between 1.5 and 2 years
- Structure: two alternative modes
    a. Mode 1: 7 courses (5 required + 1 core + 1 elective) + dissertation
    b. Mode 2: 10 courses (5 required + 3 core + 2 elective)

Required courses

ISE542, Managing Knowledge

The subject aims to introduce the students to the foundations of KM. It is designed to provide the students with KM practitioner understanding of how KM fits into, and supports business operations with the further understanding of how KM is conducted from a system approach. Some of the key topics covered in this subject include:

- Basic understanding of knowledge theory, concepts of KM and practice and its applications.
- To familiarize with KM strategy and how to manage culture aspects, and initiatives of KM.
- To understand the management of KM projects.
- Discusses knowledge types (i.e., mental or structural reference models, etc.) and roles in situation handling (sensemaking, decision-making, problem-solving, action implementation) as prerequisite foundation for practical KM work.
- To familiarize with managing knowledge in different industries.
- To understand ethical issues and standards in KM.
- Understand people-centric and IT-based KM from business perspectives based on understanding that business performance results from knowledgeable (competent), motivated, and accountable human actions, in part supported by IT capabilities.

ISE543, Methods and Tools for Knowledge Management Systems

The subject aims to educate the participants on how to identify and leverage on technologies to support KM in an organization. The chosen topics are disseminated by a balanced mix of people, technology and process issues in an organizational context. The methods and tools covered span from readiness assessment for pre-deployment to regular

"health checks" of system(s) in operation. Some of the key topics covered in this subject include:

- Understanding what is a KMS and role of IT in KM
- The codification and personalization approaches to KM and the alignment of KM strategies to organizational objectives
- Specific methods and tools for readiness and cultural assessments, KM audits and analyses
- Critical success factors for KM initiatives
- Taxonomy, classification tools and search engines
- E-collaboration tools and enterprise knowledge portals
- Personal knowledge management – skills and technologies
- Essential of the professional ethics in confidentiality undertaking KM projects.

ISE5600, Organisational Learning: Methods and Practices

In this Subject, we will explore the concept of the learning organization and organizational learning processes, as well as how the concept h as been used, debated or challenged. The later part of the Subject will focus on the methods and tools for the realizing of organizational learning, and assessments of its performance with application examples and case building exercises. The subject is divided into 8 lessons as follows:

- Lesson 1: Introduction
- Lesson 2: The Process of Organizational Learning
- Lesson 3: The Art of Organizational Learning
- Lesson 4: System Thinking: Managing Chaos and Complexity
- Lesson 5: Scenario Planning, Storytelling, and Sense Making
- Lesson 6: Unlearning and Organizational Forgetting
- Lesson 7: Performance and Evaluation of Learning

ISE5601, Managing and Measuring Intellectual Capital

This subject is to provide an overview of methods and approaches to manage and measure knowledge-based assets, and show the critical importance of various Intellectual Capital and Intangible Assets Management approaches to the success of Knowledge Management initiatives and strategies. The following topics are covered:

- Definitions and emerging standards of Intangible assets, Knowledge-based assets and Intellectual Capital
- Intellectual capital management foundations
- "Measurement of IC" as a KM Strategy
- Established models for measuring intellectual capital and corporate performance e.g. Balanced Score Cards, Intangible Asset Monitor, The Skandia Navigator, etc.
- Valuation of intangible assets
- Design of metrics and alignment with corporate objectives and business drivers
- Case studies of Intellectual accounting
- Tools for measuring and reporting IC in organizations
- Intellectual capital implementation approaches

ISE5604, Strategic Issues & Case Studies in Knowledge Management

In this subject, we will explore various advanced topics and strategic issues in KM and organizational learning processes, as well as how the concepts have been used, debated or challenged. The subject will focus on the methods and tools for the realizing, critical assessing and addressing those strategic issues through as a series of case studies,

application examples and c as e building exercises. The subject is basically divided into 9 lessons as follows:

- Lesson 1: Role and Evolution of Knowledge Communities
- Lesson 2: Development of KM Standards and Frameworks Worldwide
- Lesson 3: Role of Information Technology in Knowledge Management
- Lesson 4: Innovation: A Knowledge-Intensive Process
- Lesson 5 Case Box I
- Lesson 6: Advanced and Emerging Knowledge Management
- Lesson 7: Artificial Intelligence in Knowledge Management
- Lesson 8: Knowledge Management and Complexity
- Lesson 9: Case Box II

Core courses

ISE5602, Management of Innovation and Technology

The syllabus is designed around the following four distinctive themes including:

- *Integrating Technology and Corporate Strategy*
  Technological Evaluation; How to Put Technology into Corporate Planning; Technological Innovation and Strategy; Design and Implementation of Technology Strategy
- *Developing a Firm's Innovative Capabilities*
  Internal and External Sources of Technology; Linking New Technology and Novel Customers Need; Cultivating Capabilities to Innovate
- *Creating and Implementing a Technology Development Strategy*
  New Technology Development; Building Competencies and Capabilities through New Product Development; Managing the Development of New Markets for New Technologies
- *Innovation Challenges in Established Firms*
  Choosing the Right Technology (Justification Scheme); Building a Learning Organization for Technology Adoption

ISE5603, Enterprise Knowledge Portals

The subject aims to educate the participants on the relevance and power of a portal to an organization. During the early stage of a portal deployment, an organization may treat the portal as merely a document management and collaboration tool. Later on, the portal may become a framework for live communications, a platform for developing and launching applications, as well as a platform for the sharing of tacit and volunteered knowledge especially during instantaneous unplanned ad hoc collaborations. The chosen topics are disseminated by a balanced mix of people, technology and process issues in an organizational context. The methods and tools covered span from requirements gathering for pre-deployment to regular "health checks" and upgrade/consolidation decisions when one or more portals is in operation. Some of the key topics covered in this subject include:

- What is a portal and its key characteristics
- The basic and advanced features of a portal
- Common types of portals, a taxonomy of portals, and portal evolutions
- Portal architecture, standards and portlets
- Role of taxonomy in a portal. Taxonomy creation and maintenance
- Portal content management
- Portal case studies and lessons learnt

- Portal strategy, consolidations and evolutions from intranets to a portal

ISE5605, Knowledge Communities

This subject introduces students to the concept of knowledge communities. Increasingly, the personalization strategy is being seen as one of the most prevalent ways of fostering and sustaining knowledge sharing and innovation in organisations, societies and even across a group of countries.

In particular, this course will critically examine the various types and models of communities (e.g. project communities, communities of interest, community of practice, knowledge and know-how networks, personal/social networks). Emphasis is on the formation, evolution and governance of communities as well as the tools and technologies to support the operation and growth of communities at different stages of its lifespan.

Through a balanced mix of theories and practical case studies, by the end of the module, students will be expected to have a strong mastery of the various types of communities and their respective roles and contributions in an organisation and/or the marketplace. More importantly, students should be able to demonstrate that, if applicable, how to incorporate knowledge community or communities into their organisation's knowledge management and/or E-Learning strategy. Methods on how to measure/appraise the value (both tangible and intangible) of communities will also be covered. Students are also expected to demonstrate how to develop a business case for launching a community, critically assess the ongoing value of a community and use appropriate tools to gauge and report on the relationships in social/personal networks.

ISE5606, Business Intelligence and Data Mining

This subject introduces the participants the fundamental concepts of business intelligence and data mining. By the end of the module, the participants will be expected to have an overall understanding of the major issues and applications in business intelligence and data mining, including a basic grasp of the algorithm classes and best practices for building successful business intelligence projects. Coverage of the case studies is intended to cover what is possible, as well as pitfalls and dangers to be avoided. Some of the key topics covered include:

- Business intelligence concepts and architecture of data mining
- Issues of using database management system in data mining and operations carried out during data preprocessing
- Relationships among data warehouse, Online Analytic Processing (OLAP) and data process
- Predictive modeling for classification
- Regression analysis modeling for prediction
- Partitioned and hierarchical data clustering
- Market basket analysis and association
- Strategy of implementing data mining for enhancing business intelligence

ISE5607, E-Learning Technologies and Practices

This subject introduces students to the concept of online learning. With the advancement of internet technologies and the ever growing need for knowledge workers to enhance skills and competencies, online (or E-Learning) is increasingly being seen as a dynamic, appropriate and cost-effective way to deliver customized learning material in academia and in industry.

However, there are many misconceptions about the E-Learning concept. Many view E-Learning as merely the Web-enablement of existing training material and by assuming so, fail to leverage on the power of various communications and interaction modes to

maximize the benefits of online learning. One of the key focus of this course is to set the expectation correctly and discuss, with illustrations, the various types of E-Learning models (e.g. collaborative/live learning, blended learning, simulation-based and scenario planning methods) that are prevalent in the marketplace. Other key topics to be covered in the course include E-Learning strategy development, E-Learning communities, community of practice, evaluation of Learning Management Systems (LMS) and Learning Content Management Systems (LCMS), corporate universities, virtual campuses, technologies for E-Learning. Three business trends are also critically examined – the changing relationship between Knowledge Management systems (KMS) and E-Learning systems, the seeming convergences between E-Learning in academia and industry, and between Enterprise and Learning Portals.

Elective courses

11 subjects to be recommended as elective subjects. All the elective subjects are delivered in face-to-face mode. Students may also take subjects offered by other departments.

University of Bradford, UK

- School of Engineering, Design & Technology
- M. Sc. in Financial Engineering and Knowledge Management
- http://www.eng.brad.ac.uk/05/PG_studies/msc/?page=fekm

Summary

- Degree: M. Sc.
- Mode: on-campus
- Duration: 3 semesters
- Structure: 2 courses (20 credits each) + 6 courses (10 credits each) + project (20 credits)+ dissertation (60 credits)

Required courses

Web and Server Programming (20 credits)

On-line computer usage exercise, what is HTML and Javascript, basic HTML commands, overview of wireless mark-up language, HTML security. Web server configuration and operation, server side programming languages, interactive web servers, operational, legal and security issues Database, single and multitable, relationships, SQL,building a database application, linking to a web server.

Financial Engineering (20 credits)

What is Financial Engineering? Financial objects. Time series, sampled data systems, sampling rate and the Nyquist criterion. Stationary and non-stationary time series. Linear and non-linear phenomena. Random walk, the Diffusion equation, Brownian motion, Fractal dimension, the Hurst exponent. Statistical measures. Mean, variance, higher-order moments, Gaussian and non-Gaussian (Pareto-Levy) distributions, 'fat-tailed' phenomena. Digital filter applications - moving averages, de-trenders, Hilbert filters. Correlation and Co-integration of time series. Forecasting or Fortune Telling? What can we realistically forecast? Types of models for forecasting,the concept of a 'forecast horizon'. Complex

financial objects - derivatives, options, futures, put-call parity equation, trading put-call ration, options matrix, data mining. Financial Engineering for the real world. Information and intelligence, deploying FE on the Web, making a successful web business out of FE.

Foundations of Cryptography (10 credits)

1. Introduction to algebraic Number Theory: Modular arithmetic. Finite field arithmetic. Fields, groups and rings. Fermat's theorem. Euler's theorem. Carmichael's theorem. Chinese Remainder theorem. Quadratic residues. Randomness. Prime Numbers. 2. Introduction to and history of cryptography: Ciphers in antiquity, Caesar cipher and other substitution ciphers. The black chambers. Enigma, Turing and Bletchley Park. Classical (Symmetric). 3. Ciphers: Monoalphabetic ciphers, polyalphabetic ciphers. Disadvantages of classical ciphers and their replacement by public key schemes. 4. Examples of advanced applications

Financial Cryptography (10 credits)

Revision of cryptographic basis. Symmetric & asymmetric ciphers, block ciphers, stream ciphers, zero knowledge, hiding information in trapdoor knapsacks.Protecting the e-business model. Vulnerabilities of the e-business model, Internet related risk factors, threat assessment, and countermeasures.Financial protocols and transactions. DES (Data Encryption Standard) & ANSi X9.9 Message Digests, SWIFT network, BOLERO and emerging Internet transaction protocols.Protecting the financial server. Vulnerabilities of servers, hackers and their methods, firewalls, access control, authorisation.Electronic cash. What is e-cash? The Mondex experiment, DigiCash, 'blind' money and its uses, double spending attacks, the 'electronic wallet'.The FIX (Financial Information Exchange) standard. Building a cryptographically secure site. Where do I start? SSL, application layer security, end-to-end security, VPN (virtual private networks). Internet 'tunnelling'.

Research Seminar Series (10 credits)

n/a.

Knowledge Management (10 credits)

Intangible assets and the role of knowledge in organisations. Relationship of knowledge management to organisational learning and competitive strategy. Business excellence and knowledge management. Conducting a knowledge management audit. Knowledge driven innovation. Discovery of knowledge in data. The role of technology.

Risk Management (10 credits)

n/a.

Advanced Systems Programming (10 credits)

Communications Systems Programming: Computer communications methodologies and paradigms. Software algorithm and protocol design. Software engineering of communications protocol. Layered functionality models, placement of mechanisms in protocol hierarchies. TCP/IP communications, IP addressing, ports and sockets. Socket programming, Telnet, FTP, http. Review of HTML, SSI and CGI Design of general communications client and server architectures. Software engineering and design of Web robots and autonomous clients.

Cranfield University, UK

- School of Applied Sciences (Manufacturing Dept.)
- M. Sc. in Knowledge Management for Enterprise Development

- http://www.cranfield.ac.uk/sas/cim/teaching/knowledge/km.htm

Summary

- Degree: M. Sc.
- Mode: on-campus
- Duration: 1 yr. full time, 2 yrs. part time
- Structure: 8 required courses + group project + individual project

Required courses

Business Process Analysis and Engineering

To develop the student's understanding of business process analysis and engineering through the application of modelling tools, techniques and methodologies.

- Business Process Management.
- Manufacturing and Services Processes.
- Re-engineering and Improvement Cases.
- Modelling and charting tools. Lean Processes.
- Improvement Workshop Techniques.
- Business Process Outsourcing.

Enterprise Modelling

To extend the student's appreciation and understanding of integrated knowledge systems within the context of the wider enterprise environment through the application of modelling tools, techniques and methodologies.

- Introduction to modelling.
- Taxonomy.
- Overview of methods and techniques.
- Soft systems practice.
- Decision centre analysis.
- Structured analysis methodology.
- Process description capture tools and techniques.
- Data recording.
- Information acquisition.
- Systems analysis.
- Knowledge object state transition networking.
- Systems wide modelling methodologies.
- Discrete event simulation techniques and
- methodologies.
- Case study analysis.
- Use of industry based software tools.

Data Management

The aim of this module is to provide fundamental concepts and working knowledge on data management techniques including data capture, data quality management, data warehousing and data mining system design, development and application.

- Data capture,
- data quality management,
- data management process,
- data analysis,

- Basic database architecture,
- design of databases,
- database management systems,
- case study,
- distributed databases,
- introduction to Business Intelligence,
- concepts of data warehousing,
- OLAP,
- Data Mining: concepts, techniques, tools and applications,
- Data Visualization.

General Management

To give an introduction to some of the key general management and personal management skills needed to influence and implement change.

- Management Accounting Principles and Systems;
- Competitive Manufacturing Simulation exercise;
- Personal style and team contribution, interpersonal dynamics, leadership, human and cultural diversity;
- Marketing.

Enterprise Computing

To provide a basic understanding and knowledge of the Enterprise Computing techniques used in industry. The course will also provide hands-on experience using a leading industry-standard software application.

- Enterprise wide IT systems,
- Enterprise Resource Planning (ERP): concepts, techniques and tools,
- data exchange,
- SAP/R3 based hands-on case studies,
- Customer Relations Management (CRM): concepts and strategies, the CRM approach examines all areas of the business that affect customers - marketing, sales, customer service through the integration of people, process and technology, taking advantage of the revolutionary impact of the Internet.

Knowledge System Design

To extend the student’s appreciation and understanding of key Internet and related technologies and to demonstrate how such technology is used in the design of knowledge systems to aid enterprise development.

- Knowledge System Technologies
- Enterprise Systems
- Collaborative Working in Supply Chain
- Transaction processing through the Internet
- Enterprise Application Integration
- Visual Modelling with UML
- Data Protection and Security
- Specifying a Knowledge Workspace for Collaborative Project
- Collaborative Working Tools
- Building a Knowledge Workspace for Collaborative Project using BSCW

Enterprise Integration

To develop an appreciation of the implications and opportunities of integrated enterprise systems and to enhance student understanding of business value within the context of new modes of enterprise organisation.

- Corporate environment,
- determinants of business value,
- social and cultural diversity of organisational forms,
- globalisation factors,
- business values,
- agility and flexibility,
- case studies,
- introduction to the enterprise,
- interaction of enterprise functions,
- communications and integration techniques.

Understanding Knowledge

To develop an overview and foundation of this evolving subject area, its challenges and opportunities and some of the key skills required to deliver knowledge management practice.

- Introduction to knowledge management issues.
- A background to knowledge.
- Towards a typology of knowledge.
- Models of knowledge creation.
- Learning organisation.
- The environment of knowledge management.
- Knowledge Management implementation case studies.
- Knowledge representation schemes.
- Knowledge acquisition techniques.
- Systems thinking and diagramming / Soft Systems.

California State University

- The Tseng College of Extended Learning
- Master of Knowledge Management
- http://www.csun.edu/~exlinfo/km.html

Summary

- Degree: master
- Mode: online, cohort
- Duration: 2 yrs.
- Structure:

Required courses

KM 610: The Information and Knowledge Professional in the Information World (3)

Explores the history of information management; trends in information generation, publishing, and use; and the future of information and knowledge. Provides students with an understanding of different information and knowledge environments. Employment

opportunities for information and knowledge professionals, including outsourcing, brokering and freelancing, are also discussed.

KM 611: Policy, Law and Economics of Knowledge Management (3)

Reviews organizational policy development and laws pertaining to information and knowledge storage, use and retrieval. Explores strategies and methodologies used to define the value of information and knowledge. Students will develop an understanding of the ethical and public policy aspects of managing knowledge.

KM 620: Information Organization in the Knowledge Management Environment (3)

Studies the constitution, structure and form of information and knowledge, including traditional principles of information and knowledge organization as well as special metadata standards for non-traditional materials, data mining, storage and retrieval, formats, strategies and software. All media types will be covered, including audio, video, electronic and print.

KM 630: Information Needs and Education for Knowledge Managers (3)

Introduces students to user information and knowledge management needs and the best methods for presenting educational materials for user-centered education/training programs. The course will focus on the nature of adult learning and provide an overview of learning theory and leading practices and assessment methods. Students will become familiar with information-seeking behavioral research and methods of developing and delivering education and training programs for populations that deal with knowledge in various contexts. The course will also emphasize public speaking. All students will be required to plan and deliver an instructional presentation.

KM 631: Management of Information and Knowledge Services (3)

Presents management principles and skills relating to supervision, financial analysis, marketing and project management. Emphasis is placed on leadership, customer service, and managing organizational changes that result from the implementation of knowledge management concepts and practices.

KM 632: The Knowledge Management Business (3)

Provides an understanding of what is involved in creating various types of knowledge management organizations, including a knowledge management team or department, a KM consulting business, or an information-delivery organization, such as a library or publishing company. The course analyzes the benefits an information business can provide and compares the value of having a KM program within an organization with the costs of failing to manage knowledge appropriately. The cultural challenges faced in the implementation of KM programs will also be discussed. Students will acquire the skills necessary to determine the knowledge management needs of an organization and to develop a KM business plan. This course also provides an understanding of the business enterprise and addresses the legal issues relating to business formation.

KM 633: Communication in the Knowledge Environments (3)

Explores the fundamentals of effective communication in a knowledge environment. This course examines collaboration, teambuilding, leadership, knowledge transfer, information overload, organizational culture and storytelling and provides an overview of communication networks to enable students to gain skills in the transfer of knowledge. Students will gain expertise in how information and knowledge flow in an organizational setting and an understanding of the dynamics involved in creating, changing and managing the sharing of knowledge in the organizational context.

KM 641: Information Access and Online Searching (3)

Explores the principles of information retrieval and introduces key sources for information navigation and display concepts. Explains search strategies and skills for using both print and electronic sources, including algorithms for retrieval and mediated searching.

KM 642: Knowledge Management (3)

Provides the foundation skills for using knowledge management within an organization. This course focuses on essential concepts and their practical business applications, including how KM relates to e-business and how learning occurs in organizations. The course also examines the challenges that commonly arise with the introduction and implementation of KM and introduces frameworks and processes for strategic planning, implementation and evaluation.

KM 643: Competitive Intelligence (3)

Introduces the foundational skills necessary for addressing external competitive intelligence issues that arise when an organization manages its knowledge. This course analyzes cultural, behavioral and ethical issues related to competitive intelligence. It also covers statistical and strategic analysis of these issues.

KM 650: Technology of Information for the Knowledge Management Professional (3)

Introduces the conceptual and practical elements of visual and computer literacy. This course will cover KM technologies assessment and the critical relationship between the knowledge manager and the information technology expert.

KM 690: Capstone Experience (3)

Focuses on professional and career development for the new knowledge management professional. Students will create a portfolio that includes a major paper, a career plan, a project report, and a professional resume. Students will also learn effective interviewing skills. Depending upon the goals of the student, a project will be undertaken in cooperation with an organization and under the direction of the faculty.

Dominican University

- Graduate School of Library and Information Science
- M. Sc. in Knowledge Management
- http://www.dom.edu/gslis/programs.asp?program_id=76&schnav_id=2043&tschnav_id=1010

Summary

- Degree: M. Sc.
- Mode: classroom
- Duration: 1 yr. + 2 summer sessions (minimum)
- Structure: 13 courses, 7 req + 3 or 2 elecore + 3 or 4 eleopen

Foundation Courses / 21 hours

LIS 880: Knowledge Management

Provides an awareness of current theories and foundation of knowledge management with an emphasis on profit and not for profit organizations. Discusses knowledge assets and

their value to organizations in terms of products, processes, market and services. Examines analytical tools and techniques for knowledge acquisition, assessment, evaluation, management, organization, and dissemination. Provides an analysis of commercially available documents, databases, and applications packages, reviews best practices and experiences, and addresses the design and execution of knowledge management projects. Prerequisites: Four core courses or permission of the instructor.

GSB 624: Organizational Analysis and Design

This course in organizational theory is meant to help students identify and understand the various aspects of organizational design. We hope to integrate the classic and traditional streams of thought with contemporary ideas and see how these are practiced in the real world.

LIS 743: Reference Sources in Business and Economics

A study of management information resources. The course analyzes the production and access of externally generated information information in both computer and print formats.

GBIS 727: Knowledge Technologies

This course examines a set of information systems which specifically support managerial decision makers: Decision Support Systems, Group Decision Support Systems, Executive Information Systems, Data Warehouses, Expert Systems, and Neural Networks. Over the semester, we will explore and discuss the development, implementation, and application of these systems, how these systems can be applied to current business problems, as well as how organization issues impact the implementation and usage of these systems. This will involve developing conceptual knowledge of these systems as well as gaining practical knowledge of several software packages for decision support.

LIS 755: Information Policy

An overview of information policy issues, both intra- and inter-organizational. One major cluster of topics covered includes the role, the organization, and the effect, particularly as it concerns productivity, of information services within the organization. A second major cluster concerns the policy issues relating to inter-organizational creation and use of information, including economic, legal, and social issues, and broad policy concerns such as trans-border data flow and national information policies.

LIS 703: Organization of Knowledge

An overview of principles, methods and systems in the organization of all types of library materials and information. An introduction to the basic level use and interpretation of principles for AACR2 , subject headings, Dewey Decimal Classification, OCLC (Online Computer Library Center), MARC21 (Machine Readable Cataloging) formats and Library of Congress Classification. Prerequisite or co-requisite: 701.

LIS 799: Practicum

Supervised experience (120 hours) in an approved library or information center under the direction of a GSLIS faculty member. In addition, a course research report or project, will be required. The library supervisor, the faculty member and the student meet periodically to review the student"s progress. Prerequisites: Ten courses including core courses. GPA of 3.3 or higher.

Concentration in Management Systems

Required courses / 9 hours

GBIS 703: Management Computer Programming I

The main objective of this course is to provide the student introductory programming experience using the language Visual Basic.Net, a Windows based, object oriented, event driven, graphical, interactive programming environment. Students will come to appreciate the programmer perspective (for example, way of thinking and challenges) and learn to talk the same language.

GSB 612: Managerial Accounting

This course introduces students to basic accounting theory and practice, with an emphasis on the measurement of income, the preparation of general purpose financial statements, and corporate disclosures. The course also familiarizes students with the use of financial information to improve managerial decision-making and control. Topics emphasized include financial statement analysis, costing methods, budgeting and variance analysis, cost-volume-profit analysis, capital budgeting techniques, and the time value of money.

GSB 615: Financial Management

This course provides students with the foundation of financial management including information, tools and decisions. It starts with a review of the data financial statements present and of the methods used to analyze these data. Next, the course covers the tool of time value of money with its application to the pricing of stock and of bonds and the tool of risk and return analysis. This course finishes by using the information and tools to determine the cost of capital and make capital budgeting decisions. Throughout the course, the student is provided opportunities for practical applications to operating concerns. Prerequisites: GSB 611, 612 and 613

Electives / 9 hours

Economics for Managers

Organizational Behavior

Forecasting

Managerial Communications

Systems Analysis and Design

Database Management Systems

IT Management

Advanced Topics in Knowledge Management

Project Management

Concentration in Information Science

Required courses / 6 hours

LIS 751: Database Management

An introduction to database concepts, database design, and database implementation. Examines the role of data in the library/information environment and the application of database principles in information storage and handling. Students will have hands-on practice with a database management system. Prerequisites or co-requisites: 701 and 703.

LIS 754: Information Systems Analysis and Design

Introduction to the concepts and techniques of systems analysis and design and their application to information systems and services. Systems analysis is broadly defined, including related topics such as cost-benefit analysis and operations research. Topics include critical path methodology, basic queuing theory, retrieval system evaluation and measurement, and human factors in information systems design. The course also offers an introduction to logical data structuring. Prerequisites or co-requisites: 701 and 703.

Electives / 12 hours

- Indexing and Abstracting
- Information Storage and Retrieval
- Internet Fundamentals and Design
- Advanced Topics in Knowledge Management
- Metadata for Internet Resources
- Competitive Intelligence for Management Decision-Making
- Searching Electronic Databases
- Data Mining

Kent State University

- College of Communication and Information (School of Library and Information Science), with College of Arts and Sciences (Department of Computer Science), College of Business Administration (Graduate School of Management), College of Communication and Information (School of Communication Studies, School of Journalism and Mass Communication, School of Visual Communication Design)
- M. Sc. in Information Architecture and Knowledge Management
- http://iakm.kent.edu/iakmprogram.html

Summary

- Degree: M. Sc.
- Mode: classroom
- Duration: not available
- Structure:

Program Core: 5 courses, 15 credit hours

IAKM 60001 Information Architecture and Knowledge Management I

Overview of Information Architecture, Information Use, and Knowledge Management. Basic skills and understandings in information literacy, organization of knowledge, information sources and searching. Information sciences, systems, and professionals in the information society.

IAKM 60002 Information Architecture and Knowledge Management II

Prerequisite: IAKM 60001. Introduction to various types of knowledge organization systems / services / structures (KOS) used in the networked environment. Understanding of the functional, philosophical, logical, and linguistic fundamentals of KOS . Explanation of design options, features of KOS , and procedures to be used in the thesaurus, taxonomy, and ontology construction.

IAKM 60005 Information Technologies

The course will encompass five themes associated with information technologies (IT): IT in the Organization; The Web Revolution; Organizational Applications; Managerial and Decision Support Systems; and Implementing and Managing IT. Topics range from systems infrastructure, competitive advantage, data warehousing, evaluation methods and IT economics.

IAKM 60006 Strategic Information Management

Fundamental concepts of strategy, resource management, and systems theory are explored and then applied to diverse problems in information technology (IT) management. Specific IT studied includes information systems analysis and design, telecommunications, data management, and emerging artificial intelligence resources. Both theory and technologies are examined with a particular emphasis on their relevance to the emerging problems of electronic commerce.

ECON 62015 Economics of Information

Introduction to microeconomic theory and decision making and its applications to the information economy. Overview of the economics of information. Consumer behavior and production theory, the demand for information; information as a factor of production; information costs and pricing. Case studies in the information industry.

Knowledge Management Core: 4 courses, 12 credits hours

IAKM 60301 Foundational Principles of Knowledge Management

This course covers an introduction to: historical roots for knowledge and knowledge management; theories/definitions of knowledge; theories, applications, tools, and practices of KM; Knowledge Management Life-Cycle Framework and Models; significant issues in KM - best practices, culture, economics, strategy, intellectual capital, sustainable innovation.

IAKM 60302 Organizational Memory Management

This course provides a conceptual foundation and practicum for Organizational Memory Management (OMM) that focuses on: principles (conceptual framework, historical context), projects (identifying, selecting and evaluating OMM systems, applications, repositories), and practices (current research initiatives and organizational challenges, concerns, issues, obstacles associated with deployment).

IAKM 60303 Organizational Knowledge Management

Implementation strategies for human resources, organizational processes, and technology are explored. The organizational knowledge management activities of knowledge acquisition, generation, formalization, deployment, utilization, measurement, and evaluation are presented.

IAKM 60304 Research Methods for Knowledge Management

This course provides a broad overview of the use of qualitative methods in knowledge management, including an examination of the process of conducting qualitative research from conceptualization, design, data collection, articulation, and preliminary implementation. Critical thinking, analysis, and writing skills are emphasized.

Knowledge Management Electives: 4 courses, 12 credit hours

- IAKM 60691 Seminar: (variable course titles)
- IAKM 60692 Practicum
- IAKM 60792 Internship

- IAKM 61095 Topics: (variable course titles)
- IAKM 61096 Individual Investigation
- BAD 64042 Management Information Systems
- BAD 64081 Data Communications and Networking in Business
- BAD 64082 Database Management Systems
- BAD 64083 Information Security
- COMM 65851 Organizational Communication
- CS 63995* Advances in Internet-Based Applications and Systems
- JMC 50015 Media Management
- JMC 60015 Advanced Media Management
- LIS 60610 Library Management
- LIS 60649 Digital Image Processing
- LIS 60650* Information Policy
- POL 68091 Managing Conflict and Consensus

Thesis or Master's Project

- IAKM 61199 Thesis I and
- IAKM 61299 Thesis II (if appropriate)
- IAKM 60198 Master's Project

University of Oklahoma

- College of Arts and Sciences (School of Library and Information Studies)
- M. Sc. in Knowledge Management
- http://www.ou.edu/cas/slis/degreeprogs/mskm.htm

Summary

- Degree: M. Sc.
- Mode: classroom
- Duration: not available
- Structure: 15 req + 15 elec + 6 eleo = 36 h

Required courses, 15 hours:

G5023 Management of Information and Knowledge Organizations

Prerequisite: 5033. Theories, processes, behaviors, and issues that allow knowledge based institutions to transform themselves in to ones that organize and share knowledge in an effective, efficient manner; leadership, motivation and organizational communication; management of knowledge workers, ethical and legal aspects of managing information and knowledge organizations. (F, Sp, Su)

G5033 Information and Knowledge Society

Prerequisite: Graduate standing or permission of instructor. The nature of knowledge and information; National and global organizational information infrastructure. The role of information and knowledge professionals in the knowledge society; information policy; economics of information; information industries; legal and ethical considerations in information and knowledge system. This course is a prerequisite or corequisite for all courses required for the MLIS or MSKM and must be completed in a student's first semester of summer session as an MLIS or MSKM student. (F, Sp, Su).

G5043 Organization of Information and Knowledge Resources

Prerequisite: 5033. Organization of internal and external sources of information; information services and tools; basic concepts of information storage and retrieval systems; design and structure of information systems; identification and organization of knowledge resources such as expertise, skills and competencies; knowledge organization methods such as classification, cataloguing taxonomies and metadata; search strategies and information retrieval. (F, Sp)

G5053 Information Users in the Knowledge Society

Prerequisite: 5033. Information use by people in various roles, situations, and contexts, individually and in groups. Information behavior and the influence of learning and cognitive process; value systems; and situational, psychological, sociological, and political perspectives. Application of study of user information behavior to textual, graphical, and visual representation of knowledge. Includes both theoretical models and practical methodologies for study of uses and for user-centered design of information and knowledge systems and services. (F, Sp)

G5823 Internship in Library/Information Centers

Prerequisite: Eighteen hours of knowledge management coursework and permission of adviser and supervising faculty. Provides an opportunity for student synthesis of principles and theories acquired in coursework and application of these principles and theories in an appropriate setting. Professional supervision; requires 135 hours. (F, Sp, Su)

Guided electives, 15 hours; at least one course from each of the following categories:

Learning Organizations and Organizational Culture

- HR 5033 Seminar in Leadership in Organizations
- KM 5263 Organizational Learning and Learning Organizations
- ODYN 5113 the Psychology of Leadership
- ODYN 5133 Teams and Motivation
- ODYN 5253 Organizational Development
- ODYN 5313 Planning Processes and Strategy Development

Information Technology

- KM 5643 Knowledge Representation
- LIS 5990 Knowledge Commerce
- TCOM 5213 Network Design and Management
- TCOM 5353 E-Commerce Architecture
- TCOM 5553 Telecommunications Technology

Content Management

- KM 5433 Design and Implementation of Networked Information Services
- LIS 5403 Cataloging and Classification
- KM 5413 Indexing and Abstracting
- KM 5473 Document and Records Management

Access to Knowledge Structures

- IE 5813 Information Ergonomics
- KM 5523 Online Information Searching

- KM 5553 Business and Competitive Intelligence

Research, Production, and Evaluation

- LIS 5723 Knowledge Management Design Project

General electives, 6 hours

two additional courses selected from courses in the categories above, from the following courses, or from appropriate courses in other units under advisor's guidance or completion of a thesis (no more than 6 hours of thesis credit may count toward the degree).

- KM 5223 Information Technology Management
- KM 5653 Preservation of Information Materials
- KM 5713 Research Methods
- KM 5920 Directed Research (1-3 hours)
- KM 5940 Directed Project (1-3 hours)
- KM 5960 Directed Reading (1-3 hours)
- KM 5980 Research for Master's Thesis (2-6 hours)
- KM 5990 Special Problems (1-3 hours)

Robert Gordon University

- Aberdeen Business School
- M. Sc. in Knowledge Management
- http://www.rgu.ac.uk/abs/postgraduate/page.cfm?pge=5403

Summary

- Degree: M. Sc., also PgCert and PgDip
- Mode: on-campus and online
- Duration: 1 yr. full time (45 wks), 3 yrs. part time (105 wks)
- Structure:

Required courses

Knowledge Management: Philosophy and Roles

Identifies and discusses the theory and practice of Knoweldge Management in the organisational setting. It aims to analyse and evaluate the role of knowledge and information management in decision-making for competitive advantage and value.

Information Studies

Outlines the range of information sources and the role of information services in analysing user needs and meeting them.

Knowledge Management: Tools and Technology

Provides students with the skills to evaluate and apply relevant tools and techniques in the capture, access and creation of individual and organisational intellectual capital.

The Business Context of Human Resource Management

This provides a strategic overview of human resource management.

Knowledge Management Systems

Identifies and evaluates relevant Knowledge Management tools, techniques and products and assess their effectiveness in the capture, access and creation of individual and organisational intellectual capital.

Technology and Culture

Promotes a critical understanding of socio-economic, organisational and cultural implications of technological advance, and an awareness of the professional responsibilities of knowledge practitioners.

Research Methods

Identifies appropriate strategies and techniques for analysing problems and conducting investigations.

Fieldwork Placement

Provides an opportunity to apply knowledge and skills gained from the course and apply then in a relevant context.

Dissertation

The dissertation will be an investigation into a relevant topic. This is agreed with the tutor and full dissertation supervision is provided.

London Metropolitan University

- Dept. of Applied Social Sciences, Information Management (subject area)
- M. Sc. in Information and Knowledge Management
- http://www.londonmet.ac.uk/pgprospectus/courses/information-and-knowledge-management.cfm

Summary

- Degree: M. Sc., also PgD, PgCert
- Mode: classroom + distance learning support
- Duration: 1 yr. full time, 2 yrs. part time (M. Sc.: 180 credits)
- Structure: 6 required (20 credits each) + dissertation (60 credits)

Required courses

CMP048, Strategic Information Management

This module provides students with a framework for the exploration of current, and emerging issues, relating to the identification and management of information assets within organisations.

Indicative Syllabus:

- Defining the concept of information
- Information strategies and policies
- Utilising audit and mapping tools
- The relationship of ICTs with information management (IM)
- The human interface/interaction component of IM

CMP027, Research and Evaluation Strategies for IKM

This modules aims to equip students with the ability to understand and deploy a range of appropriate research and evaluation techniques capable of supporting the case for the adoption and development of IKM strategies.

Indicative Syllabus:

- The structure of the research process
- Tools and techniques for producing a research-based project plan
- Identifying, analysing and exploiting a range of data, using appropriate analytical methodologies, including quantitative and qualitative research methods.
- Development of evaluation and measurement strategies for IKM scenarios

CMP052, Legal Aspects of Information and Knowledge Management

This module aims to provide an introduction and overview of the principal areas of law governing information, particularly in relation to the new technologies, and to raise awareness of the increasing importance of the EU and international aspects of dealing with information, data, and databases.

Indicative Syllabus:

- Law, legal systems, sources of law, and types of law.
- Intellectual property in the UK, EU, and international context.
- Concentration upon specific substantive Intellectual Property and information technology legal issues such as copyright, databases, etc.
- Consideration of general legal issues arising out of the new technologies, such as e-commerce, e-contracts, internet jurisdiction, etc.

CMP050, Knowledge Architecture

This module focuses upon the design of systems to manage an organisation's knowledge and information resources. It examines how knowledge and information resources may be organized and presented to improve the efficiency of search and retrieval.

Indicative Syllabus:

- Exploration of classification and indexing theories and systems and their applicability to IKM
- Taxonomies in knowledge and information organization
- Subject analysis and thesaurus construction
- Needs and task analysis in systems design
- Designing for usability
- Evaluating knowledge and information systems

CMP049, Knowlege, Culture and Change

The overall objective of the module is to provide students with a framework with which to explore the potential for maximising the benefits of intellectual capital and knowledge assets within the organisation, thereby contributing to the enhancement of organisational effectiveness through continuous organisational learning and innovation.

Indicative Syllabus:

- Defining concepts of knowledge and knowledge management
- Understanding the impact of organisational culture and human resource management on KM strategy effectiveness
- KM implementation strategies and policies
- Measurements to assess the success of KM strategies
- Demonstrated best practices in KM

CMP051, Knowledge Applications and Technologies

Organisations are increasingly seeking technical solutions to knowledge management challenges and this module takes the opportunity to address both the range of technical

solutions as well as the issues around their successful implementation within organisations.

Indicative Syllabus: A range of technical solutions will be presented including Databases; Intranets; Electronic Document Management Systems, Workflow Systems, Web Content Management Systems and the associated Project Management Issues.

CMPP28, Information and Knowledge Management Project (60 credits)

This module provides students with an opportunity to demonstrate that they can successfully synthesise the theoretical, analytical and applied skills gained over the taught element of the course.

Indicative Syllabus: From the outset of the programme, students will be encouraged to look ahead to the project element of the course, with a view to identifying subjects or areas, of particular interest. By the beginning of the third semester of study, students anticipating completion of the programme within the minimum two years, would be expected to have developed an outline project proposal, which is formalised during their studies for the Research and Evaluation Module. Feedback from this module will include the identification of a designated project supervisor with whom the student would liaise during the period of study.

Loughborough University

- Faculty of Science, Dept. of Information Science
- M. Sc. in Information and Knowledge Management
- http://www.lboro.ac.uk/prospectus/pg/is/iakm/

Summary

- Degree: M. Sc., also PG diploma
- Mode:
- Duration: 1 yr. full time, up to 3 yrs. part time (180 credits)
- Structure: 10 required courses (10 credits each) + 8 electives courses (?), or 10 required courses + 2 electives + dissertation (60 credits) (not clear in website)

Required courses (10 courses)

Design and Authoring for the World Wide Web

The aim of this module is for the students to learn, understand and employ Hypertext Markup Language (HTML) in conjunction with Cascading Style Sheets (CSS) and Javascript in order to create effective web pages.

Contents

- basic WWW and Internet concepts;
- introduction to HTML and its variants and extensions;
- design of web pages; conventions and style guides;
- use of graphics in web design;
- evaluating web pages and web sites;
- future developments.

Information Retrieval for Knowledge Management

The aim of this module is for students to be able to:

- understand and distinguish between the information needs of users in a knowledge based organisation;
- be aware of the external information sources that will support the users;
- gain practical experience using external electronic information services (EIS);
- understand the issues involved in setting up services for end users including contractual issues and user profiling;
- identify the IR tools for filtering external information;
- identify the IR tools that enable access to internal information and knowledge sources;
- understand the electronic methods available for integrating external and internal data, information and knowledge.

Contents

Students will be given an understanding of the organisational structure of knowledge based organisations, including the roles and tasks and how these influence the demand for data, information and knowledge. They will then be introduced to systems and services that will facilitate the satisfaction of these needs in terms of access to both external and internal sources. In the practical sessions students will learn the necessary IR skills by using a popular online service and be exposed to a range of data, information and knowledge management tools.

Informatics, KM and Systems

The aims of this module are for the student to:

- gain an introduction to systems thinking and the systems approach to problem solving;
- acquire practical experience of investigating system using creative management models;
- gain an appreciation of system-based methodologies for real-world application.

Contents:

- Framework of systems science: the systems approach, introduction to systems concepts and theory.
- Information modelling: diagrammatic models, classification and type.
- Systems behaviour: cybernetics and information feedback, open loop and closed loop decision models.
- Systems methodologies: hard systems methodology, soft systems methodology and management cybernetics.

Principles of Knowledge Management

The aims of this module are for the student to:

- develop an awareness of current theories and practices of knowledge management (KM).
- to apply theoretical understanding of knowledge management to real life situation.

Contents:

- Antecedents to KM.
- Philosophical approaches to knowledge.
- Organisational learning and memory.
- Intellectual capital.
- Strategic issues around KM to enhance organisational effectiveness.
- Cultural management and social capital.

- KM tools and technology.
- KM systems.
- Implementation of KM in organisations and the concept of a 'learning organisation'.

Information Architecture

The aim of this module is for the student to gain a knowledge of the principles of information organisation, and to develop a knowledge of the systems and techniques as applied in a knowledge-based environment.

Contents:

- Content management.
- Summarisation, abstracting and text analysis.
- Metadata.
- Taxonomies, site and directory indexes (including tools and application), thesauri.

Database Structure and Design

The aims of this module are for the student to:

- comprehend the use and nature of databases;
- be able to apply the taught skills in the design and creation of particular databases.

Contents:

- Database use in knowledge management environments;
- basic database concepts (records and fields);
- Boolean queries;
- design of databases;
- input and output formats;
- handling graphics;
- relational theory;
- structured query language;
- normalisation;
- integrating graphics;
- entity relationship modelling;
- database architectures.

Competitor Intelligence

The aims of this module are for the student to gain a broad introduction to:

- the value of information and intellectual capital to organisations;
- competitive intelligence cycle functions, the role of counter-competitive intelligence and the work of CI units;
- company structures and financial reporting requirements;
- intellectual property and related legislation;
- a range of hardcopy and electronic competitor and business information sources;
- company share prices and market.

Contents:

- ethical behaviour when conducting CI.
- importance to organisations of being aware of competitor activity and the external factors affecting success.
- the role of counter-competitive intelligence.

- information of value to organisations: external and internal, and its likely availability, covering sources and protections.
- use of DIALOG online host database as a CI source.
- web techniques for CI.
- the importance of organisational culture in CI.
- personal qualities required for success.

Legal Context of Knowledge Management

The aim of this module is for the students to understand the legal issues and potential pitfalls in both setting up an IM or KM strategy, and in managing information and knowledge-intensive organisations.

Contents

- Overview of the legal framework within which information and knowledge management operate, including the legal risks of virtual communities; legal constraints and controls on the free dissemination of information; legal right of authors or owners of intellectual property, contractual arrangements and non-contractual liability; professional standards and codes of conduct.
- Basics of IPR law, including patents, trade marks, designs, passing off, trade secrets, copyright, database right, moral rights and EU initiatives.
- The balance between rights-owners and users in IPR law.
- Dealing with defamation in electronic media.
- Data protection.
- Domain names and copyright.
- Software patents.
- Spamdexing.
- Liability for information provision.
- Conflict of laws.
- Pornography and other objectionable material.
- Introduction to Knowledge Management aspects of IPR.
- The Creative Commons initiative.
- THERE WILL ONLY BE VERY LIMITED COVERAGE OF NON-UK LAW.

Management of Innovation and Entrepreneurship

The aim of this module is for the students to understand the relationship between creative management, innovation and enterprise and be prepared to make a market intervention. By so doing they will be ready to make a direct contribution to UK plc.

Contents:

- Creative management: visioning, innovation, understanding the information value chain, entrepreneurship, marketing, promotion and publicity.
- Intelligent Communities: knowledge cultures, promoting knowledge management within organisations, globalisation issues, enterprise modelling.
- Business and Financial Planning: quality management, customer relationship management systems, risk management, outsourcing, success and failure of companies.

Management Techniques and People Skills

The aims of this module are for the student to: 1. become familiar with theories and practical techniques of management and organisational behaviour, with a particular emphasis on the information and knowledge management professions; 2. acquire a

foundation for graduates' first and subsequent posts as managers; 3. develop their interpersonal communication and presentation skills.

Contents: Organisational structures; corporate cultures; organisational behaviour; motivation; leadership; supervision skills; workforce planning; groups and teams in organisations; training and coaching; project management; time management; presentation skills; conflict management; managing diversity.

Elective courses (2 courses)

e-Publishing Design and Production

Interaction Design

Information and Knowledge Management in the NHS

Consumer Health Information

e-Publishing Marketing and Business Issues

Marketing for Information Professionals

Multimedia

Human Information Processing

Markup Languages for the WWW

e-Business Techniques

University of Canberra

- Division of Communication & Education, School of Information Management and Tourism
- Master of Knowledge Management
- http://www.canberra.edu.au/courses/index.cfm?action=detail&courseid=630AA

Summary

- Degree: master
- Mode: online
- Duration: 1 yr. full time, 2 yrs. part time, 3 yrs. max
- Structure: total of 24 credit points, 6 courses

Required courses (16 credit point, 4 courses):

5702 Knowledge Management Principles M

5703 Knowledge Management Processes M

6018 Knowledge Mgt Enabling Technologies PG

5704 Knowledge Management Leadership M

Elective courses (plus 8 credit points from the following subject choices):

5705 Knowledge Management for eBusiness M

5189 Information Retrieval M

5701 Information Analysis & Retrieval M

5708 Issues in Online Management M

University of Technology Sydney

- Faculty of Humanities and Social Sciences, Information and Knowledge Management
- MA in Information and Knowledge Management
- http://www.handbook.uts.edu.au/hss/pg/c04203.html

Summary

- Degree: Master of Arts
- Mode: classroom
- Duration: 1.5 yrs. full time, 3 yrs. part time
- Structure: Any combination of 72 credit points from courses in two graduate diplomas (IM and KM, 48 cp each

KM stream

Core (5 courses)

57103 Knowledge Management Strategies

57087 Knowledge Management and the Organisation

57099 Enabling Information Access

57100 People, Information and Knowledge

57089 Information Research and Data Analysis

Electives (two courses from below – 16 cp)

50482 Social Informatics

50493 Managing Information

57001 Information and Knowledge Initiative

57003 Business Information and Intelligence

57008 Virtual Information Collections, Resources and Services

57084 Information Architecture and Design

57086 Information Seminars

57090 Information Organisation

IM stream

Core (6 courses)

7084 Information Architecture and Design

57090 Information Organisation

57089 Information Research and Data Analysis

57087 Knowledge Management and the Organisation

57099 Enabling Information Access

57100 People, Information and Knowledge

Electives (one course from below – 8 cp)

50482 Social Informatics

50493 Managing Information

57001 Information and Knowledge Initiatives

57003 Business Information and Intelligence

57008 Virtual Information Collections, Resources and Services

57086 Information Seminars

57103 Knowledge Management Strategies

Project (one of the following)

57009 Information and Knowledge Management Project

STM90090 Project (two semesters)

Nanyang Technological University

- School of Communication and Information, Division of Information Studies
- M. Sc. in Knowledge Management
- http://www.ntu.edu.sg/sci/graduate/knowledge.html

Summary

- Degree: M. Sc.
- Mode: classroom
- Duration: 2 yrs.
- Structure: first year, three core subjects in the first semester and two group 'A' electives in the second semester. second year, two group 'B' electives per semester in addition to the Knowledge Management Research Project.

Compulsory Core Subjects

K6101 Foundations of Knowledge Management

K6102 Knowledge Management Tools

K6103 Professional Seminar

Group 'A' Electives (any 2 from the list):

K6111 Information & Knowledge Sources

K6112 Communication & Organisational Behaviour

K6113 Internet Technologies & Applications

K6114 Human Capital Management

Group 'B' Electives (coursework and dissertation: any 4 from the list; coursework only: any 6)

K6099 Critical Inquiry in Knowledge Management (comp. for Coursework Only)

K6121 Business Intelligence

K6122 Electronic Records & Document Management

K6123 Electronic Commerce & Knowledge Management

K6124 Technopreneurship & Venture Creation

K6125 Knowledge Discovery & Data Mining

K6126 Knowledge Management Measurement

K6127 Knowledge Management in the Public Sector

K6128 Communication Management & Leadership

K6129 Learning Organisation

K6130 Knowledge Classification & Organisation

K6131 Intellectual Capital

K6191 Special Topic 1

K6192 Special Topic 2

Stellenbosch University

- Faculty of Arts, Dept. of Information Science, Centre for Knowledge Dynamics and Decision-making
- MPhil in Information and Knowledge Management
- http://academic.sun.ac.za/infoscience/ikm/index.htm

Summary

- Degree: MPhil
- Mode: classroom (4 one-week sessions over first 18 mo)
- Duration: 3 yrs.
- Structure: 240 credits divided into two modules, designed to run over three years

Courses

776 (120) Advanced studies of the organisational management of knowledge and information

- The Knowledge Economy and Society

The roots and nature of the Knowledge Economy. The global network system. Globalisation, innovation, identity, productivity.

- Organisation

General characteristics of knowledge organisations (P Drucker). Organisational sense-making (KE Weick). Organisational self-understanding (G Morgan). Organisational gnoseology (H Tsoukas)

- Management & Leadership

Management fundamentals. Leadership theory. Electronic business modelling. Communities of practice. Information and knowledge support systems management. Business and competitive intelligence. Strategy

- Knowledge & Information Dynamics

First, second and third generations of Knowledge Management. Thought leadership and lateral thinking. Intellectual capital. Information management theory (DA Marchand). Information Space theory (M Boisot). Scenario building. Cyber and information law

- Systems

Complexity theory. General systems theory and cybernetics.

- Decision-making

Decision and decision-making theory. Decision support systems and technologies

- Knowledge Technology

Technologies such as: CMap, Mind maps, Workflow, Visualisation, Collaborative tools, document management, streaming. Think Tools Suite. Information Systems management. Artificial intelligence

872 (120) Thesis

The independent execution under supervision at NQF level 8a of a research project which leads to a thesis of 110 to 140 pages.

Middlesex University

- School of Computing Science
- M. Sc. in Knowledge Management
- http://www.mdx.ac.uk/subjects/cit/msckm.htm

Summary

- Degree: M. Sc.
- Mode: classroom
- Duration: 1 yr. full time, 2 to 3 yrs. part time
- Structure: 6 modules + project

Courses

BIS4128 Management Support Systems

BIS4401 Knowledge Management Systems

BIS4402 Research Topics in Knowledge Management

BIS4403 Knowledge Management Programmes in Organisations

BIS4404 Knowledge Discovery and Data Mining

CMT4131 Design and Evaluation of Interactive Systems

BIS4992 Postgraduate Computing Project

University of Westminster

- Harrow School of Computer Science
- M. Sc. in Information & Knowledge Management

- http://www.wmin.ac.uk/hscs/page-510

Summary

- Degree: M. Sc., may lead to PhD
- Mode: classroom
- Duration: 1 yr. full time
- Structure: 6 required courses + 1 elective + project (worth 2 courses)

Core courses

Data Management

Enterprise Modelling

Data Mining

Large-Scale Systems Development

Semantic Technologies

Research Methods and Transferable Skills

Elective courses (one option module selected from below)

Decision Support Heuristics

Information and Knowledge Management Issues

Performance Analysis

Core project (double module)

Central Queensland University

- Faculty of Business & Informatics, School of Information Technology
- Master of Knowledge Management
- http://handbook.cqu.edu.au/Handbook/programs_1.jsp?s=1&code=CV04

Summary

- Degree: Master
- Mode: classroom
- Duration: 1.5 yr. full time, 3 yrs. part time
- Structure: 7 core courses + 2 electives

Core courses

Systems Management Overview

Scholarly Information Sources

Knowledge Management

Data Mining

Knowledge Management Practicum

Leading Change in Education and Training

People, Work & Organisations

Electives

2 courses

Dublin Institute of Technology

- School of Computing
- M. Sc. in Computing (Knowledge Management)
- http://www.comp.dit.ie/DT217/index.html

Summary

- Degree: M. Sc.
- Mode: classroom
- Duration: 1 yr. full time, 2 yrs. part time
- Structure: 9 core courses + 2 option modules + dissertation

Core Modules

Foundations of Knowledge Management

Knowledge Representation and Reasoning

Knowledge Systems Analysis and Design

Advanced Databases for Knowledge Management

Enterprise Systems and Architecture

Problem Solving Communication and Innovation

Knowledge Based Project Management

Case Studies in Knowledge Management

Research Methods and Proposal Writing

Option Modules (two from below)

Business Systems Intelligence

Complex Adaptive and Agent Based Computation

Geographic Information Systems

Machine Learning

Security

Legal Issues in Knowledge Management

Utrecht University

- Faculty of Science, Dept. of Information and Computer Science
- Master in Content and Knowledge Engineering
- http://www.informationscience.nl/

Summary

- Degree: Master
- Mode: classroom
- Duration: 2 yrs.
- Structure: 4 core courses + 6 electives + thesis

Core courses (4)

Content Design

Development of Knowledge Systems

Use of Content and Knowledge Systems

Knowledge Management

Elective courses (6, at least 2 from below)

Advanced Research Methods

Enterprise Information Architecture

Extended Enterprise

Semantic Web

Animation and 3D Models

Seminar Content and Knowledge Engineering

Usability evaluation methods

Management Control

Other elective courses can be chosen from other Master's programmes, in particular the Master in Business Informatics or the different Computer Science masters at the Department of Information and Computing Sciences.

Cranfield University, DCMT

- Defence College of Management and Technology, Dept. of Information Systems
- M. Sc. in Knowledge Management Systems (also PgDipl, PfCert)
- http://www.dcmt.cranfield.ac.uk/prospectus/postgraduate/knowledge

Summary

- Degree: M. Sc., also PgDipl, PgCert
- Mode: distance
- Duration: M. Sc. (3yrs), PgDipl (2yrs), PgCert (1yr)
- Structure: 4 core courses + 4 electives

Core courses:

Foundations of Knowledge

Organisational Knowledge

Knowledge Management

Knowledge Management Systems

Elective courses (four from below):

Knowledge Representation

Knowledge Programming

Knowledge Storage and Sharing

Knowledge Discovery

Knowledge Interfaces

Knowledge Engineering

Northumbria University

- School of Computing, Engineering & Information Sciences
- M. Sc. in e-Knowledge Management
- http://online.northumbria.ac.uk/prospectus/sch_coursedetail.asp?school=10&offset=14&CourseID=817

Summary

- Degree: M. Sc., also PG diploma, certificate
- Mode: classroom
- Duration: 1 yr. full time, 2 yrs. part time
- Structure: 6 core courses + 2 electives

Core modules

Foundations of Knowledge Management

Knowledge and the Collaborative Technologies

Personal Knowledge and Reflective Practice

Strategy and Knowledge

Managing Change

Research Methods

Elective courses (Two options may be taken from the following):

Managing Corporate Information and Knowledge

Working Virtually (online) mode

Knowledge Innovation and E-Learning (online)

Communities and the web environment (online) mode

City University of Hong Kong

- Faculty of Business, Dept. of Information Systems

- M. Sc. in Electronic Business and Knowledge Management (formerly Master of Arts in Electronic Business)
- http://www.fb.cityu.edu.hk/is/msebkm/

Summary

- Degree: M. Sc.
- Mode: combined (what does it mean?)
- Duration: 1 yr. full-time, 2 yrs. part-time
- Structure: 6 core courses + 4 electives

Core courses (Year 1, Programme Core - 18 credit units)

Foundations of Electronic Business Systems 3

Analysis and Design of Electronic Business Systems 3

Knowledge-Based Relationship Management 3

Electronic Business Strategies and Management 3

Information Technology Based Organisation transformation 3

Knowledge Management 3

Electives (Year 2, any 12 credit units)

Advanced Electronic Business Application Development 3

Enterprise-wide Distributed Systems 3

Human Computer Interaction and Multimedia 3

Infrastructure and Security Management for Electronic Commerce 3

Special Topic in Electronic Business 3

Residential trip 3

Data Mining 3

Supply Chain Management 3

eBusiness Software and Technology 3

The Electronic Business Regulatory Environment: An Executive Perspective 3

Electronic Business Project 6

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