
INFORMATION COMMUNICATION TECHNOLOGY AND KNOWLEDGE MANAGEMENT

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Abstract

Information Communication Technology is seen by most organizations as the backbone for leveraging corporate knowledge. Changes in information and communication technology (ICT) require continuous modifications in contemporary organizations and in corresponding work processes. The integration of new technologies is highly correlated with the emerging principles of knowledge management. This paper claims that information technology is and will be quite helpful for knowledge management; however knowledge science cannot be established only by information science. This paper considers the deference between information and knowledge simply, but considers deeply the power or ability to convert from one to another, which is the ability to understand and learn things, or the ability to think and understand things instinctively or automatically.

Key words: Information Communication Technology, Knowledge management, Knowledge Repositories, Internet, World Wide Web.

Introduction

Knowledge Management is the process of capturing and making use of a firm's collective expertise anywhere in the business – on paper, in documents, in databases or in people's heads. It is the fuel or raw material for innovation - the only competitive advantage that can sustain a company in an unpredictable business environment. It is not intended to favor expert systems of the early processes. The goal is to present a balanced view of how computer technology captures, distributes and shares knowledge in the organization by linking human experts and documented knowledge in an integrated Knowledge Management system.

What is Knowledge Management?

Knowledge management (KM) is a newly emerging, interdisciplinary business model that has knowledge within the framework of an organization as its focus. It is rooted in many disciplines, including business, economics, psychology, and information management. It is the ultimate competitive advantage for today's firm.

KM is the process of capturing and making use of firm's collective expertise anywhere in the business on paper, in documents, in databases (called explicit Knowledge) or in people's heads (called tacit knowledge). It is the fuel or raw material for innovation- the only competitive advantage that can sustain a company in an unpredictable business environment. It is not intended to favor expert systems of the early 1990s, when computers

Mandira Bairagi

were programmed to emulate human experts thought processes. The goal is to present a balanced view of how computer technology captures, distributes and shares knowledge in the organization by linking human experts and documented knowledge in an integrated KM system.

The goal is for an organization to view all its processes as knowledge processes. This includes Knowledge creation, dissemination, upgrade and application toward organizational survival.

Knowledge and Management

In case if you were born to a Russian mother, you would have found yourself deep inside a water tank in your first moments of entering the earth and you would have happily swam up to the surface of the tank and announced your arrival with a shriek. After this first swim even if in the very next moment you were put back in to the bathtub, you would have simply sunk to the bottom of the tank and died. It would take another three to four weeks of intense training to relearn the skill of swimming. What happened here is a classic instance of knowledge inherent in you and which you acquired throughout eight months after formation ensconced in the amniotic sac of your mother, was not managed well enough to make you a natural swimmer like your amphibious brethren of the sea. KM is relearning.

Let's move on to the next stage. Imagine you were an infant. No one told you as yet that dazzling yellow flame from the white stick that glows frequently when the power goes out would burn your hand. Even if they did you couldn't have understood. But soon you will as you may succumb your temptation to reach and touch the flame. "Ouch!" and the long wail that followed would ring in the recesses of your brain for the rest of your life. Next time you see anything yellow, well you know what to do. Your first lesson in KM.

How about the ruthless tigers in the neighborhood circus, circa to the period when the government had not banned their display, courtesy, animal right activist and union minister, Meneka Gandhi? The ringmaster would carry with him a whipping rod painted red in the tip, the colour of the branding iron, which was used on the animal when it was taught the silly tricks, it is prodded to perform. KM at its worst.

Now we find you inside the familiar ring. No not the circus ring but the stock market ring. You have just seconds to decipher the dazzling array of figures that are scrolling in myriad colours from the overhanging screen. One quick punch of the button and someone somewhere is either going to lose a cool half a million or more or is going to beam and open the champagne bottle to acknowledge the electronic blip announcing the freshly minted million arriving on his electronic bank account. The power of KM is yours but we all know that as a successful stockbroker it took you years of learning the ropes and it has taken the clairvoyance of a Mexican card reader and the luck of a Casino owner to make people trust their millions and their underpants in your hands. The reward of KM. One false move and one unethical decision, it is the way of Harshad Mehta and Ketan Parikh for you. You know what is the reward of KM.

Or is that you high above the clouds wielding the sidestick of the supersonic F-16? You know as well that when the devil decides to hit you will have less than a nanosecond to bring your years of training, skills intuition, your personality and of course knowledge of the billion dollar battling machine to bear which will decide whether you will be continuing your mission or would be joining the angels after being blown into small bits. KM at its very best. (2)

Information and knowledge are two different things

Information is knowledge and knowledge can become information. Somewhat confusing isn't it. Well, let's say KM is at one level pretty much human and is prone to be somewhat fuzzy. Let's see whether we can clear this one.

First of all, let's be quite candid about this. Knowledge and information are different! Information consists of facts and data that are organized to describe a particular situation or problem. Knowledge is something that covers the truths and beliefs, perspective and concepts, judgments and expectations, methodologies and knows-how. "Knowledge is accumulated, organized and integrated and held over longer periods. We may define knowledge management as the process of creation, capture and organizing, assessing and using knowledge to create customer value". Stewart (1997)

The key link between knowledge and information is probably best expressed in the commonly accepted idea that knowledge in the business context is nothing but actionable information. If you can use it to do what you are trying to do, information arguably becomes knowledge. One way of looking at knowledge is that it is information stored or captured along with its context. Knowledge allows for making predictions, casual associations, or predictive decisions about what to do, unlike information, which simply gives us the facts. As Peter Drucker puts it "information is data endowed with relevance and purpose". (1)

Information Technology for Knowledge Management

There is an ongoing lively debate about the role that information technology can play for knowledge management. On the one hand, information technology is used pervasively in organizations, and thus qualifies as a natural medium for the flow of knowledge. A recent study from the American Productivity and Quality Center shows that organizations embarking in knowledge management efforts generally rely, for accomplishing their goals, on the setting up of a suitable IT infrastructure (AP&QC 1997). At the other end of the spectrum, leading knowledge management theorists have warned about the attitude that drives management towards strong 837 Borghoff U.M., Pareschi R.: Information Technology for Knowledge Management investments in IT, possibly at the expense of investments in human capital; see for instance Sveiby (1997a).

The danger that this viewpoint sees is that IT-driven knowledge management strategies may end up objectifying and calcifying knowledge into static, inert information, thus disregarding altogether the role of tacit knowledge. Knowledge management strategies of this type would bring back the ghost of the infamous, and none too far in time, re-

engineering days, when the corporate motto was “More IT, less people!”; they conjure grim scenarios of organizations with enough memory to remember everything and not enough intelligence to do anything with it. Part of the problem here derives from a linguistic ambiguity: nowadays information technologies are as much about creating direct connections among people through such applications as electronic mail, chat-rooms, video-conferencing and other types of groupware as they are about storing information in databases and other types of repositories. As for information databases, they can also be fruitfully re-thought, in a knowledge management perspective, as resources for the sharing of best practices and for preserving the intellectual capital of organizations. Generally speaking, investments in IT seem to be unavoidable in order to scale up knowledge management projects. The best way of applying information technology to knowledge management is probably a combination of two factors: on the one hand, the awareness of the limits of information technology, and of the fact that any IT deployment will not achieve much, if it is not accompanied by a global cultural change toward knowledge values; on the other hand, the availability of information technologies that have been expressly designed with knowledge management in view. This last topic, the design and application of knowledge-oriented information technology, provided the focus for the conference on Practical Applications of Knowledge Management held in October 1996 in Basel, Switzerland (Wolf and Reimer 1996). For this special issue of J.UCS on Information Technology for Knowledge Management we selected several contributions to the PAKM conference and asked the authors for extended versions of their papers. The selected contributions relate to technologies supporting various types of organizational knowledge during different phases of its life-cycle.

People vs Computer

One of the approaches is given in Nonaka and Takeuchi’s famous book: “The Knowledge-Cr Company” published in 1995 [7]. Nonaka assumes that knowledge is created through the inter between tacit and explicit knowledge, and proposes four modes of knowledge conversion.

- Socialization is a process of sharing experiences and thereby creating tacit knowledge such as shared mental models and technical skills.
- Externalization is a process of articulating tacit knowledge into explicit concepts, taking the shapes of metaphors, analogies, concepts, hypotheses, or models.
- Combination is a process of systemizing concepts into a knowledge system. This mode of knowledge conversion involves combining different bodies of explicit knowledge.
- Internalization is a process of embodying explicit knowledge into tacit knowledge. It is closely related to learning by doing.

This theory is mainly devoted to management of knowledge that workers of an enterprise have individually. On the other hand, researchers from information science have been trying to establish their own knowledge science using the rapid developing information and communication technology. There is a hierarchy of knowledge science from the viewpoint of information scientists. At the bottom, there is the foundation of information engineering, and at the second level, there are elements of knowledge science, and then

these are objects of knowledge science, finally, there are many applications. Information engineering has been developed as a study of computer hardware and software, and its application, i.e., computer science. Information originally accompanies all the sides of human activities. However, since it is hard for us to feel information directly, unlike substance or energy, its conceptualization was behind. Although the appearance of the computer contributed to its conceptualization greatly, it limited the range of information as the object of technology to the computer and its circumference. It is necessary to expand this range and to bring close to the system of information over life science, social science, and cultural sciences. This approach is quite natural. However, many social scientists do not fully accept this approach. (3)

Role of Information Technology in creating Knowledge Management systems

Knowledge management experts believe that some of today's most successful and accessible knowledge management systems are based on the simple assumption that a knowledge management system is a searchable, shareable and easily retrievable repository of heterogeneous information types. To gather, store and share knowledge, thereby creating a repository, organizations need to install an information technology infrastructure.

Whatever be the nature of a knowledge management centre, one thing is essential – a strong Information Technology base – without which creating and maintaining useful knowledge banks/ repositories becomes a daunting task. Information technology is the backbone for making an organization into a knowledge- based organization.

Management thinkers opine that knowledge management is undoubtedly the best positioned part of the business to really leverage technology for competitive gains. As such, information technology is, increasingly, being used as an important tool for facilitating the emerging role of knowledge management in organizations. According to Rajarshi Sengupta(2000), Executive Director, Pricewaterhouse Coopers, Technology plays a critical role, it expedites the way in which information can be analyzed better so that a business analyst has more time to act and decide on the analysis rather than spend time on putting together the data”(Computers Today, 16-31 January,2000). For global organizations, Information technology has helped to lower the barriers of time and geography that impede the flow of information and formation of relationships.

The role of technology in knowledge management is primarily to put knowledge workers in touch with the knowledge they need. Companies need to do exercises aimed at creating the appropriate IT systems to capture and disseminate the new learning.

In the new world being shaped by the technological revolution, business leaders are learning to build on the opportunities it creates. By removing the barriers of time, place and form, information technology is creating the basis for new kinds of business assets (speed, agility, reach and insight). These new assets created by information technology are certainly going to help and assist knowledge management function of an organization to a great extent.

Mandira Bairagi

A core concept in technological support for knowledge management is the 'corporate memory'. A corporate or organizational memory can be characterized as a comprehensive computer system which captures a company's accumulated know-how and other knowledge assets and makes them available to enhance the efficiency and effectiveness of knowledge intensive work processes. The successful development of such a system requires a careful analysis of established work practices and available information technology infrastructure.

Information Technology as an Enabler for Knowledge Management

Information Technology(I.T.) is seen by most organizations as the backbone for leveraging corporate knowledge. However, it is naïve to think of it as a panacea. Eric Seubert of Infosys believes that knowledge management uses technology as an enabler. The focus of knowledge management is not on technology per se but on instigating organizational change.

There is a widespread belief that knowledge management is a software product. This notion is not right. Knowledge management does not start with technology. It starts with business objectives and processes and recognition of the need to share knowledge. While knowledge management is often facilitated by information technology, technology by itself is not knowledge management.

As such, knowledge management and information technology are not synonymous. Sandeep Mathur, Country General Manager, Lotus Development International Corp., India Branch Office says, "Some vendors believe that knowledge management is solely about technology. It is not so. Knowledge management is as much about people and culture as it is about technology" (Computers Today, 16-31 January,2000). Natarajan & Shekhar of Aptech(2000(also believe that information technology is a "necessary though not solely sufficient component of profitable knowledge management".

According to a report published in McKinsey Quarterly 2001, "Successful companies understand that knowledge management and information technology are not synonymous. These companies knowledge management programmes, far from being special, one off-projects, are long-term efforts that involves all aspects of the business and dovetail with other strategic decisions". (4)

Knowledge Management Tools

Organizations are turning to information technology based solutions because of the enormous transformation that information technology has wrought on the possibilities for connecting people with other people and with all forms of information.

Knowledge management tools run the gamut from standard, off-the-shelf e-mail packages to sophisticated collaboration tools designed specifically to support community building. Generally, tools fall into one or more of the following categories:

- Knowledge repositories;
- Expertise access tools;

- Discussion and chat technologies;
- Search and data mining tools.

Technologies such as data mining, text analysis and search tools, web crawlers and document management all have intuitive appeal. These tools help knowledge workers to find stuff when they need them. It does not end there. Different groups in the organization need to leverage knowledge: through brainstorming and anticipating competitors' moves. These are highly collaborative activities, where GroupWare such as Lotus Notes play a key role.

Knowledge management has also received a boost from network computing technologies such as the Internet and the World Wide Web. Effective access to information in a web environment promotes "information productivity" of employees.

Standard information technologies such as databases and intranets speed the delivery of known knowledge throughout the organization. Newer technologies that are becoming more widespread support the transfer of unknown knowledge. For example, video conferencing via satellite allows people to observe demonstrations and engage in real-time dialogue that approximates the tacit-to-tacit transfer. These technologies reduce the scope of the trade-off between richness or depth of knowledge can be diffused by creating an environment that is both high-tech and high-touch.

Creating Effective Knowledge Management Systems through Information Technology

Knowledge management systems must universally meet the following requirements:

- Easy-to-use interfaces;
- Solid reliability
- Accessibility throughout the segment; and
- Utilities to mine relevant information

The target segment employees, customers, investors, prospects, public at large must be carefully taken into account during requirements analysis and design/evaluation. Adequate security and confidentiality of databases must be maintained, as often customers are concerned about confidentiality of their data. All systems must be driven off a well conceptualized architecture to ensure homogeneity, ease of adoption, and ease of use and maintenance.

Technology used for creating knowledge management systems should be human centered technology. The use of technology should be ultimately aimed at not only improving information flows but also promoting relationship among people. (5)

Conclusion

Organizations need to install an information technology infrastructure for creating repositories. Such repositories are used to gather, store, retrieve, and share knowledge. A strong information technology base is essential for creating and maintaining a successful knowledge management system in any organization. In fact, information technology is the backbone for making an organization into a knowledge based organization. Information

Mandira Bairagi

technology also helps in bridging the gulf between unknown and known knowledge. Information technology is increasingly being used as an important tool for facilitating the emerging role of knowledge management in organization.

Information technology is used as an enabler for knowledge management. While knowledge management is often facilitated by information technology, technology by itself is not knowledge management. In fact, knowledge management and information technology are not synonymous. The true challenge of information technology is to create information systems that will actually be used by people to share, propagate and use organizational knowledge. As such technology used for creating knowledge management systems should be human centered technology. Organizations must strive to understand and develop the synergy between the capabilities of human and capacities of information and communication technologies.

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