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Chapter XII

The European Challenge of KM and Innovation:

A Skills and Competence Portfolio for the Knowledge Worker in SME's

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ABSTRACT

Globalization, bringing about universal and dynamic transformations in every sector of the economy, is placing organizations everywhere in new and different competitive situations. In this context, the improvement of enterprise performance and economic growth makes increased demands for timely knowledge in the workplace to deliver competitive, knowledge-intensive work, enabling institutions and nations to maintain their vitality

through economic growth and increased productivity. This chapter highlights the European strategy towards a knowledge-based society where innovation and competitiveness are the goals to be achieved. The Portuguese scenario concerning small and medium enterprises and the creation of a Portuguese knowledge and information economy are also described. Some approaches to knowledge management (KM), contributing to understanding the scope of this emergent domain, are introduced. The skills and competencies that a knowledge manager should develop in order to perform his/her job are discussed. The chapter concludes by mapping the main areas of study and practice that the authors consider as relevant to performing an effective knowledge management function.

Introduction

In a contemporary world, where markets, products, technology, competitors, regulation, and even societies are undergoing universal and dynamic transformation, demands have increased for customised and more sophisticated products and services. Innovation, together with the knowledge that enables it, has become a vital source of sustainable and competitive advantage, that is, the basis of economic growth and productivity increase.

Information and knowledge are creating new industries around them and, at the same time, are pervading all sectors of economy (Skyrme, 1999, p. 12), assuming a vital role in the economic change taking place over recent years, together with "technology, information, business processes, quality control, human capital and corporate capabilities and competences – all knowledge related factors" (Burton-Jones, 2001, p. vi).

Globalization has created a business environment where components/inputs are available to all firms at similar prices. Through the Internet, firms can reach distant markets at competitive prices, enabling innovative firms to respond to regional specialization and to the expansion of long distance relationships and markets.

Increased virtualisation in business activities, facilitating new ways of working, such as self-managed teams, virtual teams, flexible offices and teleworking, is prevailing as a consequence of information and communication technologies development (Skyrme, 1999, pp. 20, 34).

Such pressures are transforming "the nature of production and thus work, jobs, firms, markets and every aspect of economic activity" (Burton-Jones, 2001, p. 4) worldwide, impacting knowledge, skills, talents and the know-how required by individuals in the workplace (Quinn, Baruch & Zein, 2002). As Wiig (1999, p. 156) points out, "knowledge workers, everywhere, can access the latest information on advanced concepts and methodologies, business issues and technologies".

Companies that are better able to utilise information and knowledge can make decisions faster and closer to the point of action, overcome internal and external barriers, provide more opportunities to innovate, reduce product development time and enhance customer relationships (Hackett, 2002, p. 727).

Although the recognition of the importance of knowledge as a source of economic wealth and political power is not a new idea, it is only recently that the concepts, principles and practices related with the management of knowledge – aiming to increase an organization's ability to exploit knowledge – left the periphery of management thought and practice (Little, Quintas & Ray, 2002, p. 1).

Moreover, in the context of continuous technological advance in computational power and communication technologies, in which the volume of data and information being produced is constantly expanding (Lyman & Varian, 2000), knowledge itself, understood as "the capacity for effective action" (Senge, 2000, p. 56), remains the crucial resource to good performance of any organization and the key to wealth creation. This explains why it is important to move from information management – understood as the management of anything that is or can be digitised – to a broader concept of knowledge management, "which deals with all aspects of how people in organizations are enabled in performing knowledge-based functions" (Dawson, 2000, p. 321).

The main challenge is to stimulate knowledge production (learning) and its management. The development of intellect, innovation, technology and services – not the management of physical resources – is the key for most companies, as well as of industries and countries (Quinn, Baruch & Zein, 2002, pp. 7-8).

The transformations taking place at the enterprise level as well as at the workplace call for a new kind of worker/employee, with competencies, attitudes and intellectual agility "conductive to systemic and critical thinking within a technologically oriented environment" (Bontis, 2003, p. 7) and who is able to recognise that his/her "behaviour contributes much more to the enterprise success than conventional assets" (Wiig, 1999, p. 164).

This chapter begins by briefly referring to the European strategy, set in 2000 at the Lisbon Summit of the European Council, to build a knowledge-based economy in the European Union and some policies aiming at promoting such a goal. We also describe the Portuguese scenario concerning SMEs and the creation of a Portuguese knowledge and information economy. In this context, the importance to undertake comprehensive and systematic knowledge management within European organizations in order to compete with world markets is essential. Knowledge and knowledge management (KM) are broadly defined and discussed by introducing several approaches emerging in the literature, each one contributing with a fragmented perspective, helping to understand the scope of KM as a new management approach. Grounded in a literature review, it offers a map to the core areas that, at present, are considered as contributing towards an effective knowledge management function.

Innovation and Competitiveness in a Knowledge-Based Society

European Policies

The development of a knowledge-based society in Europe and the preparation of workers and citizens to deal with the new challenges and opportunities were discussed at the Lisbon European Council Summit in March 2000 (Lisbon European Council, 2000). The Summit's conclusions outline a strategy to transform the European Union into the "the most competitive and dynamic knowledge based economy in the world" by 2010, through being knowledge-based and able to guarantee a sustainable growth, with more jobs and greater social cohesion.

The progress towards this strategic goal was reviewed in the European Council meeting in Barcelona (March 2002). Several concerns were expressed and the strategies to attain such a goal were revised. Furthermore, the Barcelona Summit called on the Commission to draw up an *eEurope Action Plan* focusing on widespread availability of broadband networks throughout the Union by 2005 and actions on *eGovernment*, *eLearning*, *eHealth* and *eBusiness* to foster the development of new services. This led to the *e-Europe*

2005 Action Plan, which puts "users at the centre". It aims to improve participation, open up opportunities for everyone and enhance skills (*e-Europe2005*, 2002). To achieve such an objective, it is crucial to provide "opportunities for people to participate in society and help the workforce to acquire the skills needed in a knowledge-driven economy" (*op.cit,* para 1).

Later, in the Brussels European Council Summit (2003), the following were defined as priority actions: (1) raising employment and social cohesion (e.g., life-long learning should be promoted, and closer cooperation in enhancing transparency about skills standards across Europe encouraged; also investing in human capital is a prerequisite for the promotion of European competitiveness), (2) giving priority to innovation and entrepreneurship, (3) connecting Europe and (4) developing environmental protection for growth and jobs.

The same concerns and recommendations were already reflected in the *UNICE Benchmarking Report 2000.* This report recommends to European governments and companies, as a priority action, to increase the level of innovation in Europe (a) to improve attitudes towards creativity and innovation, (b) to release the full potential of new products and markets, (c) to facilitate the creation and exploitation of knowledge and new ideas, (d) to improve the knowledge and competence of people, and (e) to improve the financing of innovation (UNICE, 2000, p. 7). Furthermore, the same document emphasises that, in order to improve the employability of people within the European innovation system, governments must help develop a workforce capable of meeting the challenges of the future, must ensure that individuals have sufficient incentive to work, obtain additional skills, change work practices, accept new responsibilities, must encourage the expansion of the use of high performance work systems that support innovation, and companies must improve the skills and abilities of their employees, particularly in the area of innovation (UNICE, 2000, p. 38). The *UNICE Benchmarking Report 2001* explores the impact of the new economy on Europe's competitiveness, stating that entrepreneurship is the key to growth. It stresses the fact that the business environment in Europe is not as supportive for the development of new companies as it is in the US. The report concludes by saying that "if Europe is to be a dynamic and competitive knowledge-based economy, it needs to have a stronger spirit of enterprise, a more competitive environment, a world class knowledge infrastructure and a society more supportive of change" (UNICE, 2001a, p. 1). The same concerns are expressed in the document *Lisbon Strategy: Status 2003,* from UNICE. The idea that entrepreneurship should be fostered in Europe together with the insurance of the human resources strength and efficiency is

again stressed. As a matter of fact, one can read (UNICE, 2002b, p. 6) that "entrepreneurs create new sources of wealth, replace old inefficient firms with new innovative ones, and create new jobs" and thus "an entrepreneurial culture and skills should be supported in schools and universities and among the working population to encourage individuals to become entrepreneurs".

To meet the target agreed on by the European Council in Lisbon (2000), it is widely recognized that innovation is the "cornerstone" of the strategy (COM, 2003a). And this recognition is evident in the efforts of the EU in its promotion. The creation of a (1) *Trend Chart on Innovation in Europe* that provides collection, analysis and dissemination of information on innovation policies at national and EU level[1], (2) *European Innovation Scoreboard,* that presents, annually, quantitative data on framework conditions, the science and engineering operational environment, and innovation behaviour within firms[2], and (3) an *Innobarometer* that is a survey of the framework conditions[3], are some examples.

As seen in previous paragraphs, in order to attain the goals set in the Lisbon summit, that is, to transform the European Union into a knowledge-based society, innovation is needed. Innovation is a core characteristic of a knowledge-based economy; it is a source of competitiveness for firms and industries (whether small, medium or big enterprises). Innovation can: 1) take the form of invention arising out of the research laboratory, 2) happen by taking an idea from another business sector and adapting it for use in other production processes or markets, 3) be the search for new, untapped, market space, 4) be the development of a new approach to a business (COM, 2003a). Moreover, innovation is not only the province of research and development centres. It can be technological but also organizational (new ways of organizing work in areas such as workforce management, distribution, finance, manufacturing, etc., which can have a positive influence on competitiveness). The driving force for innovation can be external or internal. Externally, one identifies the enterprise's operating environment, the networks established with other enterprises, the market demands and conditions, the customer attitudes, the external inputs (technology, cooperation networks, advice) and the framework conditions (market capital, support regulatory environment and flexible, mobile and skilled human resources). As for the internal motivation, there is the ability of the enterprise to recognise market opportunities, its capabilities to respond innovatively, the education and training of the staff and the enterprise's knowledge base (COM, 2003a).

Fostering innovation requires more than R&D centres. It needs people with the right skills, initiative and creativity. And in this context, the Higher Education Institutions (HEI) play an important role in the innovation process. They are described as "sources of human capital and creativity, as well as themselves being the source of many innovations and of the knowledge that underpins many more" (European Commission, 2002a, p. 13). HEI should be encouraged to provide high-quality training in innovation-related matters (*op. cit.*). Further-more, and as far as SMEs are concerned, they will remain an important focus on innovative effort and of policy making. To help innovation to emerge in SMEs, "links with HEI and business services that can assist SME's choice and implementation of innovations and the further development and commercialisation of their own ideas, should be fostered" (*op. cit.,* p. 14). SMEs need assistance in the adoption of innovations, especially for those that will "allow them to participate on a more equal footing in the knowledge-based economy, and in some cases achieve entry to new markets and more indepen-dence from large-firm-oriented networks" (*op.cit.,* p. 14).

To sum up, one can see that the political thrust in Europe is towards the development of a knowledge-based economy, in order to generate the required innovation to promote its competitiveness on a global scale. This economy can only be attained through innovation (e.g., entering in new markets, commercialising different products, improving business processes). SMEs play an important role in this activity as they represent an important part of the entrepreneurship capacity in Europe. But all the objectives established in the Lisbon summit in 2000 can only be achieved with the development of an adequate workforce with the necessary skills and knowledge. As Pfeffer (2002) notes, one crucial source and differentiating factor for competitive success is employees and how they work. This author states that some companies' successes are due, not to economies of scale, but rather to their skilled workforce and the way they are managed; if competitiveness is achieved through people, "then the skills of those people are critical" (*op. cit.,* p. 67). And this knowledge could be obtained by training/education and through the networks that could be established among HEI and SMEs – the knowledge obtained would help to foster the necessary innovation and help SMEs to become more competitive.

SMEs play an important role as a "major source of job creation and entrepre-neurial experimentation" (European Commission, 2002a, p. 118). As a matter of fact, one can read in the Communication of the European Communities (2003b, p. 1) that "Europe's competitiveness depends strongly on its small

businesses, which are a key source of jobs, a breeding ground for business ideas and a main driver for entrepreneurship". And this role is even more relevant, as most of the EU employment is accounted for by firms with less than 250 employees (SMEs) mostly in the services. Also, "new business models are emerging, from 'virtual organisations' to integrated supply chains" (European Commission, 2002a, p. 119). Thus, "enterprises should be encouraged to explore new business models, both in terms of their internal organisation, and in relation to participation in networks and value chains of various kinds" (*op. cit.,* p. 119). Also, "one issue related to organisational innovation is e-business, the use of the Internet for marketing, financial transactions and networking more generally. Broadband penetration and mobile networking can only accelerate the increasing use of such potentials" (*op. cit.,* p. 120). Additionally, more sophisticated and specialised ways of exploiting knowledge are emerging and thus "new management skills will be needed to run these companies, where innovation will be the normal way of doing business rather than a perturbation" (*op. cit.,* p. 120).

The Creation of a Knowledge and Information Economy: The Portuguese Scenario Concerning SMEs

As one can draw from what is stated above, the role of the SMEs in the development of a knowledge driven society and in the competitiveness of the EU is crucial.

In this context, and taking into account the central role knowledge plays in European policies for the construction of a knowledge economy, we have undertaken our research, trying to characterize the Portuguese situation and then to identify the goals and strategies drawn up by the Portuguese government, in order to help Portugal move towards a knowledge driven society. In the following paragraphs, the results of this research are outlined.

According to data available in the *Innovation Scoreboard* 2002[4], "Portugal's current innovation performance is below the EU mean for all indicators, but trends show signs of catching up". As a matter of fact, "Portugal scores very high for trends in two indicators related to the information society: ICT expenditures and home Internet access". However, this report also states that Portugal has "levels about half those of the EU mean for the supply of new S&E[5] graduates, tertiary education and life-long learning". Finally, one can also read that, "the business sector is among the weaker areas of innovation performance

in Portugal". Summing up, the major relative strengths of Portugal concern ICT expenditures and home Internet access, while the major weaknesses are related to education, the development of a highly skilled workforce and adult participation in further education.

Lately, policies have been introduced to close the existing gap between the EU mean and Portuguese performance in this sector. On June 26, 2003, the Council of Ministers of Portugal approved the *Plano de Acção para a Sociedade da Informação* (Action Plan towards the Information Society), stating that it would be the "most important strategic and operational coordination tool of the policies of the XVth Government towards the Information Society"[6]. This action plan establishes goals considering the impact of the development of the information society on the country, the competitiveness of its enterprises, on modernization of public administration and on the citizens' quality of life, while also recognising that Portugal occupies a less favourable position, in the European context.

Thus, according to the *Plano de Acção para a Sociedade da Informação*[7], to the *Programa do XV Governo* - The Programme of the XVth Government of Portugal[8] and to the *Unidade de Missão Inovação e Conhecimento - Unit of Innovation and Knowledge Mission*[9], the main Portuguese concerns regarding the development of the information society and the knowledge economy will address four objectives:

a)   To increase the effectiveness of the economic system and the competitiveness and productivity of Portuguese enterprises;

b)   To increase the qualifications, competencies and knowledge of the Portuguese population;

c)   To contribute to the modernization, rationalization, responsibility and revitalization of the public administration and official departments;

d)   To increase the dynamics of the civil society through the promotion of the citizens' quality of life.

These objectives are then developed in several lines of action. It is not our task to detail all the actions established by the Portuguese government to promote the full participation of Portugal in the global knowledge economy; this paper highlights only those concerning SMEs.

Among the concerns of the present government, as far as the development of the Portuguese Information Society is concerned, it is relevant to note that the increase in the level of qualification of citizens assumes a high priority. As a matter of fact, one of the action lines within the Plan towards the Information Society aims to promote the development of "new skills". However, the projects expected to be developed within this plan only tackle: 1) the promotion of the education of Portuguese people concerning information and communication technologies (ICT); 2) the integration of ICTs in the education system and 3) the promotion of digital products and services. They include wider access to the Internet and increased numbers of computers in schools.

Despite the effort being made by the government to close the existing gap between the Portuguese level and the average of the other European countries, as far as the Information Society is concerned, after analysing these goals and lines of action we fear that the Portuguese vision of such goals is too technologically oriented. Concerns are still biased towards the development of infrastructures, bandwidth, access cost to the Internet, equipment in schools and numbers of home computers. There is no concern regarding the development of the needed competencies to live and succeed in a knowledge society. We understand that the technologies are necessary, but they become useless if the user does not understand why s/he should use and benefit from them (e.g., connecting with other people, establishing networks, gathering information). One way to develop this kind of knowledge is through training and qualification (European Commission, 2002b). As a matter of fact, "qualifications of their staff and their professionalism" is the factor most often mentioned when explaining the company's strength in innovation, according to the replies of managers in 11 of the 15 Member States. Portugal is one of the 11. But there is, apparently, a gap between the needs in this field and the efforts deployed. Indeed, although the importance of training is recognised, Portugal is still below average regarding enterprises and business training budgets. "A considerable high proportion of enterprises in Portugal (15%) (…) did not devote any working time to training efforts during the last year [2001]" (European Commission, 2002b, p. 49). This survey also shows some features that characterise the profile of enterprises that do not allocate a training budget to their employees. These features are: enterprises established for more than 30 years, mostly in the construction sector, small and medium enterprises and non-exporting companies. Results also show that, as far as Portugal is concerned, in order to be more innovative efforts must be made "to motivate staff at all levels to acquire new competencies and to adapt to change" (European

Commission, 2002b, pp. 52-53). It suggests a need for "change management" in the policies within companies, towards a more pro-active participation concerning future changes and a motivation to embrace innovation (*op. cit*).

Knowledge and Knowledge Work Management

Knowledge – Some Approaches

To define knowledge is not an easy task. This is a complex and ambiguous term, which has generated wide debate in the literature.

There are two philosophical perspectives that may be used to approach knowledge (Newell, Robertson, Scarborough & Swan, 2002; Yates-Mercer & Bawden, 2002). Newell et al. (2002) refer to these perspectives as *structural* and *processual,* while Yates-Mercer and Bawden name them as *scalar* and *cognitive* models.

According to the *structural* perspective (or scalar model), knowledge is perceived as a "discrete, objective, largely cognitive entity" (Newell et al., 2002, p. 3), susceptible of being classified as tacit (which includes judgement, "feel" and deep understanding, i.e., unarticulated expertise and experience) and explicit (knowledge that is formalised and expressed – e.g., technical drawings, policies, manuals of procedures, information existing in computer memories) (Nonaka & Takeuchi, 1995). Information and knowledge are seen as "closely related entities which can be transformed into one another, outside human mind" (Yates-Mercer & Bawden, 2002, p. 20). An organization that embraces this perspective will develop knowledge stores (repositories) and will try to capture the organization's knowledge by software.

Under this perspective, there are a number of frameworks developed recently in order to help us to understand the types of knowledge involved in the knowledge creation processes and the conditions under which they are applied and created. These frameworks are known by their authors' names: Nonaka, Spender and Blackler.

i)   Nonaka's framework (1994) – suggests that "knowledge creation can only occur at the level of the individual". Furthermore, Newell reinforces

this view, saying that "Nonaka stresses that creative individuals need to be supported in their endeavours and management needs to provide the necessary context for such individuals to share and create knowledge" (Newell et al., 2002, p. 5).

ii)   Spender's framework (1996, 1998) – "where collective knowledge has a prominent role, as it is the most useful because this is a type of knowledge that other firms would find difficult to understand and imitate" (Spender quoted in Newell et al., 2002, p. 5). The concept of collective knowledge can be mirrored in communities of practice, well explored by Wenger, McDermott and Snyder (2002).

iii)   Blackler's framework (1995) – according to this author there are five types of knowledge in an organization – embrained, embodied, encultured, embedded and encoded knowledge, explained as:

"Embrained knowledge is knowledge that is dependent on conceptual skills and cognitive abilities. Embodied knowledge is action oriented and is only partly explicit. Encultured knowledge refers to the process of achieving shared understanding through the development of an organizational culture. Embedded knowledge is knowledge that resides in systemic routines. It can be analysed by considering the relationships between technologies, roles, procedures and emergent routines. Finally, encoded knowledge is information conveyed by signs and symbols either in manual or electronically transmitted form" (Blackler, 1995, pp. 1025-5 quoted in Newell et al., 2002, p. 6).

According to this latter perspective, knowledge exists at the individual and collective level. Yet, "different types of knowledge dominate in different types of organisations" (*op. cit.,* p. 6).

The *processual* perspective (or cognitive model) suggests that we should focus our attention on the processes or practices of knowing, emphasizing that knowledge is socially constructed and embedded in practice. This means that more importance is given to the process of knowing and knowledge creation and the context that made possible this creation, rather than the knowledge per se, seen as something static or objective. Nonaka, Toyama and Konno (2002, p. 49) designate this context as *ba,* which means, "a shared context in which knowledge is shared, created and utilized. (…) *Ba* is the place where information is interpreted to become knowledge". In this perspective, the author argues that a "substantial part of an individual's tacit knowledge will

always remain tacit, resistant to articulation or codification". And, "this tacit knowledge only exists as conscious experience and behaviour which are rooted and manifest in processes of knowing an action" (Newell et al., 2002, p. 7). Furthermore, the cognitive model:

> *" regards knowledge as something intrinsic to, and only existing within, the human mind and cognition. Knowledge, being subjective cannot be directly transferred or communicated from one person to another, but must be converted into information first. Information is then regarded as the objective – and then a communicable and recordable form of knowledge"* (Yates-Mercer & Bawden, 2002, p. 21).

An organization that adopts the *cognitive model* will consider that knowledge resides in the minds of its employees and cannot be captured. Instead, such an organization will:

> *"implement knowledge management largely by cultural means, by organizing their physical space appropriately and by using appropriate communication tools – thus encouraging and enabling staff to share knowledge. Examples are: financial and other rewards for knowledge sharing; provision of well appointed informal meeting areas; encouraging face-to-face discussion rather than email communication"* (*op.cit.*, 2002, p. 21).

Thus, managing knowledge becomes managing people and the interactions among them.

Swan and Scarbrough (2002), based on an analysis of the number of articles on KM published between 1990-2000 available at the *ABI/Inform Proquest* database, concluded that it is possible to identify two waves concerning the interest for this emerging management approach. The first one corresponds to a dominance of the IT/IS community in the diffusion of KM, and generated "an emphasis on knowledge capture and codification" (Swan & Scarbrough, 2002, p. 11) in parallel with the development and promotion of "knowledge technologies" (e.g., data warehouses, intranets, data mining). As for the second wave, the emphasis is on social and behavioural concerns (e.g., the development of "communities of practice"). Despite this evidence, these authors also state that KM cannot be polarised between "KM as systems" and "KM as people". It means that KM should be concerned not only with the capture and codification of tacit knowledge, but also with the creation of learning organizations – that is,

the process that enables an organization to adapt to change and move forward by acquiring new knowledge, skills or behaviour and thereby transforming itself (Hackett, 2002, p. 727) and organizational culture – that is, building, creating and developing cultures and communities. The main idea is that these two perspectives, taken separately, represent a partial view of KM and that:

> *"Personnel professionals, organizational analysts, IT professionals and accountants each have something to contribute to developing coherent and workable KM practices"* (Swan & Scarbrough, 2002, p. 12).

In turn, Davenport and Cronin (2000) consider that KM is being used differently across domains, with each claiming that its partial understanding represents a definitive articulation of the concept. These domains are Library and Information Systems (LIS), Process Engineering (PE) and Organizational Theory (OT).

To the LIS, KM is seen as management of know-how, which corresponds to the "coding and classification of recorded material (content) embedded in artefacts, structures, systems and repositories," without trying to understand how business value is perceived and created. In the Process Engineering (PE) approach, KM is perceived as the discovery and extraction of value through existing processes that are disintegrated and re-compiled. This:

> *"... process approach does not do justice to the application of people's competencies, skills, talents, thoughts, ideas, intuitions, commitments, motivations and imaginations, in short, the realm of tacit knowledge"* (*op. cit.,* p. 2).

In both perspectives – LIS and PE – knowledge is seen as something that can be codified. Thus, both are incomplete, as other perspectives take into consideration the knowledge that cannot be codified, or tacit knowledge.

However, there is a growing recognition that the:

> *"knowledge of experts is an accumulation of experience – a kind of residue of their actions, thinking, and conversations – that remains a dynamic part of their ongoing experience"* (Wenger, McDermott & Snyder, 2002, p. 9).

As noted, knowledge is simultaneously tacit and explicit; each one depends on the other[10] (*op. cit.*). From a business standpoint, the tacit aspects of knowledge are often the most valuable as they consist of embodied expertise – a deep understanding of complex, interdependent systems that enable dynamic responses to context specific problems.

The importance of interaction and informal learning processes such as storytelling, conversation, coaching and apprenticeship of the kind that communities of practice provide for sharing of tacit knowledge, justifies their importance. (Wenger, McDermott & Snyder, 2002, p. 9).

It is in this context that the third domain (OT) emerges, where KM is perceived as a capacity for allowing the organizations to develop, to innovate and to strengthen their competitiveness. Thus, in the OT perspective, KM is not the management of the knowledge resource but of the context in which the knowledge is used.

To sum up what has been discussed so far, KM cannot be regarded from a single point of view – either seeing knowledge as susceptible of capture, codification and transfer, or recognising it as a human process in which only tacit knowledge would make the difference – but should be understood as the confluence of several disciplines and sciences, each contributing towards the definition and comprehension of this concept.

In line with this, Little, Quintas and Ray (2002) have defended that the interest for knowledge as an area of research and practice within the field of management has its origins in the convergence of different perspectives, including information management, organizational learning, strategic management, management of innovation, and the measurement and management of intangible assets. Thus, KM emerges as a pluri- and interdisciplinary area (*op. cit.,* p. 2) that has a vital role for organizations.

Moreover, Bontis (2002a, p. 20) defines KM as "how an organization makes use of its intellectual capital," which embraces human[11], structural[12] and relationship[13] capital. Petty and Guthrie (2000, p. 4) strengthen this perspective, stating that:

> *"Knowledge management is about the management of the intellectual capital controlled by a company. Knowledge management, as a function, describes the act of managing the object, intellectual capital."*

Carlisle (2002) reinforces that KM is more than information management, by specifying that:

> *"It requires the pursuit of different types of objectives and the development of different types of resources, strengths, process capabilities and organizational structures"* (*op. cit.,* p. 123).

To summarise what has been said till now, knowledge is very complex and its understanding and management cannot be done from just a single point of view. One should consider the multiple perspectives brought up by its history, development and the contributions of the different disciplines.

Importance Of KM: Some Evidence

Since 1997, one can witness an increase in the interest for KM, manifested through the growth in the number of conferences and publications addressing KM or related aspects (Little, Quintas & Ray, 2002). The first international conference to have KM as the main topic was held in September 1995 and the first periodicals in the field, including *Knowledge Management, Knowledge Inc., Knowledge Management Review* and the *Journal of Knowledge Management* have been published from 1997 onwards. The publication of journal articles regarding KM rose from about 25 (1995) up to about 625 in 1999 (number of knowledge management articles on *ABI/Inform* database) (*op.cit.,* p. 3).

At present, it is possible to find a diversity of good examples of events related to knowledge management. The "KM Europe 2003" (http://www.kmeurope.com), the "CIKM2003 – 12th Conference on Information and Knowledge Management" (http://bit.csc.lsu.edu/~cikm2003/), "The Fifth European Conference on Organizational Knowledge and Learning Capabilities" (http://www.uibk.ac.at/congress/oklc2004/), and "The 4th European Conference On Knowledge Management" (*http://www.mcil.co.uk/2o-eckm2003-home.htm*) are only some of the them to take place during the current year (2003).

Furthermore, other projects and activities are being carried out in order to develop the management of knowledge in Europe and foster innovation and competitiveness. The Knowledge Board (http://www.knowledgeboard.com) is one of those projects. This is the European KM Community, created with the

support of European Commission's Information Society Technologies (IST) Programme, which provided the framework for implementing a thematic network on the area of KM, and was launched in 2000, with representatives from 13 European research projects; at present this number exceeds 40. At present (July 2003) there are more than 4,000 individuals and 170 enterprises contributing to this network.

Within this community, some projects are being carried out. The development of the "European Guide to Good Practice in Knowledge Management" (http://www.knowledgeboard.com/cgi-bin/item.cgi?id=109306) is one of those deserving mention.

The Knowledge Manager Profile

Competitiveness depends not on knowledge per se, but in the addition of value where it is created and applied for specific tasks and purposes and in the way it is applied to strategic organizational objectives and to promote innovation (Newell et al., 2002). Frequently, innovation is the primary purpose for knowledge management; it can only be accomplished through the involvement of people with different expertise and experience, working together.

It is easy to find in the literature examples of large corporations implementing KM initiatives. Among these are the Ford Motor Company, Chevron, Texas Instruments, Canadian Centre for Management Development, Health Canada (Bontis, 2002b), Microsoft, Coca-Cola, Merck, Intel, and Skandia (Snyder & Pierce, 2002).

Taking into account that the large majority of firms worldwide are small and medium ones (SMEs) (EUROSTAT, 2002), why is it that the literature does not offer as many references to applications of KM in this sector? Is KM of any relevance to SMEs? If so, are their KM needs analogous to those of large corporations?

One could argue that the solution to KM lies in education and in the training and preparation of a particular kind of worker – the knowledge worker. As referred to in the document "Innovation Tomorrow," from the European Commission (2002a), education is central to the development of the knowledge-based society.

Furthermore, in the *Innobarometer 2002*[14], one of the main conclusions expressed is that managers attribute their strength in innovation mostly to the qualification and professionalism of the staff. Moreover, it should be recognised that the biggest contributors to GNP in Europe are the SMEs, who cannot afford the resources to formally "compartmentalize the information gathering and use functions, nor do they have the resources to develop the infrastructure necessary to access and use the information" (Rosenberg, 2002, p. 2). It is argued that these competencies should be developed by all employees, regardless of the dimension of the enterprise in which they are working. These would be called *KM professionals,* who, apart from having the general knowledge worker skills, should also be equipped with the skills, capabilities and competencies required to manage organizational knowledge assets to increase an organization's ability to exploit knowledge as a resource to "increase productivity, quality and innovation" (Hackett, 2002, p. 727). As a matter of fact, innovation is "stimulated by, and creates requirements for, a skilled workforce. (…) Skills are required to generate, implement, effectively use, and generate new uses for innovations (organizations as well as technological)" (European Commission, 2002a, p. 144).

Furthermore, firms should provide training opportunities to their employees to enhance their KM skills and foster an environment where knowledge is created and disseminated through the organization (Zack, 2002).

As outlined in the previous sections, the recognition of the importance of knowledge for wealth creation in organizations and in society (Newell et al., 2002, pp. 16-18), the rise of knowledge work in parallel with the corresponding decline of traditional forms of work and the restructuring of work and organizations as a consequence of the use and limitations of information and communication technologies have all brought to the fore the importance of KM practices, both at the institutional and at country level.

This section describes the competencies, skills, abilities and attitudes required by a workforce able to take advantage of the opportunities brought about by the implementation of knowledge management to create and leverage intellectual capital for business performance and in public management (Wiig, 2002, p. 225). We will concentrate on those who have the responsibility to perform knowledge management functions in institutions, that is, the KM professionals. Nevertheless, one should bear in mind that the development of such competencies, at every level, is vital to work in a knowledge-based society and should be a goal to be pursued by every knowledge worker.

Competencies and Skills For KM

Abell and Oxbrow (2001, pp. 105-126), in a research study completed in 1999 covering professionals that perform KM related jobs in a variety of organizations – private (financial services, consultancy, lawyers, industry, engineering and services) and public (Central Administration, health services, education, police, etc.) in Europe and USA, concluded that the required skills and competencies fall within one of a set of three categories, namely: 1) Professional and technical core competencies; 2) Organizational skills, and 3) KM enabling skills.

The first two relate to individuals and the third relates to KM teams, communities and networks skills. Together, these three sets represent the competency building blocks that an individual, group or organization requires in order to possess KM capability. Each of those sets are briefly explained:

i)   Professional and technical core competencies

They are acquired through educational, professional or technical qualifications, training and experience and reflect personal attributes, preferences and background; usually they are continually developed. Generally considered, they are not the primary focus of KM approaches, although it is essential that any knowledge worker is able to maintain and develop these occupational competencies. Quinn, Anderson and Finkelstein (2002, p. 86) name these as "cognitive knowledge" or "know-what".

ii) Organizational competencies

These are the most frequently cited as key skills for KM teams. They are also those required to apply professional or technical competencies effectively and include communication[15], negotiation and persuasion[16]. To these may be added facilitation, mentoring and coaching. The ability to contribute to work teams, where individuals have to play different roles according to circumstances falls also under this set of competencies. The understanding of business processes and its interpretation are at the core of this set, as the individuals need to understand the value adding impact of their contribution. Such capacity requires the ability to learn and absorb, effectively, all aspects of the organization's business. Quinn, Anderson and Finkelstein (2002, p. 86) name these competencies as "advanced skills" (know-how) and "systems understanding" (know-why).

iii)   KM enabling competencies

The third KM skills set relates to the capacity to plan and implement KM approaches. The emphasis on these skills may change as KM becomes embedded in the organization. For instance, in the initial phase of a knowledge strategy implementation, emphasis should be on the development of corporate KM behaviours and processes, requiring a stronger input regarding human resources management, the establishment of business processes and the development of management skills.

Those authors have also identified within this set of competencies two key areas enabling KM:

• Understanding the knowledge process, and
• Change management, which includes the ability to: 1) identify the benefits of change for the organization and for individuals; 2) involve people in the development of ideas and thinking about direction; 3) identify barriers and obstacles; d) understand the art of achieving the possible before tackling the impossible; e) influence the organizational and infrastructure developments and, f) retain a missionary zeal for the process (Abell & Oxbrow, 2001, p. 118).

Furthermore, the creation of value from knowledge and the implementation of strategies to attain these objectives imply that all organizations from all sectors express a need to increase their capability to define information requirements, find, analyse, use, share, store and create information. This capability requires an information-literate workforce (ALA, 1989, 1998; Bawden, 2001; Webber & Johnstone, 2001). Rosenberg (2002, p. 2) defines information literacy as the "ability to know when information is needed and then having the skill to identify, locate, evaluate, organize and effectively use that information". This means that due to the characteristics of an uncertain and global environment and work settings, a new kind of worker is needed for contemporary organizations to compete and innovate:

> *"who have to access, manage and use the vast amount of information delivered to them through multiple channels (e.g., phone, Internet, e-mail, printed documents, Web-cast) in a wide variety of formats (e.g., video, printed, electronic text)"* (Cheuk, 2002, p. 2).

In these circumstances, information literacy must be part of the "skill set of almost every employee who works with information" in a business or an institution (Rosenberg, 2002, p. 3).

Mapping the New Professional Profile

KM is a multi- and pluri-disciplinary area. This has strong implications concerning the education and training of those with competencies to perform the KM function in organizations. As referred to above, KM has its roots either in the perspective of "KM as systems," where knowledge is susceptible to creation, codification and transfer, or in the perspective of "KM as people" (Swan & Scarbrough, 2002, p. 11), where knowledge cannot be easily extracted and recorded. The first perspective has evolved with the work and research of the libraries and information sciences, together with those coming from process engineering. The second perspective developed with those coming from organizational theory, psychology and sociology. Bringing those perspectives together allows us to map KM. Furthermore, each perspective stresses a particular aspect of KM, contributing to a deeper understanding of knowledge and its management. The proliferation of perspectives and the diversity of areas contributing to KM suggest that the professional profile emerging should not be seen only from one, but should be at the confluence of the contributing disciplines.

Figure 1. Knowledge Management map in order to prepare the new professional profile.
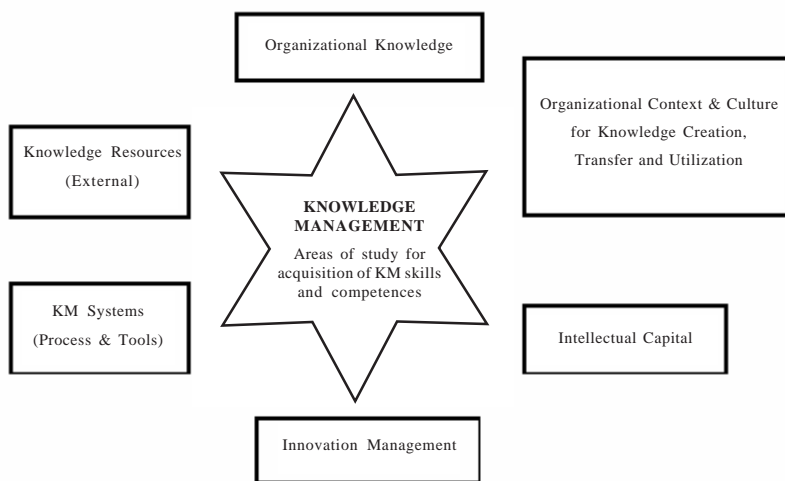
Figure 1 aims to broadly sketch the landscape of domains that, in our opinion, should be addressed in any plan of study to convey KM competencies to those who will be performing knowledge management functions.

In the six areas of study every contribution to KM described above is built avoiding any of the partial perspectives referred to in 3. The topics covered in each area are briefly explained in the following paragraphs. These are only illustrative and by no means an extensive list of what has to be addressed:

i)   Knowledge resources – the knowledge manager should be able to understand how information and knowledge resources – for example, databases, Web-based and other information and knowledge resources, usually available through library and information services, are created, organized, accessed and retrieved to enable him/her to fully exploit all the information that is being made available, both internally and externally to the organization, which is crucial to the decision making process by everyone in the organization;

ii) KM systems (KMS) – these are seen as the enabling technologies for an effective and efficient KM. As Maier (2002, p. 20) states, these tools and systems must have

   1)   basic functionalities - for example, intranets (for communication; as well as storage, exchange, search and retrieval of data and documents); CSCW - Computer Supported Collaborative Work - (enables real-time collaboration among geographically-distributed work group members); groupware (supports time management, discussions, meetings or creative workshops of creative work groups), workflow management systems (support well-structured organizational processes and handle the execution of workflows);

   2)   Integrative KMS - support codification (to create cognitive categories, through which the person makes sense), search and retrieval - for example, data mining for KM, CRM;

   3)   Interactive KMS - support KM processes - for example, locating experts and building communities, e-business, ERP (op. cit., p. 20); and

   4)   Bridging KMS - provide contextualized knowledge repositories - for example, portals, decision support systems, CRM, ERP (*op. cit.,* 20).

Generally speaking, KMS are intended to organize, interpret and make widely accessible the expertise of an organization's human capital; they help to maintain a well-informed, productive workforce (Leidner, 1998).

iii)   Organizational knowledge – the notion that while individuals learn, so also do groups and organizations, has gained wide acceptance in the last decade (Bood, 1998, p. 210). *Organizational learning* occurs as knowledge, acquired and developed by individual members, is embedded in *organizational memory* or pasted into the *organizational knowledge base* (*op.cit.,* p. 216). This draws on the idea that organizational knowledge can be stored, retrieved and recollected. Karreman (2002) points out that:

"organizational (collective) memory is socially constructed, culturally maintained and dispersed, and as indeed is indicated by the concept of knowledge management – a possible target for managerial efforts".

Within organizational knowledge, *competitive intelligence* (CI) is also referred to as *competitor intelligence, business intelligence* or *environment scanning* (Bergeron & Hiller, 2002, p. 355). It covers numerous sectors of intelligence – competitor, technology, product/service, environment (ecology), economy, legislation/regulation, acquisition/merger, customer/supplier, market, partner/collaborator, social/historical/political environment and the organization's internal environment (Fahey, 1999); CI's goal is to stimulate the organization's creativeness, innovativeness and willingness to change. *Social intelligence,* which is the process by which a society, organization or individual scans the environment, interprets what is there and constructs versions of events that may afford competitive advantage (Cronin & Davenport, 1993, p. 8), falls also within organizational knowledge. As Davenport (2000) points out, "social intelligence has reached maturity in the age of networks" and suggests that in a world of virtual workplaces it may be defined as "insight which is based on collective understanding of work practices " (*op. cit.,* p. 145) and can be used; project management and learning how to work professionally with others are vital skills for everyone who performs knowledge management functions.

iv)   Organizational context and culture - as already stated, traditional sources of success - product and process technology, protected or regulated markets, access to financial resources and economies of scale - have been in the past the sources of competitive advantage. These have become less important and what remains as a crucial, differentiating factor, difficult to be imitated/duplicated by competitors is the organizational culture and its capabilities. How people are managed, effectively motivated and the effects of this on their behaviour and skills are becoming vital (Pfeffer, 2002, pp. 62–66). Furthermore, as referred to above, knowledge creation implies more than information codification. It includes the development of a "knowledge culture" that can be translated into the nurturing of communities of practice (Davenport & Hall, 2002; Wenger, 1998; Wenger, McDermott & Snyder, 2002), trust among people, rewards, incentives, motivation (Hall, 2001) as well as the establishment of communication channels and organizational structure (Maier, 2002).

v)   Intellectual capital – although knowledge creation by business organizations has been almost neglected in management studies, it is now recognized as the most important source of organizational competitiveness at the international level. The importance of intangible resources instead of tangible ones for company value, gave rise to a growing interest in developing methods and tools that enable companies "to analyse their intellectual capital stocks" and "organizational learning flows" (Bontis, 2002b, p. 623); intellectual capital includes the human, structure and relations, as mentioned above. This area, within a KM plan of study, will contribute to the understanding of the role of intangible assets in an organization and will address the measures and metrics to assess and evaluate the IC.

vi)   Innovation management – knowledge management for S&T innovation is the goal of any organization in order to remain competitive in a rapidly changing environment; for that effect, those who are going to perform the knowledge management function should be able to identify KM resources to support a knowledge strategy for technical/scientific innovation, contribute to the writing of a development plan for an innovative product or service in a scientific or technical organization, search for development funds, contribute to the strategic understanding of the regulatory and standards environment of scientific and technical organizations and identify and evaluate knowledge markets opportunities.

These areas of study should not be seen as independent of each other, nor as mutually exclusive. For instance, the development of communities would benefit from the use of groupware; organizational learning will need a culture that encourages and stimulates people to share their knowledge. All these processes will need knowledge and information resources repositories.

The education and training of a KM professional should cover all these fields. Furthermore, it should also take into consideration the development of competencies and skills identified by Abel and Oxbrow (2001) jointly with those concerning infoliteracy.

Conclusion

Change is at the core of business life as organizations try to keep up with continuously evolving clients' tastes, competition on a global scale and shorter product life cycles. Stimulated by the policies defined by the European Councils, Europe is trying to develop towards "the most competitive and dynamic knowledge-based society in the world, by the year 2010". Portugal is not an exception and in the last three years some projects came to fruition, namely the creation of the *Unidade de Missão Inovação e Conhecimento*, together with the setting up of the *Plano de Acção Sociedade da Informação*. The effort that is being made is recognized but some shortcomings are identified – for example, the adoption of a technological perspective of a knowledge-driven society and the under- development of the required competencies to live and succeed in such an environment.

To attain the goals concerning innovation and competitiveness, it is necessary to recognize the importance of intangible resources, such as people and their expertise, and to develop new capabilities and competencies by the general worker as well as by the knowledge manager specialist.

The broad areas of study required to train the KM professionals include knowledge resources, KM systems, organizational knowledge, organizational context and culture, intellectual capital and innovation management. The development of adequate competencies of such professionals could be the basis for a strategy to help Portuguese SMEs to catch up with other European countries.

Endnotes

1   http://trendchart.cordis.lu

2   http://trendchart.cordis.lu/Scoreboard2002/index.html

3   http://www.cordis.lu/innovation-smes/src/innobarometer.htm

4   http://trendchart.cordis.lu/Scoreboard2002/html/eu_member_states/
    country_performances/country_pages/portugal_page.html

5   Science & Engineering

6   http://www.portugal.gov.pt/pt/Conselho+de+Ministros/Comunicados/
    20030626.htm

7   http://www.portugal.gov.pt/pt/Conselho+de+Ministros/Documentos/
    20030627_PM_SInformacao.htm

8   http://www.portugal.gov.pt

9   http://www.umic.pcm.gov.pt/UMIC/. This Unit has been created by the
    XVth Government of Portugal with the objective to set a transversal and
    integrated perspective of all the activity of the Government as well as the
    operational and politic articulation among Governmental members in
    order to attain the goals established in the Lisbon Summit, in 2000.

10 "Even explicit knowledge is dependent on tacit knowledge to be applied"
    (Wenger, McDermott & Snyder, 2002, p. 9).

11 "Human capital is the stock of knowledge that exists at the individual level
    in an organization" (Bontis, 2002a, p. 24). It includes the knowledge that
    resides in the minds of employees (tacit knowledge and difficult to codify
    and transfer) as well as the firm's processes, strategies and tactics (*op.
    cit.*). According to Sveiby, "Human capital is the accumulated value of
    competence, training, skills and knowledge residing within organizational
    members" (Snyder & Pierce, 2002, p. 477).

12 Bontis (2002a, p. 24) describes structural capital, as the "… Knowledge
    embedded in the non-human storehouses and routines of organisations.
    (…) Consists of the mechanisms and structures of the organization that
    can help support employees in their quest for optimum performance".
    Structural capital, also named "organizational capital", includes all forms
    of intellectual property as well as the knowledge embedded in the routines
    of the company, such as organizational or operating systems (Snyder &
    Pierce, 2002, p. 478).

¹³   Relationship capital "… Comprises customer and supplier relationships, knowledge of market channels and an understanding of the impact of governmental or industry association" (Bontis, 2002a, p. 24). Customer (relational) capital is the value derived from connections outside the organization; it includes reliable suppliers and loyal customers (Snyder & Pierce, 2002, p. 478).

¹⁴   http://www.cordis.lu/innovation-smes/src/innobarometer.htm

¹⁵   Represent the ability to express oneself clearly to explain complex situations or thoughts, to get one's point across, listening, understanding and being aware of the needs of one's audience (Abel & Oxbrow, 2001, p. 116).

¹⁶   Consists of the ability to influence and will determine the ability to act effectively (Abel & Oxbrow, 2001, p. 116).

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