INFORMATION TECHNOLOGY
It's Role in Facilitating the Sharing and Transfer of Knowledge in Small Medium Sized Enterprises

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Abstract: This paper argues that Knowledge management and sharing is of vital importance to small medium sized enterprise, enabling them to develop skills and competences, increase value, and sustain their competitive advantage. In this study we have investigated the role of information technology as facilitator for knowledge sharing in the organization. The development of KMS, in this center, demands that knowledge be obtained, produced, shared, regulated and leveraged by a steady conglomeration of individuals, processes, information technology applications and a knowledge-sharing organizational culture. Also we present new technology for convenient knowledge sharing as a successful case study in the roads management center. Implications of how this might have been achieved are also provided in this research.

1 INTRODUCTION

Due to the IT revolution and advancements of the Internet, the value of knowledge assets has been greatly enhanced. Many companies are building knowledge management system (KMS) in order to manage organizational learning and business know-how. The main purpose of such a policy is to help knowledge workers to create important business knowledge, to organize it, and to make it available whenever and wherever it is needed in the companies (O'Brien and Marakas, 2006).

The advent of internet-related information technology such as intranets, extranets, and intelligent agents has contributed significantly to the increased interest in knowledge management: ―Organizations are beginning to connect themselves in ways that they hadn't planned for or expected… Groups, departments, and teams suddenly find themselves being able to share information that they hadn't been able to share previously. (InformationWeek, 10/20/97).

The highest value of IT to KM is in allowing the expansion and universalization of the scope of knowledge and in increasing the speed of transferability. Additionally using IT, we are able to retrieve and store knowledge in individual or groups, which allows this knowledge to be shared with other divisions in the same organization or business partners in the world. Furthermore, IT contributes to the integration of knowledge or even to the stimulation of new knowledge (Davenport and Prusak, 1998).

Today, the competitiveness of the firm relies less on traditional factors (capital, land, and labor) than was true in the past. Knowledge now appears to be replacing these traditional factors. Moreover, knowledge will become not just a source of competitive advantage but the only source of it (Drucker, 1993).

However, many companies have faced various kinds of difficulties in implementing KMS. First, if knowledge is merely accumulated in workers' brains, there is no way of recording it systematically. Second, even though knowledge is recorded and recorded in documents, it is very complicated to search for, retrieve, or review it, a problem which

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erects barriers to the diffusion of knowledge. Even though managers in previous times knew how important KM was, it was very difficult to implement it successfully (Bradley et al., 2006).

Within KM, maturity and the use of information technology (IT) development facilitates new methods and applications (such as groupware, on-line databases, intranets, etc.); it allows firms to deliver products and services better in quality and thus to achieve competitive advantage and profit (Hendriks, 1999); (Holsapple, 2002); (Lynn and Reilly, 2000); (Quinn and Baruch, 1999).

Thus, the growth of KM has been closely tied to information and communication technology (Chumer et al., 2000). Therefore, it is found that IT plays a major role in the implementation of KMS (Hislop, 2002). Nevertheless, few studies explore the role and effect of information technologies in the KMS. Hence, the purpose of this study is to investigate the role and effect of IT in sharing knowledge in the KMS as a factor of success in knowledge management project, and introducing new and effective method for it.

To deal with this issue more effectively, we focus on a key question:

- How can information technology facilitate knowledge sharing in organization?

The research indicates an important issue of KM. that, IT is an indispensable enabler of KM. while IT-enabled knowledge management goes beyond mere automation to play an informating‘ role in organizations by facilitating knowledge sharing.

2 DEFINITION (KNOWLEDGE, KNOWLEDGE MANAGEMENT)

2.1 Knowledge

Knowledge, learning and cognition are classical terms that have been re-discovered in the context of the information technology and knowledge management revolutions. Beckman (1998) compiled a number of useful and relevant definitions of knowledge and organizational knowledge:

- Knowledge is organized information applicable to problem solving (Woolf, 1990).
- Knowledge is information that has been organized and analyzed to make it understandable and applicable to problem solving or decision-making (Turban, 1992).
- Knowledge encompasses the implicit and explicit restrictions placed upon objects (entities), operations, and relationships along with general and specific heuristics and inference procedures involved in the situation being modeled (Sowa, 1984).
- Knowledge consists of truths and beliefs, perspectives and concepts, judgments and expectations, methodologies and know-how (Wiig, 1993).
- Knowledge is the whole set of insights, experiences, and procedures which are considered correct and true and which therefore guide the thoughts, behaviors, and communication of people (van der Spek and Spijkervet, 1997).
- Knowledge is reasoning about information to actively guide task execution, problem-solving, and decision-making in order to perform, learn, and teach (Beckman, 1997).

A number of other authors have also proposed knowledge typologies. Nonaka and Takeuchi (1995) have divided knowledge accessibility into two categories: tacit and explicit. Beckman (1998) identifies three stages of accessibility: tacit, implicit, and explicit:

- Tacit (human mind, organization)—accessible indirectly only with difficulty through knowledge elicitation and observation of behavior.
- Implicit (human mind, organization)—accessible through querying and discussion, but informal knowledge must first be located and then communicated.
- Explicit (document, computer)—readily accessible, as well as documented into formal knowledge sources that are often well-organized.

2.2 Knowledge Management

Knowledge management is defined as: ―the systematic, explicit, and deliberate building, renewal, and application of knowledge to maximize an enterprise‘s knowledge- related effectiveness and returns from its knowledge assets (Wiig, 1993).

Sveiby (1998) defines knowledge management is the art of creating value from an organization‘s intangible assets. Moreover, he identifies two main tracks of knowledge management activities: one track focuses on knowledge management as the management of information and the other track as the management of people.

Other researches show; linking the individual perspective of knowledge to the organizational level, organizational knowledge creation theory is

concerned with the processes which make available individual knowledge to the organizational knowledge system (Nonaka and von Krogh, 2009). This knowledge processes consist of several steps, starting with the creation of knowledge followed by the use of knowledge, the transfer and sharing of knowledge, and the storage and retrieval for further use (Seufertet al. 2004). A crucial and difficult step in the organizational knowledge process is the conversion of tacit knowledge into explicit knowledge.as we explain before; Tacit (implicit) knowledge is unarticulated and rooted in experience and intuition and tied to the senses and explicit knowledge is uttered, can be formulated in sentences, has a universal character and is accessible through consciousness (Nonaka and von Krogh, 2009). Only explicit knowledge can be integrated in the organizational knowledge base. To support the transformation of tacit to explicit knowledge and to facilitate the remaining steps of the organizational knowledge process, the discipline of knowledge management has evolved since the early 1990s (Nonaka, 1999); (Spender involves 1996). Knowledge management (KM) all practices of an organization to create, store, use and share knowledge (Probst et al., 1998).

3 LITERATURE REVIEW

3.1 Knowledge Sharing

Knowledge sharing is the behavior of an individual dispersing his or her obtained knowledge and information to other colleagues within an organization (Ryu et al., 2003). Knowledge sharing involves a process of communication whereby two or more parties are involved in the transfer of knowledge. Hence, knowledge sharing is defined as a process of communication between two or more participants involving the provision and acquisition of knowledge (Usoro et al., 2007).

Recently, researchers have highlighted the various factors that affect an individual‘s willingness to share knowledge, such as information and communication technologies, costs and benefits, incentive systems, extrinsic and intrinsic motivation, social capital, social and personal cognition, organization climate, and management championship (Alavi and Leidner, 1999); (Bock and Kim, 2002); (Bock et al., 2005); (Chiu et al., 2006); (Hsu et al., 2007); (Kankanhalli et al., 2005); (Koh and Kim, 2004); (Orlikowski, 1996); (Purvis et al., 2001); (Wasko and Faraj, 2005). Therefore, we could presume that individuals‘ behavior for knowledge sharing is affected by the contextual factors and personal perceptions of the knowledge sharing in which they partake in. Social cognitive theory (SCT) (Bandura, 1982; 1986; 1997) is a widely accepted model for validating individual behavior (Compeau and Higgins, 1995).

The norm of reciprocity and trust are treated as two major contextual factors influencing personal perceptions and a member‘s behavior. Knowledge sharing self-efficacy, perceived relative advantage, and compatibility are seen as predictors of personal factors since they are all considered as the main influences shaping users‘ behavior (Bandura, 1982; 1986; 1997); (Igbaria and Iivari, 1995); (Rogers, 2003); (Sia et al., 2004); (Verhoef and Langerak, 2001).

Having looked at the purpose and resources for knowledge sharing, we now turn to the process of knowledge sharing by looking the formal and informal settings in which knowledge sharing occurs and looking at the content of knowledge shared. Bartol and Srivastava (2002) define knowledge sharing as the action by which employees disseminate relevant information to others across the organization. According to Bock and Kim (2002), knowledge sharing is the most important part of knowledge management (KM). Apart from Bartol and Srivastava‘s operational definition a more social definition suggested by Helmstadter (2003, p. 257) characterizes knowledge sharing in terms of voluntary interactions between human actors through a framework of shared institutions, including ethical norms, behavioral regularities and so on.

In general, social psychologists consider that knowledge sharing motivation has two complementary aspects: egoistic and altruistic (Deci, 1975). The first was based on economic and social exchange theory. It includes economic rewards empirically; Bock and Kim combined the two theories with social cognitive theory to propose expected rewards, expected social associations and expected contribution as. The major determinants of an individual‘s knowledge sharing attitudes. Moreover, Bock et al. applied these two theories to produce two antecedents of sharing attitude: anticipated extrinsic rewards and anticipated reciprocal relationships. The second, altruistic motive, assumes that an individual is willing to increase the welfare of others and has no expectation of any personal returns. This resembles organization citizenship behavior (OCB), which is discretionary individual behavior that is not directly or explicitly

recognized by a formal reward system, and promotes the effective functioning of the organization (Smith and Organ, 1983).

In additional, according to researches; Knowledge sharing requires collaboration between the users of knowledge; namely the collaborators. This task cannot be accomplished simply by storing knowledge in the repository. It also requires a mechanism, which helps people find the collaborators with relevant knowledge. Collaboration over the Internet communities has characterized itself by heavily relying on interaction among the collaborators (Biström, 2005); (Eikemeier and Lechner, 2003). Collaborators can be any virtual users who interact to achieve the goals of resources discovery, access, knowledge sharing, group communication and discussion. The collaboration for knowledge sharing should be enacted without spatial and temporal limitations. In addition, it should take place over medium such as the Internet and therefore beyond the geographical boundaries.

3.2 The Role of IT in Knowledge Sharing

The means by which knowledge is shared within organizations and the factors that facilitate knowledge sharing/transfer are core issues in knowledge management. advances in technology have facilitated the recent growth in systems designed for managing organizational knowledge, IT is comprehensively utilized by members in organization, IT is comprehensively constructed in organization, top management is capable of applying IT, members in organization apply IT to search and use current organizational knowledge, and members in an organization apply IT to create new knowledge (Sher and Lee, 2003).

The Internet, one of the IT tools, gives rise to virtual communities that aim at facilitating collaboration by providing an environment for mutual sharing and interaction. A collaborative process in such an environment involves intensive online knowledge discovery and knowledge sharing between collaborators, such as knowledge consumers and knowledge contributors (Yang and Chen, 2007).

Butler et al. (2007) indicate that effective, i.e., successful, KMS are constituted by highly accessible and well-integrated web- based Intranet technologies that facilitate knowledge sharing on tasks/processes and/or generic/infrastructures among general and/or specific communities-of-practice. Benbya (2006, p. 4) also argues that effective knowledge sharing technologies (i.e., core IT artefacts) are integrative, highly accessible, and searchable, because integration is a strong predictor of KMS effectiveness, the ability of a system to integrate knowledge from a variety of sources and present it in a manner that enables easy access and reuse is associated with both knowledge quality and knowledge usage. IT artefacts, such as email, datamining and learning tools, are important, but non-core, as they are generally not well-integrated and do not provide a focal point or node for effective knowledge sharing (cf. Benbya, 2006) then we need a system can manage knowledge integrity.

In the process of KM, the absorption, creation, arrangement, storage, transfer and diffusion of knowledge are all dependent on assistance provided by IT. Khandelwal and Gottschalk (2003) pointed out that the application of IT to the support of KM apparently influences the results of knowledge collaboration within the organization. There are some example of using information technology for implementing KMS and sharing knowledge in organization:

Hewlett-Packard (HP), a company competing in the market of computers, peripheral equipment and other electronic equipment developed CONNEX (http:// www.carrozza.com/connex), a People-Finder KMS (T Carrozza, phone interview and follow-up e-mail with developer of CONNEX at HP Labs, September 16, 1999). The goal of the project was to build a network of experts, available online, to provide a guide to human knowledge within HP. CONNEX consists of a centralized database of user knowledge profiles, with a Web browser interface that allows users to find profiles in multiple ways. User's profiles contain a summary of their knowledge and skills, affiliations, education and interests, as well as contact information.

CONNEX users can easily find experts within HP by searching the database by any combination of profile fields or by browsing through the different areas of knowledge, geographies and/or names. To support a large user base with high volume of transactions, CONNEX was built using Sybase database and Verity's Topic search engine, on an HP platform.

The National Security Agency (NSA) has also taken a step towards the implementation of a system to locate experts for using their knowledge in critical situations (Wright and Spencer, 1999). The NSA is part of the Intelligence Community, and their two missions are Foreign Signals Intelligence and National Information System Security. The goal of

the implementation of the knowledge and skills management system (KSMS), a People-Finder KMS, is to catalog the talent pool within the agency to allow the precise identification of knowledge and skills, and to take advantage of information technology. The NSA went through the development of the system by applying database engineering in order to solve the complexities of implementing an adequate, workable and successful KMS. They also divided the execution of this project into several Work Tasks and developed knowledge taxonomy applicable to their workforce.

4 CASE STUDY

The roads management center, in Ministry of Road & Transportation of Iran, is medium organization with different branches across Iran. This center recently has implemented new Knowledge Management System by focusing on creating, gathering, organizing and disseminating an organization's knowledge as opposed to `information' or 'data'. The development of KMS, in this center, demands that knowledge be obtained, produced, shared, regulated and leveraged by a steady conglomeration of individuals, processes, information technology applications and a knowledge-sharing organizational culture.

For getting this target, they use new technology to make appropriate condition for fascinating knowledge sharing in organization because the Ministry of Road & Transportation had been used the technology for knowledge sharing in knowledge management project already and it was not proper for this goal. New technology is Wiki technology, as one of the advantages of web.2, has many good points in sharing knowledge such as in customer/client collaboration, documentation, and developing an online community. The information is often added to wiki but not deleted when no longer relevant or accurate or updated when changed. Wiki offers an excellent way to manage documents and knowledge integrity. In wiki, foremost is the fact that documents are edited in a very visible way, which adds accountability and Members of organization have to justify the changes because everybody can see it. Also, each of members can edit or add new information to other knowledge or information that has been written by other members, previous technology did not have this feature and it was the main weakness of that. This faint was the reason of employee's discontent.

Wiki's inherent version control means organization never have to worry about losing a document again. The use of wiki can also save time by letting organization and its clients share documents for collaborative editing and quicker approval. A technical advantage of wiki over other document management tools is that there are plenty of good open source versions available at little or no cost. Plus, wiki is usually extensible, so organization can customize them to its needs and doesn't need an expert administrator or extra hardware resources. Despite wiki's benefits, the success of wiki in KMS depends on how dedicated the participants are in using the wiki and checking in regularly and wiki platforms have a bit of a learning curve. With training members in organization the usage of wiki reveals obviously.

The advantages of wiki technology help roads management center for making proper condition between clients to share their knowledge more than before.

5 METHODOLOGY

Research methods can be generally divided into two types: quantitative research and qualitative research. The main objective of this research is to explore the roles and effects of IT on successful knowledge sharing on knowledge management project, (Berg, 2000); (Hammersley, 1996). In that case, the characteristics of the qualitative research method make it better suited to be applied here. Therefore, there is a design phase involved, which possesses distinct methodology. The phase involved voluminous review of the literature and in-depth interviews with senior managers in roads management center, both of which were aimed at collecting data. Interviews are one of the most extensively used methods of data collection (Bryman and Burgess, 1999). The individual in-depth interviews conducted in this study are of a face-to face, which is one of the most common approaches in qualitative research. This type of interview involves asking a number of pre-determined questions and special topics. Under such circumstances, respondents are able to determine the direction and content of the interview within a broader framework provided by the interviewer. After the interview at each manager had been completed, the results were assembled, transcribed and e-mailed to the respondents for their review and approval in order to prevent any misinterpretations. This process is expected to provide this study with a

richer and more holistic appreciation of the problems regarding. In our study, we select twenty top managers and thirty employees of roads management center, In order to answer research question the following questions asked of them.

There is a list of questions in interviews?

- What is the different between new technology and previous technology for knowledge sharing in your organization?
- What are the advantages of wiki technology?
- How can this new technology help client in better knowledge sharing in organization?
- Is there any limitation in using of new technology?
- Is it critical for your organization to get appropriate knowledge sharing?

Answers to the questions were collected and assessed, accordingly, the following results were obtained the replies.

6 RESULTS

After analyses of replies we found, most of the managers and employees believed sharing knowledge is necessary for effectiveness and having efficiency in their organization and it can help reduce many cost the work again. They emphasized that new approach in implementing knowledge management with using wiki technology has help better and easier knowledge sharing in organization than previous approach and technology because new approach use story telling technic for sharing knowledge and wiki technology supports this method in best way. According to this method, Categories of knowledge organization will be recognized and important knowledge subjects in each category is clarified, then based on this subjects, some question will be generated. The result of this process will be added in wiki after that managers and employees in different sector of organization can link to wiki with intranet or internet and according their knowledge and experience answer the question in their category. In previous method and technology employees or managers had to think a lot of hours for understanding what she or he can write about her or his knowledge but in new approach, appropriate context for the users is provided to share fully organized her or his knowledge or experience in important field or critical Knowledge gap is expressed as a question in her or his sector of organization.

Table 1.

No.	Most advantage of using wiki technology as facilitator of knowledge sharing in organization
1	Collaborative authoring
2	Easy editing - knowledge can edited at any time by anyone
3	Easy citing and sourcing
4	Name of article is part of the hyperlink
5	Server storage of documents
6	Automatic Versioning and Difference Engines for documents
7	Search facilities
8	Automatic links to discussion pages
9	Most recent editions very visible; easy monitoring
10	Massively distributable collaboration
11	Groups and Categories
12	Easy links to multi-language documentation

In addition the majority of participants in interview considered that wiki technology plays the role of reference in organization and internal knowledge needs of people encourage & motivate them for using this technology as a facilitating knowledge sharing in their organization. Also they were very pleasure because of wiki features that provides users, like adding film, picture, voice or uploading files related to contents that user share with the others. In wiki technology everyone can access to knowledge of other people and everybody can edit or add new entries in this system. Table1 is revealing advantages of this technology clearly.

7 CONCLUSIONS AND RECOMMENDATIONS

In this paper, we have analyzed the role of the information technology as facilitator of knowledge sharing in organization. We considered IT as a tool which is able to manage, store, and transmit structural knowledge is a critical solution for implementing impressive knowledge management. Also we realized the type of the IT's tools are so important in quality of knowledge sharing. And we proposed new technology for better knowledge sharing that it is wiki technology. We understood wiki has more benefits than the rest of technologies that had been used for knowledge sharing in organization. The roads management center, as a successful case, with using the wiki technology can make suitable condition for their clients in knowledge sharing. Our recommendations for other organizations in implementing a successful knowledge management project is that before any actions in this case first realized their organization needs and select an appropriate information

technology as fascinating way in knowledge sharing. According our result in this paper, wiki is tested as proper technology among other as a tool for sharing knowledge so we recommend to other organization to use this technology

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