Internet Support for Knowledge Management Systems

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INTRODUCTION

Organizations are building and maintaining systems for managing organizational knowledge and memory. Users of these systems may not be at the same location; in many cases they are distributed across large geographical distances and multiple offices. Key to this task is developing an infrastructure that facilitates distributed access and utilization of the retained knowledge and memory. Connectivity and easy to use interfaces are main concerns. Jennex (2000) found that using the Internet as a common communications platform (either as an Intranet or an Extranet) and Web browsers as an interface is a viable, low cost solution. Newell, et al. (1999) found that Intranets not only supported distributed knowledge processes but also enhanced users' abilities to capture and control knowledge. Stenmark (2002) proposes that using a multiple perspective of the Internet— information, awareness, and communication—allows developers to build successful Internet-based knowledge management systems, KMS. This article discusses how the Internet can be effectively used as an infrastructure for knowledge management/organizational memory systems, KMS/OMS.

BACKGROUND

The OMS consists of the processes and information system components used to capture, store, search, retrieve, display, and manipulate knowledge. The KMS consists of the tools and processes used by knowledge workers to interface with the knowledge contained in the OMS. Knowledge is managed and used through a combination of the KMS and OMS. Jennex and Olfman (2002) identified the KMS-OMS model in Figure 1 as a representation of the relationships between the OMS, KMS, and organizational learning. Organizational learning, OL, is identified as a quantifiable improvement in activities, increased available knowledge for decision-making, or sustainable competitive advantage (Cavaleri, 1994; Dodgson, 1993; Easterby-Smith, 1997; Miller, 1996).

There are two approaches to building a KMS as discussed by Hansen et al. (1999), Morrison and Weiser (1996), and Stenmark (2002). These can be described as a process/task approach and the infrastructure/generic approach. The process/task approach focuses on the use of knowledge/OM by participants in a process, task or project in order to improve the effectiveness of that process, task or project. This approach identifies the information and knowledge needs of the process, where they are located, and who needs them. This approach requires the KMS to capture less context, as users are assumed to understand the knowledge that is captured and used.

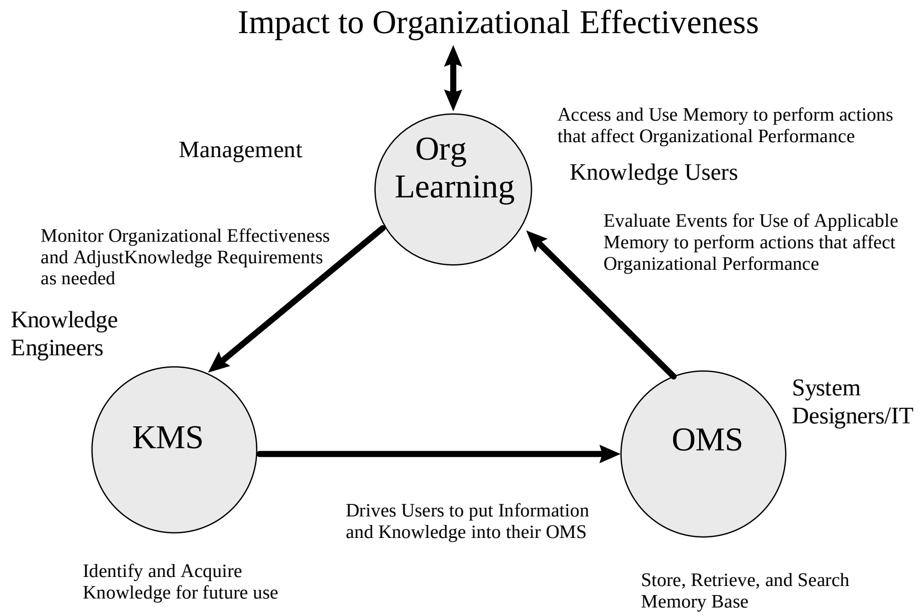
The infrastructure/generic approach focuses on building a system to capture and distribute knowledge/OM for use throughout the organization. Concern is with the capturing of context to explain the captured knowledge and the technical details needed to provide good mnemonic functions associated with the identification, retrieval, and use of knowledge/OM. The approach focuses on network capacity, database structure and organization, and knowledge/information classification.

Both approaches may be used to create a complete KMS. The process/task approach supports specific work activities, while the infrastructure/generic approach integrates organizational knowledge into a single system that can be leveraged over the total organization instead of just a process or project.

Jennex and Olfman (2001) developed a set of design recommendations for enabling KM/OM in systems. The recommendations, Table 1, are based on studies of KMS/OMS success factors. One recommendation calls for use of a common infrastructure. The Internet is suggested for this due to its widespread availability, open architecture, and developed interfaces. This also assists in standardizing software across the organization through the use of browsers and Web applications.

The Internet meets several of these recommendations. It provides a common network that is global. Use of common browsers aids in standardizing software. Ease of use of browsers and in building and maintaining Internet-based systems empowers users (Newell et al., 1999) and simplifies incorporating the KMS into everyday processes. Ease in handling unstructured data as well as databases simplifies knowledge representation, capture, and dissemination. Table 2 lists Internet tools and features that expand the ability of the Internet to serve as the infrastructure for a KMS. Some of these features are expanded in the following.

Figure 1. The Jennex-Olfman KMS-OMS model



Gandon et al. (2000) propose using XML to encode memory and knowledge, and suggest using a multi-agent system that can exploit this technology. The proposed system would have improved search capabilities and would improve the disorganization and poor search capability normally associated with Web pages. Chamberlin et al. (2001) and Robie et al. (1998) discuss using XML query language to search and retrieve XML encoded documents.

Dunlop (2000) proposes using clustering techniques to group people around critical knowledge links. As individual links go dead due to people leaving the organization, the clustered links will provide a linkage to people who are familiar with the knowledge of the departed employee. Lindgren (2002) proposes the use of Competence Visualizer to track skills and competencies of teams and organizations.

Te'eni and Feldman (2001) propose using task-adapted Web sites to facilitate searches. This approach requires the site be used specifically for a KMS. Research has shown that some tailored sites, such as those dedicated to products or communities, have been highly effective.

Eppler (2001), Smolnik and Nastansky (2002), and Abramowicz et al. (2002) use knowledge maps to graphically display knowledge architecture. This technique uses an intranet hypertext clickable map to visually display the architecture of a knowledge domain. Knowledge maps are also known as topic maps and skill maps. Knowledge maps are useful, as they create an easy to use standard graphical interface for the Intranet users and an easily understandable directory to the knowledge.

The use of ontologies and taxonomies to classify and organize knowledge domains is growing. Zhou et al. (2002) propose the use of ROD, rapid ontology development, as a means of developing an ontology for an undeveloped knowledge domain.

FUTURE TRENDS

Although there is strong support for using the Internet as a knowledge infrastructure, there are areas that current research is improving. Chief among these is the difficulty in organizing and searching large quantities of knowledge in varying knowledge formats and structures. Knowledge can be stored as documents, audio, images, databases, and spreadsheets. Lack of standard structure can make organizing knowledge difficult, while the lack of standard terms and naming conventions makes searching difficult. An example is Ernst & Young UK, who in early 2000 had in excess of one million documents in its KMS (Ezingeard et al., 2000). Another concern is the tendency to not to use the system. Jennex and Olfman (2002) fount that voluntary use is enhanced if the system provides near and long-term job benefits, is not too complex, and the organization's culture supports sharing and using knowledge and the system. Other significant issues requiring resolution are summarized in Table 3 and include security, having ad-