Managing Professions for Knowledge Management

Enrico Scarso, University of Padua, Italy

Ettore Bolisani, University of Padua, Italy

ABSTRACT

In the last years, Knowledge Management (KM) studies have focused on the foundations of this "new managerial discipline". Today, there is an increasing need to transform the theoretical speculations into managerial tools, and to find solutions to practical questions concerning daily KM activity. A key issue that still requires investigation regards the management of human resources devoted to KM. The paper analyzes this topic by means of an in-depth investigation of the relevant experience of some leading companies. In particular it examines the problem of managing new roles and tasks for KM, the issue of developing structured KM units, and the question of evaluating KM activities. A discussion of the possible implications for research and management is carried out in the conclusion.

Keywords: *Business Management, CKO, Human Resource Management, Knowledge Management Roles, Knowledge Management Tasks, Knowledge Workers*

INTRODUCTION

From its origin, Knowledge Management (KM) has been attracting the interest of the leading US and European companies that have rapidly implemented KM programs (Grossman, 2006). Hence, KM is becoming an essential ingredient of management practices, and it needs to be integrated with the other well established management functions.

One issue that deserves explicit consideration concerns the links between Human Resource Management (HRM) and KM (Edvardsson, 2008; Gloet, 2006). Actually, human resources are involved in KM in many ways, and broadly speaking the relationship between KM and HRM can be seen under two different perspectives. The first one considers employees as the ultimate users of the knowledge an organization possesses (Oltra, 2005). Accordingly, the link between HRM and KM is seen in relation to aspects such as the organization of training activities, the provision of knowledge-based services, the facilitation of employees' interaction, etc.

The second perspective focuses on the fact that a successful implementation of KM requires personnel specifically employed and trained for managing such initiatives (Burstein et al., 2010; Edvardsson, 2008). This view argues that the adoption of appropriate knowledge-related HRM practices can influence the effectiveness of KM activities (Burstein et al., 2010; Cabrera & Cabrera, 2005), and the practical

DOI: 10.4018/jkm.2011070105

implementation of KM requires changes in the way people are managed, for instance with the aim of influencing individuals to assume a knowledge-sharing attitude.

This paper especially focuses on this second aspect, which has been relatively less considered in the literature. In particular, it investigates the challenges posed to HRM by the emerging KM-related activities. The recent literature and the empirical evidence are surveyed with the aim to underline important issues, relating to the nature and the contents of the new professions, the staffing policy, the performance appraisal, the rewards system. Based on this analysis, we discuss the main practical aspects of HRM in KM programs, and make some important points for a future research agenda.

THE ROLE OF PEOPLE IN KNOWLEDGE MANAGEMENT

Setting the grounds of KM as a managerial discipline has proven to be a difficult task that is still challenging researchers and practitioners. This is certainly due to the youth of the field and to the fact that several disciplines are contributing to its development (Baskerville & Dulipovici, 2006). In addition, it is the term knowledge itself that can be confusing. In the KM literature, knowledge is often defined in comparison with the notion of information. According to Holsapple (2003) information consists of data that have been organized for a particular use (i.e. qualities or measures of phenomena or facts, like, for instance, prices, sales, inventories, etc.), while knowledge is a combination of information, ideas, experience and insights that guide actions and decisions. Therefore, although knowledge is based on information, deriving knowledge from information requires human judgment, and is based on context and experience.

According to Holsapple and Joshi (2006), KM can be defined as the deliberate and organized efforts made by individuals or organizations to expand, cultivate and apply available knowledge in ways that can add value to their activity. To put it in a nutshell, KM consists of a set of techniques and tools to make the right knowledge available to the right people in the right moment.

A recent study (Heisig, 2009) aimed at comparing 160 different KM frameworks around the world shows that KM is generally seen as a set of main activities (knowledge creation; knowledge storage; knowledge sharing; and knowledge application) whose effectiveness is based on a proper mix of human, structural, cultural, and managerial factors.

In the past, two main approaches to KM have been followed by companies, one associated to a hard technology-oriented notion, the other to a more human-oriented vision (Lee & Choi, 2003; Newell et al., 2006). The technology-oriented view derives from Information Systems scholars: knowledge is considered to be an object that can be detached from its holder, and can hence be stored and transferred by means of a technological device. Conversely, the human-oriented approach considers knowledge as inseparable from the mind of individuals and as a result of social processes. Thus, although both views ascribe an essential role to computers and ICT systems, while in the technology-oriented approach technologies are the cornerstone of KM and they are seen as a way to automate cognitive tasks, in the human-oriented approach they are considered a set of enabling tools that may or may not be of use to human beings for facilitating their cognitive activities.

The experience seems to confirm that the effectiveness of KM projects depends on both technical and non-technical elements. The large majority of initiatives carried out by companies resort to a mixed set of solutions, which include both technical tools (e.g. knowledge repositories, knowledge portals, web directories) and organizational arrangements (e.g. teams, communities of practice, meetings).

KM can therefore be seen as a socio-technical issue, where both technological and human/organizational aspects must be adequately combined. But while the former have been widely discussed in the literature, the latter still deserves a thorough investigation. Specific issues regard people involved in KM activities. First, there is the need for new competencies and dedicated organizational structures to manage KM initiatives. Secondly, employees can be asked to perform new KM-related tasks, which require capabilities, skills, and attitudes they may not have. Such new activities also need motivation, especially when they are seen as mere distraction from the usual business. Hence, implementing KM programs has an effect on HRM, and it is necessary to investigate how to properly manage people involved in KM in order to obtain their best.

METHODOLOGY

Aims and Scope

As previously said, the issues of HRM in KM require an effort of exploration, systematization, and rationalization. With the purpose to contribute to this effort, we analyzed and compared some relevant case-studies of important companies that developed significant KM programs. The aim of the investigation was to shed light onto how companies manage employees involved in KM staff and what are the related issues. In detail, the main questions addressed were as follows:

- What are the new roles and profiles involved in KM programs? How are they managed? What are their tasks and responsibilities?
- How are KM units organized? What are the relationships with the existing organizational structures?
- How are KM tasks evaluated in companies? What mechanisms of incentive and reward are adopted to improve the effectiveness of KM programs?

Data Collection

Data collection was primarily based on secondary sources. Indeed, considering that there are several case-studies of KM programs reported in the literature, we thought that it would have been easier to examine this literature instead of making new case-studies of the same companies. The literature emphasizes that in some cases the resort to secondary sources can be fruitful (Barbour & Eley, 2007) for doing extensive comparative research, and for exploring specific aspects that were not explicitly analyzed in the original cases. The data collected from secondary sources were integrated with additional information that we could collect directly by means of case studies that we conducted in a selected number of companies.

The decision to consider multiple case-studies and not just one was justified by the goal to identify common or recurring issues and comparing the adopted solutions within a significant sample of KM programs.

Sample Selection

The selection of the sample was preceded by the identification of a number of cases of relevant KM initiatives that were well documented in the literature. Table 1 clarifies the features of our study. Almost all the surveyed companies are multinationals, whose organization is complex and HRM is complicated as well. In addition, multinational companies have to deal with different cultures. In those corporations, there are well-structured practices and procedures, and HRM absorbs significant resources. Secondly, the cases show a significant range of situations, issues, and approaches to HRM in KM.

The sample includes companies of various sectors. This certainly confirms that KM is recognized as a key activity by leading firms, independently from their business area. In addition, it allows exploring a broad variety of situations. Generally speaking, it is very difficult to classify the various KM programs that companies have been implementing. Here, since we focus on the relationship of KM with HRM,

Table 1. Outline of the cases considered

Company	Industry	KM programs	References – sources
Accenture	Business Consulting	Knowledge Exchange	Ash (2006); Falk (2005); Hill et al. (2005); Meister & Davenport (2005); Paik & Choi (2005)
Allianz	Insurance & Finance	KM at the international level	Spies et al. (2005)
ENI	Oil & Energy	KM in the E&P Division	Scarso et al. (2009)
Ernst &Young	Business Consulting	Centre for Business Knowledge	Akhavan (2005); Dellow (2005); Lara et al. (2002); Lee & Valderrama (2002); Scarso et al. (2010, 2011); Wang & Ahmed (2005);
Caterpillar	Construction and mining equipment	Knowledge Network	Ardichvili et al. (2006); Boehle (2007); Glynn (2007); Powers (2004)
PWC	Business Consulting	KM in Financial & Banking sector	Reina (2009)
Daimler	Automotive	TechClubs, EBok	Ackerman et al. (2003); Kannan et al. (2005); Tschirky (2009); Wenger et al. (2002)
Eli Lilly	Pharmaceutical	AskMe	Ghicuru & Tobin (2004); Wenger et al. (2002)
HP	Electronics	Worldwide KM program	Akhavan et al. (2005); Junnarkar & Levers (2005); Kohlbacher & Muchai (2007); Knowledge Street (2006); Lin & Kwok (2006); Martiny & Tobin (1998)
McKinsey	Business Consulting	Practice Development Network	Ghosh (2004); Wenger et al. (2002)
Shell	Oil & Energy	Turbodude, ShellWiki	Boyd (2004); Gorelick et al. (2004); Kemper (2008); Wenger et al. (2002)
Siemens	Automation	ShareNet	Akhavan et al. (2005); Franz et al. (2002); Gartner et al. (2002); Gibbert et al. (2010); Müller (2007); Nielsen & Ciabuschi (2003, 2005); Voelpel & Han (2005); Voelpel et al. (2005)
Unilever	Food	CoPs	Pos et al. (2005); Rumyantseva et al. (2007)

we can roughly identify the KM programs analyzed into two main categories, namely:

- "Soft" programs, i.e. focusing on the key contribution of people. A widely used soft approach is that of Communities of Practice (CoPs), formed to facilitate knowledge sharing between employees facing similar problems or involved in analogous operational activities (Wenger et al., 2002). Computer technologies may be of great help here, but are, generally, not the core question;
- "Hard" programs are chiefly based on the essential support of information technologies, named Knowledge Management Systems (KMS). Several computer technologies are currently used to automate (or, at least, facilitate) knowledge storage, retrieval, transmission, and sharing

(e.g. document systems and repositories, intelligent search engines, interactive communication tools, enterprise portals, web knowledge maps).

In reality, as stated, the soft and the hard approaches are generally mixed to one another. Empirical evidence shows that KM programs are often not just a matter of technology, but rather of people, which means that HRM can be crucial, also when technology plays a significant part.

Data Analysis

The investigation was mainly based on qualitative data, directly drawn from the case-study reports: descriptions of KM programs and management solutions adopted, characteristics of the KM units, profiles of KM staff, etc. In particular, the problems faced by companies, the adopted solutions and the explanations of these choices were analyzed when their descriptions were included in the case-study reports. Qualitative data (when available) were also considered, but especially to understand the dimension of KM programs and explain the consequent problems.

Possible Points of Weakness

Clearly, the reader must be aware that the use of secondary sources has some limitations. Specifically, the connection between the research questions of interest and the data available in the case study may be weak, because the research was designed by others with different purposes. In addition, there may be a temporal misalignment between the data related to the various cases. However, in our specific situation, the use of secondary sources was functional to our research aims that were mainly: drawing an essential picture of the applications of HRM to KM, providing food for thought to researchers and managers, highlighting possible critical points, and exploring the solutions adopted to face them.

The selection of the sample has also some criticalities. The cases investigated are all well documented in the literature, and they are generally considered success stories. Furthermore, the KM programs investigated refer to large corporations: investments in KM are therefore high, and there is a significant commitment of top management. Consequently, the findings of our analysis can be biased. However, since our aim was to identify the core issues of HRM in KM programs, we thought that it was important to analyze the companies that lead the way, whose solutions and problems can provide food for thought.

HRM IN KM PROGRAMS: LESSONS FROM EXPERIENCE

Roles and Responsibilities

This issue is examined in relation to two categories of employees (Maier, 2007): a) employees whose task is the efficient and effective performing of KM activities and processes, and b) personnel that work in other business units but, at the same time, participate in and are affected by KM initiatives.

The presence of KM employees in organizations derives from having realized that the systematic and rational exploitation of knowledge as a corporate asset implies that KM processes have to be managed explicitly and directly. KM jobs are peculiar compared to the more traditional ones. While the first experimental KM programs often engaged few part-time or occasional people, today this is not possible any longer, especially considering the current dimension of many KM initiatives. The creation of structured and dedicated units (namely, teams explicitly devoted to KM activities) is the way generally followed by companies.

This has important implications for HRM. First, several job profiles have been created that have no correspondence to the traditional roles. There are some KM roles that tend to be used more frequently (Maier, 2007; Ruth et al.,

2003), but tasks and responsibilities are still unclear. Formal descriptions of KM jobs are still missing, are ambiguous, or can be confused with other activities. Actually, some KM roles are re-alignments or extensions of existing roles, while others are newly created (Burstein et al., 2010). For example, it may happen that KM duties are assigned to IT or HRM people, i.e. to departments whose activity involves organizing people, processes, and information technologies and are expected, by their nature, to entail KM tasks. This especially occurs in companies where KM is seen as a set of hard computer-based programs.

Even the titles used to identify the new roles change from a company to another. For instance, the functioning of CoPs requires two main tasks, i.e.: a) the management of KM tools that underpin knowledge sharing (e.g. IT applications, document management, organization of meetings, contacts keeping), and b) the development of knowledge domains (e.g. identification of relevant knowledge contents, their formalization, developing taxonomies, leading discussions, facilitating the delivery of best practice). In the various companies, such roles may however correspond to different terms and, not rarely, to different task profiles. At Caterpillar *community managers* boost and assist the processes of knowledge sharing among the members of a CoP. But the same roles, in Siemens ShareNet program, are indicated as *facilitators*. These tasks concern KM support rather than knowledge domains. On the contrary, in PricewaterhouseCoopers's (PWC) communities, the leading role is played by *subject matter experts*, that are not full-time KM employees but senior professionals that are experts of particular fields, dedicate just part of their time in managing the community, and put their competence at the service of the others. Their KM task is, consequently, more involved in the development of knowledge domains, while they are assisted by full-time KM personnel in resolving day-by-day practical problems (called generically knowledge managers). At ENI (Ente Nazionale Idrocarburi) facilitators are often senior experts that act as a sort of primus inter pares among the other members of a community, and are supported by a full-time KM staff, named *enabling team*, led by a *coordinator*.

A popular role is that of *knowledge broker*. At SD&M, a large German software company, they are responsible (for a limited period) for collecting material and developing reports in specific areas and topics; reports are then delivered to the *technology managers* (term notably used, in that company, as a synonymous of *knowledge manager* – Brössler, 1999). Conversely, at PWC, knowledge brokers are seen as facilitators of knowledge transfer processes. Their activity mainly consists in stimulating the potential users of knowledge to access document repositories, join in CoPs, consult experts, etc. Therefore, they are KM support people rather than domain experts. At Siemens, instead, knowledge brokers are at the same time KM people (that help supporting knowledge exchanges within the CoPs) and partly experts of a specific knowledge domain as well. A similar function is played at Hewlett-Packard (HP) by *knowledge advisors*, who are responsible for helping users search for information, making people and community connections, training users in the use of KM tools.

Other ways to name KM roles can be found in other firms. At DuPont (Davis et al., 2005) there are four roles: high level *synthesizers* (experienced R&D managers responsible for monitoring technological developments); *librarians* (whose duty is to gather, assimilate, index and store copious amount of information, and to provide timely assistance and service to other employees); *knowledge engineers* (acting as knowledge interface between R&D, marketing and customers); and *knowledge operators* (typically front-line employees that accumulate and transmit operational knowledge and work very closely with knowledge engineers); and finally *domain experts* (who test the validity of the knowledge assets collected). At Accenture the knowledge incorporated into their KMS is assessed by *editors* who are responsible for the synthesis, repackaging, organization, and categorization of knowledge.

A key role is that of *Chief Knowledge Officer* – CKO – or similar names. This is probably the most popular KM role, as testified by the literature (Awazu & Desouza, 2004; Maier, 2007; McKeen et al., 2003). According to Wenger et al. (2002), the objectives of a CKO's include: maximizing the firm's knowledge assets, designing and implementing KM strategies, effectively exchanging knowledge assets internally and externally, and promoting the use of KMS.

A clear leadership is considered critical for the success of every KM initiative (Anantamula, 2008), and, for this reason, the CKO should be a senior executive. But this is not the rule, and the situations can be very different. CKOs are not always senior executives or, when they are, they can be just part-time CKOs. At PWC, for instance, the *Global Knowledge Manager* is the director of a business division. He is mainly a sponsor of the program, represents the link with the top management levels, and has budgeting responsibility. More specific aims and implementation strategies are the duty of lower level managers that, however, do not have the same authority in the company chart.

The definition of CKO profiles and their duties is also associated with the existence of an independent KM unit. At Accenture, for example, a specific manager, called *Chief Information Officer*, initially headed the KM program. When the unit was incorporated into a wider organizational division, there was a change in roles, tasks, and responsibilities.

The picture is made even more complex by the fact that there are people somewhat involved in KM activities while working in their business units. The issue of *double tasks* derives from the fact that each employee can be considered both a potential source and user of knowledge. This situation is typical of CoPs. For instance, in TechClubs - the CoPs at Daimler – engineers wear two hats: as tech club members, they improve their competence, co-ordinate standardization of practice, and share knowledge with colleagues; however their main affiliation is still at the car plant, and focuses on the design of new models. This double role can cause several problems. At Shell the conflicting priorities of managers reduce their motivation to actively participate in the Turbodude community. At Unilever the most strategically relevant communities proved to be not necessarily the most active ones, primarily because the experts that worked in an area that was of high strategic value were too busy with their local tasks to share their knowledge.

Formal KM Units and Overlapping With Existing Structures

This issue arises once KM programs switch from simple additional activities, performed by existing organizational functions, to highly strategic goals that require structuring, as happened in most firms. Formal KM units are often created to seek efficiency and control over KM activities, which implies specific solutions in terms of setting organizational charts, budgeting, fixing (economic) goals and measuring them, establishing authority and responsibility, planning careers and wages, etc.

The overall picture is, again, very complex. Lara et al. (2002) contrast two opposite situations: strictly formal KM units (e.g. American Management Systems, where the organization of KM activities is aligned with the formal culture of that company) and substantially open environments (for instance, the World Bank KM programs with a certain degree of non formalization). The majority of situations lay in the middle. These intermediate solutions may mean, for instance, that KM units are placed under the responsibility of other divisions, or that KM tasks just represent one part of the staff's current activities. KM initiatives at ENI, even though they involve the entire corporation, are considered part of the Exploration and Production Division that, at the same time, has several other tasks. At Accenture, KM and learning management have been integrated into the same unit. This reflects the view that the two activities are considered similar and complementary.

Sometimes, this can lead to unclear situations as regards responsibility and authority. At

PWC, a Global Knowledge Manager is in charge for budgeting and general KM strategies, but KM people are subordinate to another director for their daily work. Things can be even more complicated in case of complex multinational KM teams, with the existence of independent but linked KM units. This confusing picture can be seen somewhat typical, given that KM is a substantially new activity that still needs accepting and economically justifying by managers. It is what happened to other management functions (see, for instance, IT departments) that are, now, an established formal part of companies.

However, another important reason has to be mentioned: the nature itself of KM. Since the purpose of KM is to facilitate the sharing and exploitation of knowledge across the entire organization, it requires an active participation by many people that do not necessarily work in the KM unit. A good example is that, again, of CoPs that are generally designed to overcome hierarchical, linguistic, cultural, and geographic barriers that exist in an organization. Since people working at the same project, plant, or market tend to develop idiosyncratic "knowledge islands", CoPs are put as bridges over islands thus enabling companies to exploit the valuable intellectual capital scattered in their dispersed organization. For instance, Siemens Knowledge Community Support was explicitly aimed to network internal knowledge embedded in the distinct parts of the firm. The Shell Turbodude networks were created to facilitate knowledge sharing among colleagues of distinct deepwater exploration teams. At Daimler, engineers working on new models at different plants participate in inter-company TechClubs, where they can share knowledge of specific problems.

This transverseness can cause conflicts with the existing organizational structure. For instance, the development of a new CoP can require the transfer of power from the line management to the community itself. But this may be perceived as an internal element of competition. In ENI's CoPs, experts and facilitators are subordinate to their hierarchical line for usual business operations and to the KM enabling team coordinator for the time they devote to KM activity.

The question of whether and how KM programs can coexist with existing structures is thus critical, especially when they assume a formal configuration and are recognized as a part of the system. In the KM view, knowledge sharing cannot be intended as a mere informal activity that is almost invisible to the formal organization. Structuring and formalization are especially required when KM practices have a directly recognizable business goal. At Unilever, a formal framework has been put in place to help ensure the effective and efficient operation of KM activities and to establish appropriate links to the rest of the organization. At Shell, the conflicting priorities of managers reduce the motivation to actively participate in the community.

In any case, KM structures have peculiar social and organizational functioning, compared with the traditional ones. Especially in the case of CoPs, the involvement of several people, well beyond the boundaries of the KM office, suggests that those programs do not respond well to a usual control. Based on their analysis of Caterpillar, Ardichvili et al. (2006) point that managerial efforts should be devoted to remove barriers and create favorable conditions for individuals' participation. In other words, rigid hierarchies and mechanisms based on authority can prevent the contribution from the other parts of the company, which may be fatal for KM.

When KM programs grow, and their scope extends across departments and multinational sites, the question of local vs. centralized management arises as well. As the Accenture experience shows, although a central standardized policy may provide common practice and facilitate the flowing of knowledge, locally-managed communities can favor effectiveness and stricter focus on specific issues of interest. Similarly, at Caterpillar and Siemens, differences in culture, values, business approaches, sense of authority, and preferred modes of communication suggest that KM practices should be tailored to the single area of application. On the other hand, the development of distinct environments

raises the issue of integration. For instance, when CapGemini merged with Ernst & Young, adapting and integrating KM approaches and structures became a difficult task.

Value of KM

This issue involves two main aspects. Firstly, measuring the economic worth of KM is essential for budgeting resources and for fixing wage schemes. An essential point is that KM should create value for business, and a crucial question here is how costs and benefits can be effectively measured. This is still a puzzling problem in the current practice (Scarso et al., 2011). Due to the intangible nature of KM, proving the absolute validity of the business case, and evaluating costs and contributions to profit are very difficult, and sometimes nearly impossible (see e.g. Glynn on Siemens' KM programs). In addition, the most significant contribution of KM probably arises in a long-term perspective. At Daimler TechClubs, KM communities help to solve day-by-day problems which mean short-term value; but are also deemed to develop expertise of members, which means long-term value. Similarly, Procter&Gamble's KM practices are explicitly declared as a key component of the innovation and technology strategy. Also, McKinsey reports advantages in developing new customer-oriented strategies. All those examples show that the real contribution of KM is seen in terms of strategic value associated to the development of internal knowledge assets. But this contribution is clearly very difficult to estimate.

Different methods of KM measurement have been adopted in distinct cases. For evaluating the benefits, a frequently used approach is the measurement of tangible elements (i.e. documents delivered, reports written, information packages provided, accesses to knowledge repositories). Such solutions are used frequently, but while they provide information about the *quantity* of knowledge exchanged, they do not indicate its *quality,* which is clearly essential for measuring the business value. Based on that, most companies implemented a system for monitoring the satisfaction of company users, i.e. how much knowledge resources are seen as valuable contribution to everyday work. The solutions are, however, very different, and still based on a trial and error approach. At McKinsey, the measurement of satisfaction of KM efforts was initially left to the single user, while in a second time systematic measures were developed. Both at PWC and Ernst & Young qualitative measures through periodic questionnaires and interviews to users were implemented. All this proves that a standard solution has not been found yet to this key problem.

The second important question is that, to create business value, KM programs need the direct involvement of the entire company. In other words, the more the KM system is used and fed by all the company's employees, the more KM is valuable for business. It is thus important that the entire staff of a company – and not only the KM employees – accepts to contribute to KM, as sources or users of cognitive resources.

Several attempts have been made to promote the participation in KM. One way is to establish economic incentives. For instance, potential sources of valuable knowledge (i.e. experts of some particular field) may be asked to share their knowledge having an economic benefit in return. This approach was adopted by Siemens' ShareNet community: while, initially, knowledge contributions to KM resources were based on the voluntary efforts of *evangelists* that led the way, later a more formal mechanism of economic incentives was established. Anyway, since knowledge can be considered a precious capital by the experts who possess it (i.e. they are paid based on their capability to solve problems or provide new ideas), in some cases there is an attempt to protect the "copyright" on knowledge contributions. We can mention the interesting example of a large advertising company's website, that collects new ideas from professionals and "put their stamp" on such ideas.

Non-economic incentives can be based on public recognition of the most valuable contributions, thus their sources can be recognized

as experts in a particular field. The HP's IT Resource Centre program used a mechanism of credit rating of personal contributions. The experience however shows that while this mechanism is effective in environments where peer reputation is important (e.g. in the software developers community, or among R&D people) it can be less important in other contexts. Non-economic incentives can consist of prizes and bonuses, which represent more tangible forms of reward, but the problem is how to link prizes with real value.

Also, to increase the value added, it is necessary that the KM system is really exploited by the company. Convincing users to utilize the knowledge retrieved or exchanged by means of the KM program is essential for the long-term justification of the program itself. Indeed, the question here is that it may be difficult to convince people to use a system or a method whose utility is not taken for granted, and with which they are not familiar. In Siemens' ShareNet efforts to facilitate the use of KM programs include providing knowledge contents adapted to the specific goals of each individual, and implementing an ergonomic interface with KM repositories. McKinsey adopted a very articulated approach, that includes e.g.: increasing the visibility of experts that share their knowledge (to raise the credibility of the KM approach); monitoring knowledge contents provided by experts (so that only good contents are provided to users); and establishing incentives to users.

CONCLUSIONS: IMPLICATIONS FOR RESEARCH AND MANAGEMENT

This section summarizes the main lessons that can be drawn from the study in relation to the main issues treated, namely: the development of specific roles and responsibilities in KM; the setting up of formal KM units; the overlapping with existing organizational structures; and the economic value of KM tasks.

New Roles and Profiles

An effort of codification and standardization of KM workers appears to be a vital element for the development of KM initiatives. This can give order to the KM activities of a company by implementing career plans and wage schemes that can be recognized by both KM employees and the rest of the organization. Also, job profiles are an important reference for identifying the competencies that are needed for each task, and arranging adequate training programs. Another indirect (but important) result of standardization can be the creation of a category of professionals, independently from the specific company where they are employed.

It should be remembered that companies have different views of KM, so specific variations can't be eliminated. Nevertheless, a description of KM jobs can at least include some general qualifications that help to understand if a person is eligible for a particular KM position. These qualifications can firstly include the specific KM tasks or processes performed and their relationship with other organizational activities. Also, since KM jobs are strictly intertwined with the rest of the company, the main goals of the KM activity expressed in business terms and the hierarchical interdependence with other units or offices should be clarified. It may also be important to explain that a job position has or hasn't the responsibility for a specific budget. As regards the required educational background or experience, a special attention should be devoted to ICT skills. This does not mean that a person must always be a recognized expert of sophisticated computer systems. But since ICT applications are basic components of KM programs, an applicant should at least have essential notions of the potential use of these systems in KM. This facilitates the recruitment process, makes the transfer of professionals easier from a firm to another, and creates a more efficient and transparent job market.

Attempts to classify KM roles and profiles have already been made by scholars (Burstein

et al., 2010; Maier, 2007; McKeen, 2003; Oltra, 2005; Ruth et al., 2003). This can be a good starting point, but should not remain confined within the academic community. The diffusion into the business practices is the crucial work that still has to be done, and requires the direct involvement of company managers and trade or professional associations. Also, the competencies needed for KM are still ambiguous, and subject to a continuous change. There is a general shift from the pure IT skills, which denoted the first KM tasks, to broader managerial, organizational and even sociological competencies.

Training and learning programs are increasingly vital for resolving recurring problems like for example:

- Providing the essential background for specific KM tasks; although there is flourishing of courses on KM in business schools and colleges, the tradition of a "KM school" has not been established yet;
- Standardizing concepts, terminology, and approaches to KM, for helping KM employees that come from other areas and don't have specific training in KM (this appears to be the norm even in the major companies);
- Disseminating general knowledge of the fundamental elements of KM as an ingredient of managerial skills, so that the entire company can understand the KM language; as an example, people should be familiar with terms such as knowledge transfer or community of practice, the same as they are with notions like budget or organizational chart.

Formalization of KM Activities

Building a formal unit for KM requires several actions, such as: clearly defining roles and processes, budgeting and allocating resources, fixing economic goals and monitoring them, establishing authority and responsibility, planning careers and wages, and so on. The question of whether a KM unit should be a formal or informal environment is subject of debate. On the one hand, formalization is required when efficiency is sought. Indeed, as in other activities, KM has a number of tasks that represent procedures and routines, whose systematic organization can be beneficial. On the other hand, too strictly formal rules can hinder the process of knowledge sharing that is still based, at least in part, on flexible participation and voluntary contributions. Also, formalization can help KM employees to gain recognition by the rest of the company (Lara et al., 2002), but can give rise to conflicts with the other well established managerial functions.

As the case studies show, KM units often overlap the existing organization, which raises problems of multiple roles, conflict of authority, etc. Very often, KM roles are part-time tasks: most people, especially in new projects, work in KM activities while doing the usual business practice at the same time. Clearly, this reduces the effectiveness of KM actions and raises conflicts with the other operators. From a HRM perspective, the management of such conflicts is a critical task that is still largely based on a process of trial and error experimentation.

Evaluation of KM Activities

KM activities have often intangible contents and thus, by nature, are hard to measure. Furthermore, the scope of KM functions extends across the entire organization. This makes the evaluation of costs and benefits of KM for each business unit more difficult. Currently, there is no formal or standard practice for the measurement of KM activities. As shown, firms are now arranging their peculiar methods of auditing, based on a mix of qualitative measures but, at the moment, there is no best practice emerging. What should be noted is that companies are acting based on their specific experience, rather than on systematic or conceptual approaches. Here, fields of study such as Intellectual Capital and Economics of intangible assets might provide good reference for KM practice.

A second important issue that our analysis allows to highlight regards the role of incentives

and rewards systems. Since the success of KM depends on the active contribution of people scattered in the company, this issue is under the attention of KM practitioners. However, companies are not yet capable of providing measures of the economic benefits of KM in a way that can be accepted and recognized universally. Consequently, the active participation of individuals in KM programs is often based on personal evaluations of their potential benefits. This can be vital at the launching stage, but the further development of a KM program requires other forms of incentives. The survey shows that the various companies have creatively implemented several forms of economic or non-economic incentives, and there is no best practice of reference. A useful contribution of HRM studies can be the systematic analysis and comparison of the reported experience, to help identifying the solutions that have already been experimented, their advantages, and benefits.

Conclusive Remarks

No longer exclusive domain of philosophical speculation, today knowledge is referred to as an essential and concrete element of firm's competitiveness. The current economic climate, with the difficulties it brings, represents an additional motivation to invest resources in the production, management and delivery of knowledge, in the hope that this can help to keep on progressing. This is the reason why KM has now a well-established place in the research community.

In spite of this, there is still a long way to go. As our investigation on HMR issues in KM testifies, managing knowledge in companies not only calls for theoretical concepts and technical solutions, but also requires proper organizational arrangements and managerial capabilities. Like other managerial disciplines, KM would benefit from a converging development of formal notions, applicative models, and organizational practices.

On the one hand, knowledge can't be treated in the business arena as an object of pure speculation. In particular, each company shows peculiar problems and needs, and a direct connection with the day-by-day activity is essential for implementing effective KM programs. On the other hand, a strong conceptual formalization of models and approaches is important for allowing comparisons between KM and other managerial activities, as well as between KM programs of different companies. Budgeting, allocation of resources, and managerial control would become easier. In short, as our study shows, the balance and effective combination of theory and practice represents today's challenge for both scholars and practitioners involved in KM.

REFERENCES

Ackerman, M., Pipek, V., & Wulf, V. (2003). *Sharing expertise: Beyond knowledge management*. Cambridge, MA: MIT Press.

Akhavan, P., Jafari, M., & Fathian, M. (2005). Critical success factors of knowledge management systems: A multi case analysis. *European Business Review*, *18*(2), 97–113. doi:10.1108/09555340610651820

Anantamula, V. S. (2008). Leadership role in making effective use of KM. *VINE: The Journal of Information and Knowledge Management Systems*, *38*(4), 445–460.

Ardichvili, A., Maurer, M., Li, W., Wentling, T., & Stuedemann, R. (2006). Cultural influences on knowledge sharing through online communities of practices. *Journal of Knowledge Management*, *10*(1), 94–107. doi:10.1108/13673270610650139

Ash, J. (2006). Theory of evolution - How Accenture moved from training to learning. *Inside Knowledge, 10*(1), 2-5.

Awazu, Y., & Desouza, K. C. (2004). The knowledge chiefs: CKOs, CLOs and CPOs. *European Management Review*, *22*(3), 339–344.

Barbour, S., & Eley, S. (Eds.). (2007). Refereed special section: Reusing qualitative data. *Sociological Research Online*, *12*(3).

Baskerville, R., & Dulipovici, A. (2006). The theoretical foundations of knowledge management. *Knowledge Management Research & Practice*, *4*(2), 83–105. doi:10.1057/palgrave.kmrp.8500090

Boehle, S. (2007). *Caterpillar's knowledge network.* Retrieved from http://www.managesmarter.com

Boyd, A. (2004, June 24). *Shell's communities of practice - 12 years of experiences*. Paper presented at the EBK -- Knowledge Sharing Across Boundaries, London, UK.

Brössler, P. (1999, June 16). Knowledge management at a software house - A progress report. In F. Bomarius (Ed.), *Proceedings of the Workshop on Learning Software Organizations*, Kaiserslautern, Germany (LNCS 1756, pp. 77-83).

Burstein, F., Sohal, S., Zyngier, S., & Sohal, A. S. (2010). Understanding of knowledge management roles and responsibilities: A study in the Australian context. *Knowledge Management Research & Practice*, *8*(1), 76–88. doi:10.1057/kmrp.2009.18

Cabrera, E. F., & Cabrera, A. (2005). Fostering knowledge sharing through people management practices. *International Journal of Human Resource Management*, *16*(5), 720–735. doi:10.1080/09585190500083020

Ciabuschi, F. (2005). On IT systems and knowledge sharing in MNCs: A lesson from Siemens AG. *Knowledge Management Research & Practice*, *3*(2), 87–96. doi:10.1057/palgrave.kmrp.8500057

Davis, J. G., Subrahmanian, E., & Westemberg, A. W. (2005). The "global" and the "local" in knowledge management. *Journal of Knowledge Management*, *9*(1), 101–112. doi:10.1108/13673270510582992

Dellow, J. (2005). Success at Ernst & Young center for business knowledge: Online collaboration tools, knowledge managers, and a cooperative culture. In Rao, M. (Ed.), *Knowledge management tools and practices: Practitioners and experts evaluate KM solutions* (pp. 166–174). Burlington, MA: Elsevier.

Edvardsson, I. R. (2008). HRM and knowledge management. *Employee Relations*, *30*(5), 553–561. doi:10.1108/01425450810888303

Falk, S. (2005). Knowledge management at Accenture. In Rao, M. (Ed.), *Knowledge management tools and practices: Practitioners and experts evaluate KM solutions* (pp. 77–81). Burlington, MA: Elsevier.

Franz, M., Freudenthaler, K., Kameny, M., & Schoen, S. (2002). The development of the Siemens knowledge community support . In Davenport, T. H., & Probst, G. J. B. (Eds.), *Knowledge management case book* (pp. 147–159). Chichester, UK: John Wiley & Sons.

Gartner, T., Obermeier, H., & Ramhorst, D. (2002). A guided tour to knowledgemotion TM: The Siemens business services knowledge management framework. In Davenport, T. H., & Probst, G. J. B. (Eds.), *Knowledge management case book* (pp. 162–176). Chichester, UK: John Wiley & Sons.

Ghicuru, P., & Tobin, P. K. J. (2004). Challenges encountered diffusing tacit knowledge at Eli Lilly SA. *South African Journal of Information Management*, *6*(4), 1–11.

Ghosh, T. (2004). *Creating incentives for knowledge sharing*. Cambridge, MA: MIT Sloan School of Management.

Gibbert, M., Prost, G. J. B., & Davenport, T. H. (2010). *Sidestepping implementation traps when implementing knowledge management: Lessons learned from Siemens*. Behaviuor & Information Technology.

Gloet, M. (2006). Knowledge management and the links to HRM. *Management Research News*, *29*(7), 402–413. doi:10.1108/01409170610690862

Glynn, C. E. (2007). *Knowledge sharing as a strategic asset at Caterpillar*. Retrieved from http://astd2007.astd.org/PDFs/Handouts for Web/Handouts Secured for Web 5-15 thru 5-16/W303 - Catepillar.pdf

Gorelick, C., Milton, N., & Kurt, A. (2004). *Performance through learning: Knowledge management in practice*. Burlington, MA: Elsevier.

Grossman, M. (2006). An overview of knowledge management assessment approaches. *Journal of American Academy of Business*, *8*(2), 242–247.

Heisig, P. (2009). Harmonisation of knowledge management – comparing 160 KM frameworks around the globe. *Journal of Knowledge Management*, *13*(4), 4–31. doi:10.1108/13673270910971798

Hill, C. M., Cha, J. M., & Wagenhals, O. H. (2005). *Accenture: The case on knowledge management*. Bellingham, WA: Western Washington University.

Holsapple, C. W. (2003). Knowledge and its attributes. In Holsapple, C. W. (Ed.), *Handbook on knowledge management* (pp. 165–188). Berlin, Germany: Springer-Verlag.

Holsapple, C. W., & Joshi, K. D. (2006). Knowledge management ontology. In Schwartz, D. (Ed.), *Encyclopedia of knowledge management* (pp. 397–402). Hershey, PA: IGI Global. doi:10.4018/9781591405733.ch052

Junnarkar, B., & Levers, J. (2005). Hewlett-Packard making sense of knowledge management . In Rao, M. (Ed.), *Knowledge management tools and practices: Practitioners and experts evaluate KM solutions* (pp. 197–205). Burlington, MA: Elsevier.

Kannan, G., Aulbur, W., & Hass, R. (2005). Knowledge management in practice: Making technology work at DaimlerChrysler. In Rao, M. (Ed.), *Knowledge management tools and practices: Practitioners and experts evaluate km solutions* (pp. 137–146). Burlington, MA: Elsevier.

Kemper, P. (2008, September 3-5). *Shell Wiki: How an enterprise Wikipedia facilitates a better networked organization*. Paper presented at the I-Know Triple I Conference, Graz, Austria.

Knowledge Street, L. L. C. (2006). *Knowledge advisors at Hewlett-Packard*. Retrieved from http://www.knowledgestreet.com/Knowledge_Street_Report_-_Knowledge_Advisors_at_HP.pdf

Kohlbacher, F., & Mukai, K. (2007). Japan's learning communities in Hewlett-Packard consulting and integration: Challenging one-size fits all solution. *The Learning Organization*, *14*(1), 8–20. doi:10.1108/09696470710718311

Lara, E., Andreu, R., & Sieber, A. (2002). *A case study of knowledge management at Cap Gemini Ernst & Young* (Tech. Rep. No. 302-164-6). Beds, UK: The European Case Clearing House.

Lee, H., & Choi, B. (2003). Knowledge management enablers, processes, and organizational performance: An integrative view and empirical examination. *Journal of Management Information Systems*, *20*(1), 179–228.

Lee, J., & Valderrama, K. (2003). Building successful communities of practice. *Information Outlook*, *7*(5), 28–32.

Lin, L., & Kwok, L. (2006). Challenges to KM at Hewlett Packard in China. *KM Review*, *9*(1), 20–23.

Maier, M. (2007). *Knowledge management systems: Information and communication technologies for knowledge management* (3rd ed.). Berlin, Germany: Springer-Verlag.

Martiny, M. (1998). Knowledge management at HP consulting. *Organizational Dynamics*, *27*(2), 71–77. doi:10.1016/S0090-2616(98)90025-0

McKeen, J. D., & Staples, S. S. (2003). Knowledge managers: Who they are and what they do. In Holsapple, C. W. (Ed.), *Handbook of knowledge management* (pp. 21–41). Berlin, Germany: Springer-Verlag.

Meister, D., & Davenport, T. (2005). *Knowledge management at Accenture*. London, ON, Canada: The University of West Ontario, Ivey School of Business.

Müller, J. (2007, August 27-28). *Global exchange of knowledge and best-practices in Siemens building technologies with 'References@SBT'*. Paper presented at the International Conference on Knowledge Management, Vienna, Austria.

Newell, S., Bresnen, M., Edelman, L., Scarbrough, H., & Swan, J. (2006). Sharing knowledge across projects: Limits to ICT-led project review practice. *Management Learning*, *37*(2), 167–185. doi:10.1177/1350507606063441

Nielsen, B. B., & Ciabuschi, F. (2003). Siemens ShareNet: Knowledge management in practice. *Business Strategy Review*, *14*(2), 33–40. doi:10.1111/1467-8616.00257

Oltra, V. (2005). Knowledge management effectiveness: The role of HRM. *Journal of Knowledge Management*, *9*(4), 70–86. doi:10.1108/13673270510610341

Paik, Y., & Choi, D. Y. (2005). The shortcomings of a standardized global knowledge management system: The case study of accenture. *The Academy of Management Executive*, *19*(2), 81–84. doi:10.5465/AME.2005.16963096

Pos, A., Linse, K., & Aben, M. (2005). Unilever: Leveraging community value. *Inside Knowledge, 8*(4), Retrieved September 8, 2010 from http://www.ikmagazine.com

Powers, V. (2004). Virtual communities at caterpillar foster knowledge sharing. *T+D Magazine*, 40-45.

Reina, S. (2009, September 24-25). *Case study: PricewaterhouseCoopers' careful yet comprehensive work with social networking*. Paper presented at the Social Networking Conference, Panel on Enterprise Social Networking for Innovation: Case Studies, Approaches and Tools, London, UK.

Rumyantseva, M., Enkel, E., & Pos, A. (2007). Supporting growth through innovation networks in unilever. In von Krogh, G., Back, A., & Enkel, E. (Eds.), *Knowledge networks for business growth* (pp. 77–79). Berlin, Germany: Springer-Verlag.

Ruth, S., Shaw, N. C., & Frizzel, V. (2003). Knowledge management education: An overview of programs of instruction. In Holsapple, C. W. (Ed.), *Handbook of knowledge management* (pp. 581–603). Berlin, Germany: Springer-Verlag.

Scarso, E., Bolisani, E., & Padova, A. (2010). *Achieving effective knowledge sharing by bridging knowledge islands: Lessons from Ernst & Young case*. Padua, 16th International Conference on *Knowledge-Based Organizations*, 16-17 November, Sibiu (RO).

Scarso, E., Bolisani, E., & Padova, A. (2011). The complex issue of measuring KM performance: Lessons from the practice. In Vallejo-Alonso, B., Rodriguez-Castellanos, A., & Arregui-Ayastuy, G. (Eds.), *Identifying, measuring, and valuing knowledge-based intangible assets: New perspectives* (pp. 208–230). Hershey, PA: IGI Global.

Scarso, E., Bolisani, E., & Salvador, L. (2009). A systematic framework for analysing the critical success factors of communities of practice. *Journal of Knowledge Management*, *13*(6), 431–447. doi:10.1108/13673270910997105

Spies, M., Clayton, A. J., & Noormohammadian, M. (2005). Knowledge management in a decentralized global financial services provider: A case study with Allianz Group. *Knowledge Management Research & Practice*, *3*(1), 24–36. doi:10.1057/palgrave.kmrp.8500046

Tschirky, H. (2009, June 4). *Wake-up call for European management: It's innovation time!* Paper presented at the CEC European Managers Triennial Congress, European Parliament, Brussels, Belgium.

Voelpel, S. C., Dous, M., & Davenport, T. H. (2005). Five steps to creating e a global knowledge-sharing system: Siemens' ShareNet. *The Academy of Management Executive*, *19*(2), 9–23. doi:10.5465/AME.2005.16962590

Voelpel, S. C., & Han, Z. (2005). Managing knowledge sharing in China: The case of Siemens ShareNet. *Journal of Knowledge Management*, *9*(3), 51–63. doi:10.1108/13673270510602764

Wang, C. L., & Ahmed, P. K. (2005). The knowledge value chain: A pragmatic knowledge implementation network. *Handbook of Business Strategies, 6*(1), 321-326.

Wenger, E., McDermott, R., & Snyder, V. M. (2002). *Cultivating communities of practice: A guide to managing knowledge*. Boston, MA: Harvard Business School.

Enrico Scarso holds a degree in Electronic Engineering ("Laurea") and a Ph.D. in Industrial Innovation from the University of Padua. He is Associate Professor of Engineering Management at the Department of Management and Engineering of the University of Padua (Italy). His current research interests are in the area of technology and knowledge management. He has published in several journals and presented many papers at international conferences. He has participated in various research projects funded by the European Union, Italian Institutions, and private organizations. He was Program Chair of the 10th European Conference on Knowledge Management. He is member of IAMOT (International Association for Management of Technology) and IEEE Technology Management Council.

*Ettore Bolisani has a degree in Electronic Engineering ("Laurea") and a Ph.D. in Innovation Studies from the University of Padua. He was post-doc researcher at the University of Padua, EU TMR "Marie Curie" research fellow at PREST (University of Manchester), researcher at the University of Trieste and later at the University of Padua. Currently he is Associate Professor at the Faculty of Engineering of the University of Padua. His research centers on the analysis of ICT applications in business, with an emphasis on Knowledge Management and Electronic Commerce. He has participated in various research projects funded by the European Union, by Italian Institutions, and private organizations. He was Chair of the 10th European Conference on Knowledge Management (University of Padua - 2009) and Editor of "*Building the Knowledge Society on the Internet. Sharing and Exchanging Knowledge in Networked Environment*" – IGI Global (2008).*