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I-KSS: AN INTERNET KNOWLEDGE SHARING SYSTEM

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Abstract

Knowledge is increasingly recognized to be a primary resource for most organizations to sustain competitive advantage. Knowledge sharing has been identified as a key challenge in knowledge management. Many organizations often use the Internet not only as a pool of enormous information, but also for supporting information and knowledge sharing. This paper proposes a framework for organizing and sharing this Internet knowledge and describes a prototypical knowledge sharing system: I-KSS.

Introduction

To dynamically respond to a changing environment, an organization should not only process information efficiently but also create information and knowledge (Nonaka, 1994). A company's ability to create and process knowledge has always been crucial for competitive strategic advantage. Knowledge is increasingly recognized to be a primary resource for most organizations to sustain competitive advantage. Many studies have explored the role of organizations in creating, storing, and disseminating knowledge (Grant, 1996; Kogut and Zander, 1992; Teece et al., 1997). Knowledge in organizations is generated and shared through collaboration, interaction, and relations among groups or units. Some studies have identified knowledge sharing as a key challenge in knowledge management (Duffy, 2001; Dyer and Nobeoka, 2000, Gupta and Govindarajan, 2000). Industry leaders, such as Chevron, Xerox, Johnson & Johnson, Ford, and Whirlpool, are developing knowledge-intensive cultures by encouraging knowledge sharing (Stepanek and Brown, 2000).

Today, the Internet has grown to encompass diverse information resources including publications, product and service catalogs, and government information. Many organizations, such as General Electric, IBM, Merrill Lynch, and Xerox, are using the Internet as a pool of enormous information for strategic planning (Pawar and Sharda, 1997). The Internet has been used not only to obtain information about competitors, including company profiles and industry analyses, but also to support information sharing, publishing, and collaboration (Leibs, 1998).

Most literature on knowledge sharing is concerned mainly with behavioral and organizational factors that affect knowledge sharing in organizations, such as individual ability, organizational culture, and social network (Hansen, 1999; Lei et al., 1999; Szulanski, 1996). Little attention, however, has been paid to managing and enhancing information (mostly unstructured) obtained from the Internet in the process of organizational knowledge sharing.

Previous research in knowledge management indicated that information technology could be regarded as an important facilitator to capture and disseminate knowledge (Hansen et al., 1999). Some studies have addressed the potential benefits of Internet tools, such as e-mail, search and retrieval tools, and information repositories, to facilitate the sharing and integration of knowledge in organizations (Alavi and Leidner, 1999; O'Leary, 1998).

This study proposes a framework to use information technologies, such e-mail and knowledge repositories, to facilitate sharing information obtained from the Internet, and later develops a prototypical knowledge sharing system entitled an Internet Knowledge Sharing System (I-KSS). Next section presents a brief review of relevant literature. The subsequent sections present a conceptual framework and the implementation of I-KSS.

Literature Review

“Knowledge has become the key economic resource and the dominant – and perhaps even the only – source of competitive advantage.” (Drucker, 1995)

Knowledge Sharing

The major challenge of knowledge management in organizations is to share, integrate, and apply specialized knowledge of organizational members (Grant, 1996). Recent studies have identified knowledge sharing as a crucial factor for competitive strategic advantage (McEvily et al., 2000; Teece, 1998). Knowledge sharing is valuable to organizations. Through effective knowledge sharing, organizations can improve efficiency, reduce training cost, and reduce risks due to uncertainty. Several case studies, such as cases of Nucor Steel (Gupta and Govindarajan, 2000) and British Petroleum (Davenport and Prusak, 1998), demonstrated how knowledge sharing would be beneficial to organizations.

Previous studies proposed various ways to promote knowledge sharing (Gupta and Govindarajan, 2000; Hansen et al., 1999; Lei et al., 1999):

- *Use rewards or incentives:* Employees in organizations have little incentive to share their own knowledge and insights with others (Lei et al., 1999). It is necessary to motivate their willingness to share. Explicit rewards or incentive structure can help organizations create a knowledge sharing culture.
- *Codify knowledge:* It is recognized that tacit knowledge cannot effectively be codified due to the nature of knowledge, such as situated and unarticulated, while explicit knowledge is typically codified and stored in files and documents. Hansen et al. (1999) found that the companies that sell relatively standardized products attempt to codify organizational knowledge and store it in the knowledge repository. The reuse of codified knowledge helps companies save work and reduce communication costs.
- *Use different sharing mechanisms according to type of knowledge:* Document exchange is highly efficient and effective to share codified knowledge, whereas personal contact may be effective for sharing tacit knowledge (Gupta and Govindarajan, 2000).

Information Technologies for Knowledge Sharing

Use of information technologies for supporting information and knowledge management, such as groupware and data warehousing, has been investigated (Alavi and Leidner, 1999; Duffy, 2001; Ruggles, 1998). Recently, many organizations have embarked on major initiatives for building data warehouses and implementing groupware to support knowledge management in the organization (Ruggles, 1998). Groupware can be used to promote knowledge sharing by capturing knowledge and communication across groups or units. However, several drawbacks of using groupware, such as technical complexity and poor connections with Internet-based tools, severely restrict the system’s widespread use in organizations (Dennis et al., 1998). Data warehousing provides potential benefits of having more accurate information and providing better access to information. Davenport et al. (1998) put emphasis on the significance of knowledge repositories in knowledge management projects, which allow capturing knowledge, providing access to knowledge, and facilitating knowledge sharing among individuals.

Little attention has been given to managing information (mostly unstructured) obtained from the Internet and to the organizational processes for enhancing and sharing this knowledge. Thus, there is a need to develop an integrated framework for effectively sharing information obtained from the Internet. The next section presents a framework to facilitate enhancing and sharing unstructured information obtained from the Internet by using information technologies, such as e-mail and knowledge repository.

Conceptual Framework

Figure 1 presents a framework for enhancing and sharing Internet knowledge. This framework is based on Choo’s framework (1995) for the business intelligent system.

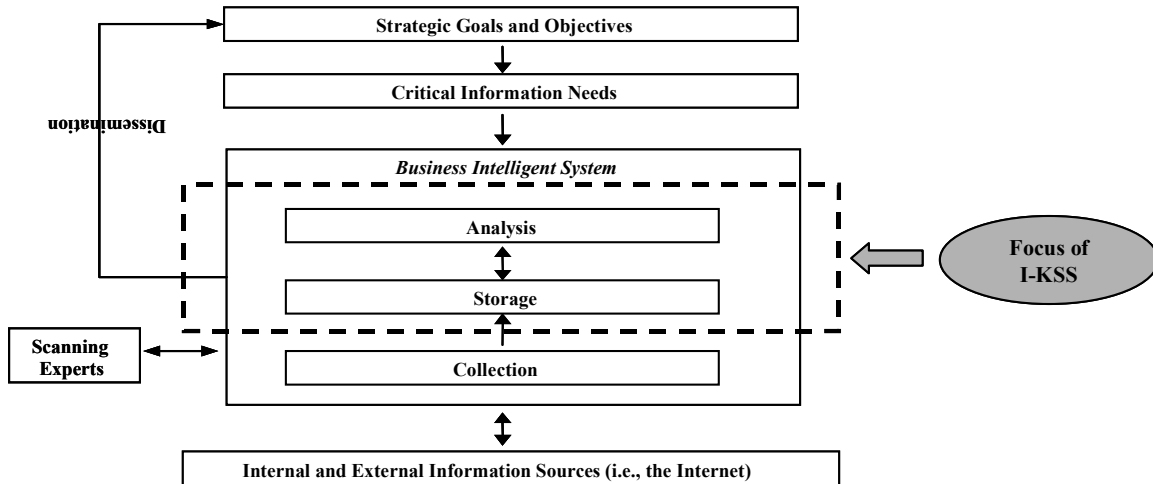


Figure 1. Framework for Internet-based Knowledge Sharing System

To monitor the internal and external environment, organizations first determine a set of critical information needs based on strategic objectives. The critical information is a list of all of the information categories supporting a particular strategic objective. Using these critical information needs, scanning experts conduct the scanning activities:

- *Collection*: information is gathered from internal and external sources by using the Internet including World Wide Web, conventional search engines (e.g., Yahoo), and traditional on-line databases (e.g., LEXIS-NEXIS).
- *Analysis*: information is compared, collated, and interpreted by using scanning experts' domain knowledge. Mission-critical or time-specific information is immediately transferred to senior managers by using electronic mail.
- *Storage*: relevant information is filed and indexed into the knowledge repository by using *add*, *update*, and *purge* algorithms and information retrieval techniques.
- I-KSS focuses on *analysis* and *storage* activities related to knowledge sharing after users have identified relevant information from the Internet.

I-KSS consists of three major processes:

- Integrating selected information with the knowledge repository,
- Sending E-mail if information has been identified as mission-critical, and
- Organizing the knowledge repository.

Integrating with Knowledge Repository

If users have identified relevant information from the Internet, the information is integrated with the knowledge repository by using the three operations: *Add*, *Update*, and *Purge*. These operations use distinctive keywords extracted from the information to determine the knowledge integration strategy. In the *Add* and *Update* operation, in order to compare selected information with the existing information, I-KSS checks the elements (i.e., keywords) of *Source*, *Subject*, *Date*, and *Content*, in turn. To retain information, I-KSS examines whether identical information exists in the knowledge repository by first using *Source*. If *Source* is the same, *Subject* is examined next. If *Subject* is the same, I-KSS consecutively inspects *Date*. Then, if *Date* of the selected information is more recent, I-KSS replaces the existing information with the selected information.

Sending E-Mail

If information has been identified as mission-critical or time-specific by the user (e.g., scanning experts), I-KSS allows the user to send the message to the other users (e.g., senior managers or experts) with a reference link to the information. Senior managers or experts may provide their own opinions or comments about the information and send their comments back. The system integrates these comments with the knowledge repository by binding them with the related information. I-KSS allows users to browse the *comment* information through the comment history interface, similar to an electronic bulletin board.

Organizing Knowledge Repository

The system provides several other interfaces for allowing users to access the knowledge repository. The knowledge repository supports four major interfaces: *search engine*, *review history*, *comment history*, and *related documents*.

- *KB search engine* allows the user to search for the information available in the knowledge repository by using a list of *significant keywords* that was identified as good indicators of the document contents. The search results contain the relevancy rankings, sources, subjects, and partial contents of the information.
- *Review history* provides the capability to review the history of the specific information: when the information was reviewed, who used the information, and which significant keywords were used in the query.
- *Comment history* provides the history of the comments of senior managers or experts about the specific information: when the comments were given, who gave the comments, and the detailed contents of the comments.
- *Related Documents* provides a list of other related information in the knowledge repository. The similarity between information is measured in terms of *significant keywords*.

If the users (e.g., senior managers) have interests in a certain topic, they can use the *KR search engine* to retrieve the related information by selecting a single or multiple significant keywords available in the knowledge repository. The system allows the users to navigate among the interfaces through either the search results or a list of the existing information. Figure 2 presents the detailed process of I-KSS.

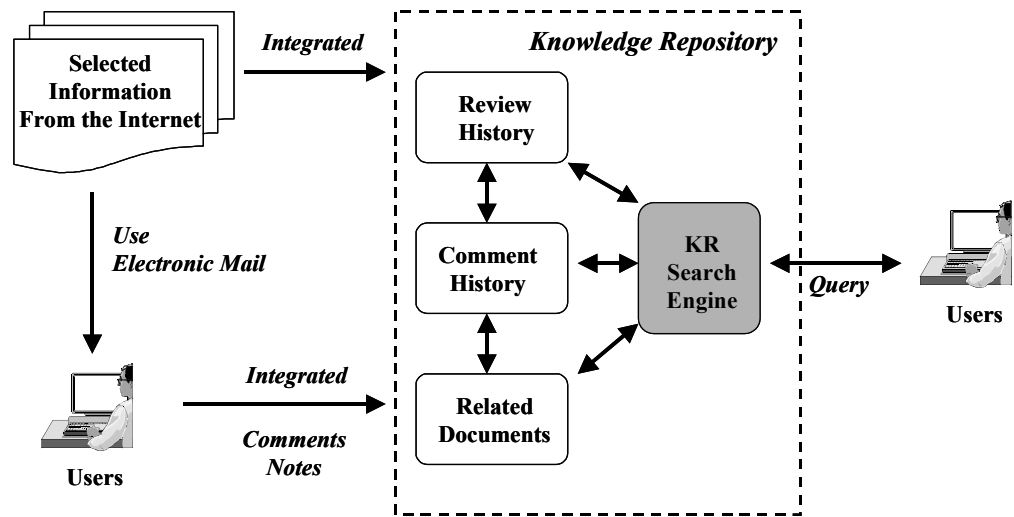


Figure 2. Overview of Proposed Knowledge Sharing Process

Prototype Implementation

I-KSS has been implemented in Java using JDK1.3® as a development tool and MS Access® for knowledge repository. Figure 3 presents examples of I-KSS interfaces.

The main interface has the same capabilities as a Web browser such as Netscape® or IE®. In addition, the main interface contains several buttons to allow users to send e-mail and access the knowledge repository. The KR search interface allows users to retrieve information from the knowledge repository by using a single or multiple keywords available

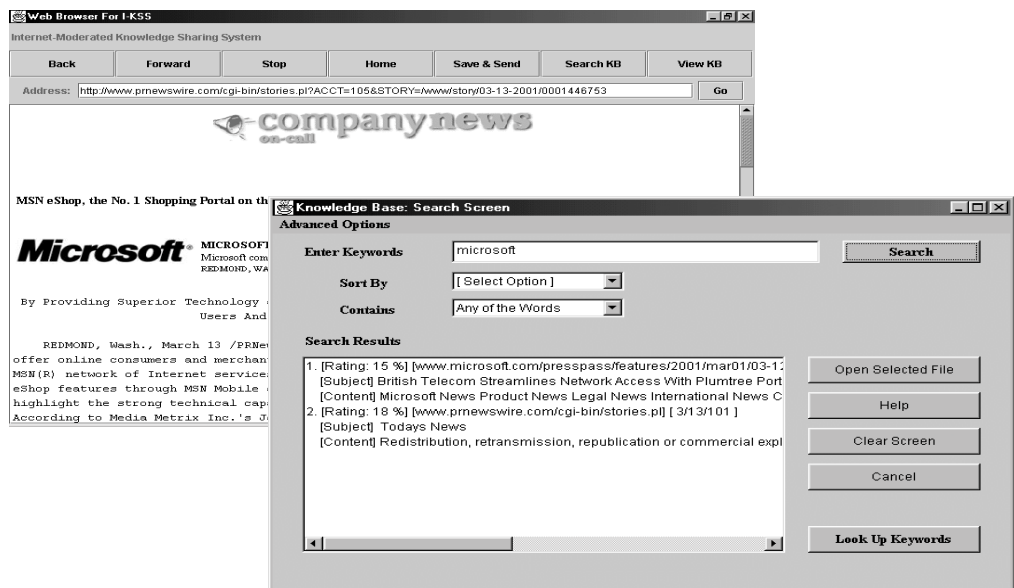


Figure 3. Examples of I-KSS Interfaces

in the *look-up* table. The interface also supports other options such as Boolean search. In addition, the system allows users to navigate among the related interfaces, such as review history and comment history, by using the *advanced options* in the menu.

Conclusion

I-KSS is an application that demonstrates the potential to leverage Internet Information in knowledge management and knowledge sharing process. It enables newly acquired strategically-relevant information to be added to a knowledge repository and to automatically alert key decision makers of knowledge repository updates. It also shows that I-KSS can be integrated into the environmental scanning process which is recognized as an crucial strategic process for identifying external opportunities and threats, implementing strategic changes, and achieving organizational alignment.

The proposed model has the potential to facilitate theoretical and empirical investigations into the design of knowledge sharing systems for managing unstructured information available from the Internet. For MIS practitioners, this model provides guidelines for incorporating information technologies within the process of organizational knowledge sharing.

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