Revisiting Knowledge Management:
Integrating "Knower" with the Knowledge Processes

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Introduction

In many ways, Knowledge Management (KM) is still a term in search of a definition. Like the archetypal mirror of the fairy tales, for every practitioner/ academic who peeps into it, KM shows a definition that the user would like to see. Correspondingly, for all practical purposes, KM has come to mean different things to different people. If one looks at the kaleidoscopic range of meanings given to KM - document management, training people, creating intranet, workflow management, installing EMS, communities of practice, distributed computing, corporate intelligence, developing corporate case-studies, using Lotus Notes, quality management and so on - it can mean anything and everything. Not surprisingly, many researchers and practitioners (e.g., Abrahamson, 1996; Skyrme, 1998; Swan *et al*, 1999) have described KM as nothing more than just a new buzzword.

This paper argues that one of the major reasons for this confusion is that most organizations and practitioners use much too broad a working definition of knowledge, which does not seem to differentiate among various manifestations of knowledge (e.g., information, know-how and know-why). The paper aims to have a relook at the concept of organisational knowledge, and tries to establish that KM as a discipline has now matured enough to differentiate the practices for *managing information* from those of *managing knowledge*. It also tries to highlight that while the information can exist in databases, knowledge implies a "knower", and that a truly effective KM system can only be built around individuals and groups.

Correspondingly, the paper is structured in three sections. The first section discusses the historical roots of the KM and shows how KM has become predominantly focused on managing information - often at the cost of neglecting the management of know-how and know-why. The second section examines the nature of organisational knowledge to highlight its three oft-neglected dimensions: namely, how knowledge is different than information, the tacit and social nature of knowledge, and that strategic value lies in creation (not just application) of knowledge. The concluding section discusses the directions in which the KM needs to move in order to not to become another " fad that forgot people" (Davenport, 1996).

KM Practices: The History of the Confusion

Since it gained currency in the popular management parlance, knowledge management has been variously equated with quality management, database management, customer relationship management, etc. As Table 1 shows, there is a vast array of definitions of KM, and each seems to emphasize a different set of practices.

In practice as well, companies differ widely in the way they conceptualise and implement KM initiatives. In a detailed study of KM practices in three companies (Dow Chemicals, Hughes, and Buckman Laboratories), Despres and Chauvel (1999) found

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that the three companies had very different approach to KM: Dow Chemicals focused its efforts on collecting and disseminating patent information from the market to its research and marketing staff; Hughes, on the other hand, had created a "knowledge highway" to connect the expertise within the company with the aim of reducing product development cycle time; and, KM at Buckman Laboratories focused on connecting field staff to improve the customer relationships. They concluded "There appears to be no ecumenical way to adopt knowledge management; those presented with the task are, instead, facing a mosaic of options… those on the path are taking very different routes."

Table 1
Definitions of Knowledge Management

- KM is the "process of collecting, organizing, classifying and disseminating information throughout an organization, so as to make it purposeful to those who need it." (Albert, 1998)
- KM is "Policies, procedures and technologies employed for operating a continuously updated linked pair of networked databases." (Anthes, 1991)
- KM is "the formalization of and access to experience, knowledge, and expertise that create new capabilities, enable superior performance, encourage innovation, and enhance customer value." (Beckman, 1997)
- "Knowledge management complements and enhances other organizational initiatives such as total quality management (TQM), business process re-engineering (BPR) and organizational learning, providing a new and urgent focus to sustain competitive position." (Gray, 1996)
- KM is "combining indexing, searching, and push technology to help companies organize data stored in multiple sources and deliver only relevant information to users." (Hibbard, 1997)
- "Knowledge management in general tries to organize and make available important know-how, wherever and whenever it's needed. This includes processes, procedures, patents, reference works, formulas, "best practices" forecasts and fixes. Technologically, intranets, groupware, data warehouses, networks, bulletin boards videoconferencing are key tools for storing and distributing this intelligence " (Maglitta, 1996)
- KM is "getting right knowledge to right people at the right time so that they can make the best decisions." (Petrash, 1996)
- KM is "an approach to adding or creating value by more actively leveraging the know-how, experience, and judgement resident within and, in many cases, outside of an organization." (Ruggles, 1998)
- KM is "a more organic and holistic way of understanding and exploiting the role of knowledge in the processes of managing and doing work, and an authentic guide for individuals and organizations in coping with the increasingly complex and shifting environment of the modern economy." (World Bank, 1998)

One can discern two reasons for this confusing plethora of practices, which define KM. One, of course, is the simple fact that while Knowledge Management may be a recently coined term, organizations had always been managing knowledge in a variety of ways. Even before the advent of KM as a organizational practice/system,

companies always had systems to upgrade the knowledge-base of their employees, maintained databases of customers, kept track of the work-flow processes, invested in patents, and so on.

For instance, a survey of 93 knowledge applications across 83 companies by Teltech Resource Network (Hildebrand, 1999), found that as many as 42 percent of the high-impact projects didn't use the term knowledge management at their inception. As Prusak (2001) observed: "knowledge management, like any system of thought that has value, is both old and new, and its combination of new ideas with ideas that 'everyone has known all along'." Similarly, Davenport and Prusak (1998) noted that, "knowledge management isn't rocket science... It's good sense and managerial basics... knowledge management is [not] totally new."

The second reason for the confusion has its roots in the history of KM in its contemporary form. Organisational focus on managing its knowledge-processes is not entirely a recent phenomenon. . Even the term, "knowledge management" was coined by Karl Wiig in a 1986 conference organized by UN-ILO in Switzerland (Wiig, 1997). Prior to the current popularity of KM since mid-1990s, organizations always had robust practices which helped them improving performance through managing their learning and knowledge. The underlying key drivers and assumptions of KM (e.g., developing individual/system capabilities, enhancing learning opportunities, etc.) were essentially same as those of organisational learning, core competence, etc. Most of these aims at enhancing organisation's learning and knowledge were, however, achieved through developing robust people-management practices

However, KM gained acceptance as an integrated organisational practice only during 1990s, when the newer applications of the information technology made it possible to achieve a scale and integration of organisational knowledge-processes that was not possible earlier. These new advances in technology enabled organizations to wire themselves up, connect its people across time and geography, and to enable movement of information from one place/person to another through a seamless interface. These technologies also had the potential for organizations to capture the expertise of its people in central repositories. Thus, even if their "knowledge-assets, the people, walked out of the door", their knowledge would remain with the organization.

For example, by creating an intranet in 1995-96, British Petroleum was able to connect its 53,000 employees across 90 business units. This enabled them to collaborate as virtual teams, interact and share expertise, solve problems and information, etc (Cohen, 1996). This virtual teamwork allowed the company to co-opt its employees, suppliers and contractors, spread across as far as Columbia to Alaska during the drilling operations in North Sea. Through this collaborative interaction they were able to find radical ways to reduce cost and time of the operation, and to share and disseminate these learnings across the company.

Likewise, in 1999, the German electronic giant, Siemens, connected its 12,000 salespeople in its telecommunication division though its website ShareNet. This networking enabled the company to generate $122mn additional sales by sharing information. For example, when the local team of Siemens bid for a contract with Telekon Malaysia, they did not have the required expertise. However, by connecting with the team in Denmark who had done a similar project, the Malaysian team was able to win the contract, as well as able to deliver (Abidi, 2001).

This scale and efficiency that information technology provides has often resulted in equating KM with implementation of IT-enabled tools and techniques (e.g., intranet, LotusNotes, email Management System, etc.; see also Table 2). A report published by

International Data Corp in May 2000, predicted that the global market for KM related technologies was likely to increase from $1.3bn in 1999 to $8bn in 2003. As Brown and Duguid (2000) observed that among organisations planning to implement KM "…buying more information technology seems to be a key indulgence."

This trend is also apparent in the KM-related literature. In a study of published literature on KM, Swan, Newell, and Robertson (2000) surveyed more than 400 articles published on KM in the mainstream management and academic journals between 1993-98. They found that 47.7% articles on KM were published in computer/IT journals and magazines. In 1998 alone, almost 70% articles on KM focused on information technology only.

Table 2
Common Technologies associated with Knowledge Management (Bock, 2000)

- Intranets
- Document Management Systems
- Information Retrieval Engines
- Relational and Object Databases
- Electronic Publishing Systems
- Groupware and Workflow Systems
- Push Technologies and Agents
- Help-Desk Applications
- Brainstorming Applications
- Data Warehousing and Data Mining Tools, etc.

These developments in the history of KM have resulted in three consequences:

- Over a period of time, information technology, which was meant to be an enabler for managing knowledge, has emerged as the very definition of KM itself. As a consequence, knowledge management has also become a bewildering assortment of practices, which range from information technologies (e.g., document management) and people-management practices (communities of practice). At a conceptual level, this confusion has resulted in a crisis of finding an integration between IT-enabled knowledge management with HR-enabled organisational learning; while at an organisational level, it raises the "ownership" issue (HR or IT dept?) of the KM initiatives.
- Perhaps a more significant impact of this trend has been on the very meaning of "knowledge" in organisations. While IT applications make it easy and efficient to manage those bits of knowledge which are tangible and explicit, it has much less control over knowledge which is fluid, complex and emergent. Given the primacy of IT in KM initiatives, however, an unfortunate consequence has been that, in practice, most KM efforts get confused with mere "information management". As Swan, Newell, and Robertson (2000) noted, in many organizations, KM initiatives have merely become "a re-labelling of information

management rather than a genuinely innovative attempt to create opportunities for the creation and development of knowledge in organizations."

- The driving force behind the popularity of KM was to capture and share the expertise of people and groups, so that organizations do not lose their knowledge-assets. Since this could be achieved through technology tools, inadvertently the IT-enabled KM practices have tended to highlight technology, while minimizing the role and identity of experts in the organizations. Applegate *et al* (1988), in fact, asserted: "Information systems will maintain the corporate history, experience and expertise that long-term employees now hold. The information systems themselves - *not the people* - can become the stable structure of the organization. People will be free to come and go, but the value of their experience will be incorporated in the systems that help them and their successors run the business."

In the recent years, there has been a growing realization of this lop-sided emphasis on technology in managing knowledge. A report by the Gartner Group on KM (Harris *et al*, 1999) noted: "KM is not the implementation of a technology; rather, it is a multidisciplined approach that integrates business strategy, cultural values and work processes. KM programs perform best when enabled with sophisticated and elegant technology, but an emphasis on technology alone will achieve very little progress toward KM; conversely, even the strongest KM culture that is not supported with robust technology also will falter." Similarly, Davenport (1996) asserted that "firms wishing to effectively manage knowledge today need a heavy dose of human labor." In fact, some studies (e.g., Gill, 1995) even show that an over-reliance on information technology can hamper with the firm's capacity to learn and create knowledge.

There is, thus, an emergent need to redefine knowledge management in a way which integrates technology with people and expertise. To do so, however, also necessitates revisiting the concept of organizational knowledge, and to appreciate the role of individuals in learning and knowledge creation.

Missing Dimensions of Organisational Knowledge

As discussed above, the over-emphasis on the role of technology in KM has resulted in a lop-sided definition of knowledge. In this section, we will discuss three basic issues, which are necessary to develop a comprehensive understanding of organisational knowledge. These are: (1) how knowledge is different from information, (2) what is the nature of organisational knowledge, and (3) strategic value of organisational knowledge.

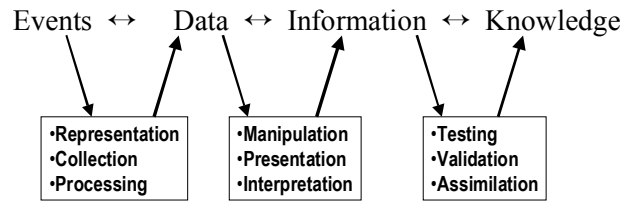
1. Information and Knowledge

As discussed earlier, one of the lacunae of the current state of KM practices is that they rarely distinguish between information and knowledge. A number of practitioners and researchers, however, have attempted to make this distinction. Nevis, DiBella and Gould (1995), for instance, noted that, "knowledge is more than information; it includes the meaning or interpretation of the information, and a lot of intangibles such as the tacit knowledge of experienced people that is not well articulated but often determines collective organizational competence." Similarly, in a classic article published more than three decades back, Churchman (1971) had noted: "To conceive of knowledge as a collection of information seems to rob the concept of all of its life... Knowledge

resides in the user and not in the collection. It is how the user reacts to a collection of information that matters."

Earl (1994) proposed one of the few conceptual schemas, which attempted to show a hierarchical evolution of information into knowledge (see Figure 1). He suggested three levels of processing through which experience of an event gets transformed into knowledge about that event. In this sequence, one can generate information by manipulating and interpreting the data. However, only when information gets tested and validated, that it gets converted into knowledge. For instance, the fact that a certain market segment is growing at an annual rate of 60% is just a piece of information; however, when one builds upon this information to devise a new marketing strategy, the information gets transformed into new knowledge.

Figure 1:
Evolution of Knowledge



Based on Earl (1994)

A common theme, which cuts across all these differentiation is that *while information can exist in isolation, knowledge needs people to come into existence and to reside in*. Information becomes knowledge, only when there are individuals who can understand it, test its validity to a situation and assimilate its implications. As Brown and Duguid (2000) expressed it succinctly: "…knowledge usually entails a knower. That is, where people treat information as independent and more-or-less self-sufficient, they seem more inclined to associate knowledge with someone. In general, it sounds right to ask, "Where is that information?" but odd to ask, "Where's that knowledge?"…It seems more reasonable to ask, "Who knows that?""

2. Nature of Organisational Knowledge

Given that knowledge entails a "knower", it is vital to reconsider the meaning and nature of organisational knowledge. In contrast to the prevailing view, which treats knowledge as "unproblematic, predefined, and prepackaged" (Boland, 1987), Allee (1997) described organisational knowledge as "messy". She emphasized that "In organizations every aspect of knowledge is connected to everything else. You cannot neatly isolate the "knowledge" component of anything. Organizational knowledge relates to culture, structures, technology and the unique configuration of individuals that make up the organization."

One can identify three aspects which define this "messiness" of knowledge:

Firstly, not all knowledge in the organization can be explicitly stated. To quote Polyani (1964): "we can know more than we can tell." The famous statement of Lewis Platt, the erstwhile CEO of Hewlitt Packard, "If HP knew what HP knows, we would be three times as profitable", is also an acknowledgement of this tacit dimension of knowledge.

Individuals and groups know many things which are embedded in their skills, beliefs, perspectives, and which influence their day-to-day activities and performance. As Davenport and Prusak (1998) noted: " Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers."

This is the kind of knowledge, which an artisan shows when he is able to "sense" the fault with the machine, or the salesperson shows in "knowing" how to clinch a contract with the client. In a study, Scribner *et al* (1991) observed the operations of workers in a commercial dairy (warehouse order packers, delivery drivers, inventory takers, clerks, etc.). They found that many of these workers showed an effortless expertise in performing complex calculations required for their job, and yet were unable to explain how they did these. Such tacit knowledge "consists partly of technical skills - the kind of informal, hard-to-pin-down skills captured in terms of "know-how". A master craftsman after years of experience develops a wealth of expertise "at his fingertips." But he is often unable to articulate the scientific or technical principle behind what he knows…. It consists of mental models, beliefs, and perspectives so ingrained that we take them for granted, and therefore cannot easily articulate them." (Nonaka, 1991)

Secondly, knowledge resides not just in individuals, but is also embedded in work-groups and teams, and in the relationships among the members. Badaracco (1991) described this kind of knowledge as "complementary knowledge" which resides in "specialised relationships among individuals and groups and in the particular norms, attitudes, information flows, and ways of making decisions that shape their dealing with each other." He noted that success of teams depends not just on the formal task and role definitions, but more on the "subtle and amorphous" factors which "help create the right chemistry within a group. Something "clicks" when the right personalities, work environment, communication among team members, and leadership come together in harmony."

Many studies (e.g., Hackman, 1990) have noted this special chemistry, which makes each effective work-group uniquely different "like no other group, a unique entity unto itself with its own special problems, opportunities, and ways of operating." Similarly, in their study, Rosenberg and Frischtak (1985) noted how the success of technology transfer depended on the specialized knowledge of the individual teams "resulting from their accumulated experience in design, production, and investment activities... It is acquired in problem-solving and trouble-shooting activities within the firm, remaining there in a substantially unmodified state."

Lastly - and following from the above - a large part of the critical organisational knowledge is not "out there, ready-to-use" kind; rather, it "emerges" through the interactions, relationships, and working together of its members. While organizations aim to capture and share "best practices", the fact is that people do not consciously *create* best practices while working. Rather, they *discover* these practices when they interact with each other around work-related issues.

Brown and Gray (1995) illustrated this emergent property of knowledge in their narration about the interactions among Xerox's Technical field staff. These "tech reps",

when not at the customers' premises, would spend long time at the local part warehouse, interact with each other informally, and exchange stories from their field visits. What Xerox discovered was that in contrast to normal logic of working, the "tech reps weren't slacking off; they were doing some of their most valuable work. Field service, it turns out, is no job for lone wolves. It's a social activity. Like most work, it involves a community of professionals. The tech reps… were also *coproducing insights* about how to repair machines better."

Similarly, Nonaka and Takeuchi (1995) describe a number of Japanese case-studies (e.g., Mazda's RX-7, Honda's City model, Canon's mini-copier, etc.) where the insight emerged and new concepts for product were created through informal interactions among the team members. These new ideas were not explicitly known to the members when they started working together on the projects. However, as they interacted, they emerged through the interactions - first in the form of hazy metaphors, and only later as clear and objective concepts. The authors noted that such emergence is "typically seen in the process of concept creation, and is triggered by dialogue or collective reflection."

These and other studies also show that one of the essential conditions for knowledge to emerge (or change from tacit to explicit) is the existence of a community. Such "communities-of-practice" (Wenger, 1998) appear to be the basic vehicle for exchange and interpretation of information, and for retaining the knowledge in a "living" way; they preserve and communicate those tacit aspects of knowledge (tips, feedbacks, best practices, etc.), that formal systems cannot capture. From this perspective, as Brown and Gray (1995) noted, knowledge sharing/transfer or learning "is less about absorbing information than it is about becoming part of a community. It is a social process built around informed participation: people need information to do their work, but it is only through working that they get the information they need."

3. Strategic Value of Organisational Knowledge-Processes

The prevailing view of the value of organisational knowledge predominantly rests on the premise that knowledge increases efficiency of the work processes through its more focused application. KM is seen to derive its strategic value because it helps decreasing duplication of efforts (and mistakes), reducing dependence on a few individuals' expertise, increasing efficiency by institutionalizing the best practices, and so on. As Maglitta (1996) summed this approach to KM: "Knowledge management in general tries to organize and make available important know-how, wherever and whenever it's needed. This includes processes, procedures, patents, reference works, formulas, "best practices" forecasts and fixes. Technologically, intranets, groupware, data warehouses, networks, bulletin boards videoconferencing are key tools for storing and distributing this intelligence."

Appealing though it is, this approach to KM has a serious drawback. It is based on an assumption that value of knowledge either remains static over time, or at best, increases cumulatively. In reality, however, formalized knowledge-base of an organisation becomes obsolete over time. Many studies (e.g., Kotter and Heskett, 1992; Marshall, Mobley and Calvert, 1996; Miller, 1990, etc.) on organisational failure show that successful and institutionalized organisational routines of one time were the primary causes of the latter failures. Leonardo-Burton (1997), in her study of product development process found that a formalized and institutionalized knowledge-base in an organization can also hinder the process of change and adaptation. She concluded: "Because core capabilities are collection of knowledge sets, they are distributed and

are being constantly enhanced from multiple sources. However, at the same time that they enable innovation, they hinder it."

Echoing the same theme, Hedberg (1981) noted: "Knowledge grows, and simultaneously it becomes obsolete as reality changes. Understanding involves both learning new knowledge and discarding obsolete and misleading knowledge. The discarding activity - unlearning - is as important a part of understanding as is adding new knowledge."

Thus, knowledge *per se* does not create value, if it is simply collected, indexed and made available to others to use. Since in a fast changing business environment, the obsolescence of knowledge is faster, such a repository of knowledge can even become the reason for organisation's inability to adapt to changes. According to Malhotra (2000): "Institutionalization of 'best practices' by embedding them in information technology might facilitate efficient handling of routine, 'linear,' and predictable situations during stable or incrementally changing environments. However, when change is radical and discontinuous, there is a persistent need for continual renewal of the basic premises underlying the practices archived in the knowledge repositories."

Rather, the value of organisational knowledge depends on its ability to renew itself, and to create new meaning in the changing contexts. Viewed from this perspective, KM needs to focus on reation and generation of new knowledge, and not just information-processing and knowledge-application (Takeuchi and Nonaka, 1995). To renew knowledge and create new meaning, however, require different knowledge-processes, which allow for "challenging conventional wisdom, questioning the data behind accumulating knowledge, and recombining expertise to create new capabilities" (Ghoshal & Bartlett, 1996).

Monsanto, for example, created a KM system which harnesses this value from organisational knowledge (Junnarkar, 1997). KM at Monsanto, of course, used information technology; they implemented data warehousing, full-text search engines, internet/intranet capabilities, collaborative workgroup software, and major new operational systems (SAP). However, the aim of using technology was not just to compile pieces of information in a central repository. Rather, as Junnarkar (1997) noted: "At its heart, the knowledge creation process is about making connections. The objective of Monsanto's knowledge work, then, is to facilitate those connections, first, among knowledgeable people (by helping them find and interact with one another) and second, between people and sources of information…. Information technology may be a necessary but will never be a sufficient condition for knowledge creation and sharing." Correspondingly, Monsanto also supported the different roles people would take up in the network in this process of knowledge-creation: "knowledge stewards" who would highlight and clarify relevant issues, and help the group to focus its collective attention on these; the "topic experts" whose perspective and knowledge helped the network members to "make sense" of the information before them; and, the "cross-pollinators" who would act as conduits, connecting different networks and people to each other. In addition, the company also formed "knowledge teams", which would not only maintain the "yellow pages", but also proactively seek out new relevant knowledge from sources within and outside the company.

Monsanto provides a good pointer to how knowledge-processes can managed to create new knowledge and meaning. It exemplifies the basic issue in managing knowledge which was highlighted by Boland (1987): "Information is not a resource to be stockpiled as one more factor of production. It is meaning, and it can only be achieved through dialogue in a human community"

Conclusion: Towards a People-Centric KM

The purpose of this paper was to revisit and review the concept of organisational knowledge, and to reassess the current practices of KM. At this stage of evolution of KM as a discipline, such a review is essential for two reasons:

1. Due to historical reasons, KM has become so much identified with information technology, that any IT-tool can now be seen as a knowledge management tool. Many studies (e.g., Teltech's KM survey of 83 companies, reported by Hildebrand, 1999) show that a purely IT-based KM is far less likely to succeed than if the IT tools used to enable human interactions and sharing. Davenport (1996) also recommended a hybrid architecture of KM in which the technology assists people to share and generate knowledge. However, with the present trend, KM stands the danger of losing its relevance and potential to contribute to organisational growth.
2. A discussion on nature of knowledge is also necessary to relocate the creators and users of knowledge - the people - as an integral part of the organisational knowledge processes. Such discernment is also necessary to design KM systems and processes which retain the living, social and emergent quality of knowledge. After all, as Wenger (1998) pointed out: "our design is hostage to our understanding, perspectives and theories"

So how does one build a KM system around people, instead of around technology?

Based on the preceding discussion, one can identify three clear imperatives for building a people-centric KM system. These imperatives also imply a shift in the emphasis of the current popular KM initiatives, which are based on an information-processing perspective:

1. From Information-Processing to Knowledge-Creation

A people-centric KM system must focus on how to facilitate creation of knowledge, rather than just on efficient application of existing knowledge. Knowledge-creation, as Takeuchi and Nonaka (1995) pointed out, is a spiraling process, which gets stirred through interaction of the tacit and explicit knowledge. That is, knowledge-creation in an organization depends on processes, which help linking the inarticulate human insights with the cogent and well-structured sources of organisational knowledge.

It is important to appreciate a few critical implication of knowledge-creation process. Firstly, it is more a people-process rather than a technological process (Malone & Crowston, 1991). The four processes - socialization, externalization, combination and internalization - which Takeuchi and Nonaka (1995) identified as the cornerstone for knowledge-creation, were essentially people processes.

Secondly, knowledge-creation can happen only when one recognizes the role of cognitive process in organization, which may not be very clear and tangible. Besides the focused objective thinking, more "primitive" ways of thinking - e.g., intuition, metaphors and analogies - play a significant role in tacit knowledge to emerge in more explicit forms. According to Takeuchi and Nonaka (1995),these forms of thinking provide "a way for individuals grounded in different contexts and with different experiences to understand something intuitively though the use of imagination and

symbols… Through metaphors, people put together what they know in new ways and begin to express what they know but cannot yet say."

Thirdly, knowledge-creation is far from a clear-cut structured organised process. It happens under conditions of at best "playfulness" (Landry, 2000), and at worst uncertainty and ambiguity (Takeuchi and Nonaka, 1995). "Knowledge is born in chaotic process that takes time" (Wheatley, 2001). When the context is unstructured, it allows for people to look for alternative meanings and make sense of the situation from a fresh perspective.

2. From Centralised to Distributed

Following from the above, since knowledge creation requires reciprocal interaction among people, then the centralised KM model of "collect, store and disseminate" is not likely to help in the knowledge-creation process. Most KM systems, however are built on the framework of a central repository, which people are supposed to contribute to and collect knowledge from. In many ways, this model of KM is built around how most organizations have traditionally been dealing with knowledge: centralised policy manuals, training classes, circulars, surveys, etc.

On the other hand, the real working knowledge in the organization is distributed much more asymmetrically. As Krackhardt and Hanson (1993) noted: "…much of the real work of companies happens despite formal organization. Often what needs attention is the *informal* organization, the networks of relationships that employees form across the functions and divisions to accomplish tasks fast." In their study they identified that in organizations there can be different overlapping network which may be based on different criteria, e.g., who to seek advice from, who to trust or who to communicate to. Knowledge creation and sharing would take place only if the KM system shapes itself around these networks, facilitates them and helps people to connect to each other.

For instance, the PeerAssist Programme of British Petroleum (now BP Amoco) helped solving many touch work-related problems, since it was designed to encourage colleagues to assist teams in making difficult interpretations and tough decisions. Instead of relying on people to contribute "best practices" to a central repository, PeerAssist encouraged people to interact with other teams, and help them solving problems. The "assisters" were not corporate staff or people above in any hierarchical or reporting relationship. Rather, they were peers who could later themselves seek assistance from others in their work (Dixon, 1999). Another intranet-based KM initiative at BP Amoco, Connect, helps people to find out the "experts" within the company for any given problem. As Collison (1999) describes the KM at BP Amoco: "The underlying knowledge management philosophy here is the premise that the medium for knowledge is the human brain, and the best networking protocol is conversation. Given this premise, the empasis is placed upon generating the connection (making it easy to post information, and search for it intelligently), and building relationship (prompting for the right information to generate a conversation and the trust for a relationship)."

The KM system at Pfizer is also designed on a similar distributed approach (quoted in Malhotra, 2000): "There's a great big river of data out there. Rather than building dams to try and bottle it all up into discrete little entities, we just give people canoes and compasses..."

In a centralised KM system any piece of knowledge gets vetted before it can go in a central repository, and therefore, only one "best" perspective on a problem is available to all users. On the other hand, a distributed KM model allows diverse perspectives to

exist simultaneously. While it does create redundancy, diversity of perspectives in a system is a precondition for any knowledge creation. As Quinn and Cameron (1988) noted: "Having multiple frameworks available… is probably the single most powerful attribute of self-renewing… organizations."

3. From Knowledge Warehouse to Knowledge Market

Lastly, the current models of KM treat knowledge as something, which is both static and lacks ownership. The idea of "reaching knowledge to the right person at the right time" presumes that knowledge exists in isolation to "knower", can be packaged and stored, and can be passed around whenever and wherever required. Such a perspective neglects the obvious fact that knowledge "belongs" to someone, and, as Davenport and Prusak (1998) pointed out: "People rarely give away valuable possessions (including knowledge) without expecting something in return."

Any design of KM initiative, which fails to incorporate "those who possess the knowledge" will inevitably run into issues of knowledge-sharing. Companies which successfully implement a KM system, normally have some system of rewards for sharing knowledge. At the Chicago-based Amoco Corp., for instance, knowledge-sharing counts as a major criterion in determining the winner of the annually conferred Chairman's Award (Wright, 2001).

There is a growing consensus that knowledge transfer in an organization is best encouraged if the KM system helps creating a knowledge-environment which relies on "pull" rather than on "push". That is, creating a free internal market, which allows people to "sell" their knowledge, and get paid for that. According to Davenport and Prusak (1998): " We believe market forces power its movement, working similarly to markets for more tangible goods…. Like markets for goods and services, the knowledge market has buyers and sellers… It has brokers who bring buyers and sellers together and even entrepreneurs who use their market knowledge to create internal power bases. ...."

MITRE Corporation, for example, uses an innovative method to assess and reward the market value of transfer of tacit knowledge (Wright, 2001). In 1998, MITRE Corp. initiated a "thank you" program, which aims to reward knowledge which is passed on informally through emails and internal chats. If anyone finds a piece of conversation useful, he can send a "thank you" mail with a copy to thankyou@mitre.org. The system keeps track of how many unique thank you mails are sent to a person, and publishes the results on a MITRE webpage entitled "knowledge transfer champions". An yearly "Top Knowledge Sharer" award is decided based on the number of thank you notes multiplied by the number of unique people sending them.

Similarly, BP Amoco found that by giving people their unique URLs on the Connect intranet, and allowing the employees to design and upload their personal webpages, also encouraged them to invite others to visit their website, and pick up their documents (Collison, 1999). Similarly, William Woods, principal scientist at Sun Microsystems Laboratories noted that (quoted in Wright, 2001): "It's an observed phenomenon that if you have a corporate intranet with Web technology allowing people to create their own home pages, this encourages knowledge-sharing."

Creating an internal market for knowledge, however, also requires getting over the control mindset, which characterizes most KM initiatives. It is important to recognize that, as Davenport and Prusak (1998) noted: "…organizational knowledge is highly dynamic: it is moved by a variety of forces. If we want knowledge to move and be utilized more effectively, we need to better understand the forces that drive it."

References:

Abidi, S, Personal Comunication, 2001.

Abrahamson, E. Management fashion, *Academy of Management Review*, 1996, 21, 254-285.

Albert, S. Knowledge management: Living up to the hype? *Midrange Systems*, 11(13), Sep 7, 1998, pp.52.

Allee, Verna, *The Knowledge Evolution: Expanding Organizational Intelligence*. Boston: Butterworth-Heinemann, 1997.

Anthes, G.H. A Step Beyond a Database, *Computerworld*, 25(9), 1991, p. 28.

Applegate, L., Cash, J. & Mills D.Q., Information technology and tomorrow's manager. In McGowan, W.G. (Ed.), *Revolution in Real Time: Managing Information Technology in the 1990s*, pp. 33-48, Boston, MA, Harvard Business School Press, 1988

Badaracco Jr, JL, *The Knowledge Link: How Firms Compete Through Strategic Alliances*. Boston, Mass.: Harvard Business School Press, 1991

Beckman, T, A Methodology for Knowledge Management. International Association of Science and Technology for Development (IASTED) AI and Soft Computing Conference. Banff, Canada. 1997.

Bock, Wally, *Knowledge Management 101*, 2000 <http://www.intranetjournal.com/articles/200011/ic_11_29_00a.html>

Boland, R.J. "The In-formation of information systems," In R.J. Boland and R. Hirschheim (Eds.), *Critical Issues in Information Systems Research*, pp. 363-379, Wiley, Chichester, UK, 1987.

Brown, JS and ES Gray, The people are the company, *The Fast Company*, 1995 (November) <http://www.fastcompany.com/online/01/people.html>

Brown, JS and P Duguid, *The Social Life of Information*. Cambridge, Mass: Harvard Business School Press, 2001.

Churchman, C.W. *The Design of Inquiring Systems*, Basic Books, New York, NY, 1971

Cohen, Don, Knowing the Drill: Virtual Teamwork at BP, 1996 <http://www.cbi.cgey.com/journal/issue1/features/knowin/index.html>

Collinson, C, Connecting the new organisation, *Knowledge Management Review*, 1999 (March- April) <http://www.km-review.com/pdf/bpamoco01.pdf>

Davenport, TH, and L Prusak*, Working Knowledge: How Organizations Manage What They Know*. Cambridge, Mass: Harvard Business School Press, 1998

Davenport, TH, Some principle of knowledge management, 1996a <http://www.bus.utexas.edu/kman/kmprin.htm>

Davenport, TH, Why reengineering failed: The fad that forgot people, *Fast Company* (Premier Issue), 1996b, 70-74.

Despres, C & Chauvel, D, How to Map Knowledge Management, *Financial Times Mastering Information Management*, 1999 (March), 4-6

Dixon, Nancy M, The changing face of knowledge, *The Learning Organisation*, 1999, 6(5), 212-216.

Earl, MJ, Knowledge as strategy: Reflections at Skandia International and Shorko Films. In C Ciborra and T Jelassi (eds) *Strategic Infirmation Systems: A European Perspective*. John Wiley & Sons, 1994.

Ghoshal, S. & Bartlett, C.A. Rebuilding behavioral context: A blueprint for corporate renewal," *Sloan Management Review, Winter 1996, pp. 23-36*

Gill, T.G., High-Tech hidebound: Case studies of information technologies that inhibited organizational learning," *Accounting, Management and Information Technologies*, 5(1), 1995, pp. 41-60.

Gray, Denham, What is Knowledge Management, 1996, <http://www.km-forum.org/what_is.htm>

Hackman, JR, *Groups That Work (and Those that Don't).* San Francisco: Jossey-Bass, 1990

Harris, K, et al, *The Knowledge Management Scenario: Trends and Directions for 1998-2003*. The Gartner Group Inc., 1999.

Hedberg, B. How organizations learn and unlearn, In P. Nystrom and W. Starbuck (Eds.) *Handbook of Organizational Design*. New York: Oxford University Press, 1981.

Hibbard, J. Knowing what we know, *Information Week*. October 20, 1997.

Hildebrand, C.). Making KM Pay Off, *CIO Magazine*, 1999 (February 15) <http://www.cio.com/archive/enterprise/021599_ic.html>

IDC, *Knowledge Management: U.S. and Worldwide Forecast and Analysis, 1999-2004*, May 2000 <http://www.idc.com>

Junnarkar, B, Creating fertile ground for knowledge at Monsanto, *Business & Innovation*, 1997, E&Y Center For Business Innovation <http://www.cbi.cgey.com/journal/issue1/features/creati/index.html>

Kotter, JP and JL Heskett, *Corporate Culture and Performance.* New York: The Free Press, 1992.

Krackhardt, D and JR Hanson, Informal Networks: The company beyond the organisational chart, *Harvard Business Review*, 1993 (July-August), 104-111.

Landry, JR, Playing at learning: Why knowledge creation needs fun. Proceedings of the 33rd Hawaii International Conference on System Sciences, 2000

Leonardo-Barton, D, Core capabilities and core rigidities: A paradox in managing new produc development. In ML Tushman and P Anderson (eds) *Managing Strategic Innovation and Change*. New York: Oxford University Press, 1997.

Maglitta, J. Know-How, Inc., *Computerworld*, 30(1), January 15, 1996.

Malhotra, Y, Information management to knowledge management: Beyond the hHi-tech hidebound' systems. In K. Srikantaiah & M.E.D. Koenig (Eds.), *Knowledge Management for the Information Professional*. Medford, N.J.: Information Today Inc, 2000.

Malone, T.W. & Crowston, K., Toward an interdisciplinary theory of coordination, Technical Report 120*, Center for Coordination Science, MIT, 1991.*

Marshall, LJ, S Mobley and G Calvert, Why smart organisations don't learn. In S Chawla and J Renesch (eds) *Learning Organisations: Developing Cultures for Tomorrow's Workplace*. Portland, Oregon: Productivity Press, 1996.

Miller, D, *The Icarus Paradox***.** New York: Harper Collins, 1990.

Nevis, EC, AJ DiBella and JM Gould, Understanding organisations as learning systems, *Sloan Business Review*, 1995 (Winter), 73-83

Nonaka, I, The knowledge-creating company, *Harvard Business Review***,** 1991 (November-December), 96-104

Nonaka, I. and Takeuchi, H. *The Knowledge-Creating Company*, Oxford University Press, New York, NY, 1995

Petrash, G., Managing Knowledge Assets for Value. Paper presented in *Knowledge-Based Leadership Conference*. Linkage, Inc. Boston. October 1996

Polanyi, M, *The Tacit Dimension*. Doubleday, 1966.

Prusak, L, Where did knowledge management come from? *IBM Systems Journal*, 2001, 40(4), 1002-07.

Quinn, R and K Cameron, Organisational paradox and transformation. In R Quinn and K Cameron (eds) *Paradox and Transformation*. Cambridge, MA: Ballinger Publishing, 1988.

Rosenberg, N and C Frischtak, *International Technology Transfer: Concepts, Measures and Comparisons*. New York, Praeger, 1985.

Ruggles, R, The state of the notion: knowledge management in practice, *California Management Review*, 1998, 40(3), 80-89.

Scribner, S, L DiBello, J Kundred, and E Zazanis, Coordinating two knowledge systems. New York: Laboratory for Cognitive Studies of Work, CUNY, 1991.

Skyrme, D, Fact or fad? Ten shifts in knowledge management, *Knowledge Management Review*, 1998 (July-August), 3, 6-7.

Swan J, Scarbrough H, Preston J, *Knowledge Management: The next fad to forget people?*, Proceedings of the 7th European Conference on Information Systems, Copenhagen, 1999

Swan, J, Sue Newell and M Robertson, *Knowledge management - when will people management enter the debate?* Proceedings of the 33rd Hawaii International Conference on Systems Science, 2000.

Wenger, E, *Communities of Practice: Learning, Meaning, and Identity.* Cambridge University Press, Cambridge, 1998.

Wheatley, MJ, The real work of knowledge management, *IHRIM Journal*, 2001 (April-June), 5 (2), 29-33.

Wiig, K., Knowledge management: Where did it come from and where will it go? *Expert Systems with Applications*, Pergamon Press/Elsevier, Vol. 14, Fall 1997

World Bank, *What is Knowledge Management?* Background Document to World Development Report, 1998

Wright, P, Do incentive schemes promote knowledge-sharing?, 2001 http://www.km-review.com/know_articles/04.htm

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