

# Knowledge Management on the Web

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## INTRODUCTION

The importance of knowledge management has been recognized both in academia and in practice. In recent years, corporations have started talking about knowledge management, organizational learning, organizational memory, and computerized support. A few years ago, Microsoft®'s awareness of knowledge management and corporate memory was demonstrated by Bill Gates through his keynote speeches in the second and third Microsoft's CEO summits that attracted quite a few CEOs and other corporate executives from Fortune 1000 companies. Gates (1998) outlined his vision through a term he coined "digital nervous system," which is an integrated electronic network that can give people the information they need to solve business and customer problems. An effective digital nervous system should include access to the Internet, reliable e-mail, a powerful database, and excellent line-of-business applications, and should transform three major elements of any business: the relationships to customers and business partners—the e-commerce element; the information flow and relationships among workers within a company—the knowledge management element; and the internal business processes—the business operations element. The recent release of Windows® Tablet PC® edition is an example of a Microsoft tool that supports the concept of digital nervous system.

Even though knowledge management as a conscious practice is still young (Hansen et al., 1999), using information technology to support knowledge management is being explored and is well under way in many organizations. The Web technologies are not only changing the landscape of competition and the ways of doing business but also the ways of organizing, distributing, and retrieving information. Web-based technology is making effective knowledge management a reality, and Web-based knowledge management systems have been developed and deployed.

Currently, Web-based technology is enabling the management of knowledge at the document management level, in contrast to the traditional record-level data management. The record-level data management is basically the focus of traditional database management systems.

The document level is higher than the record level. For example, we generally handle daily problems through communicating with each other by using documents and exchanging ideas or perspectives about an issue, rather than dealing with database fields or records. Document-level information management is generally viewed as a lower level of knowledge management.

In this chapter, Web-based knowledge management is explored. Four representative types of Web-based knowledge management models are identified and studied. The study of these models would shed light on the effective management of organizational knowledge, what should be contained in a knowledge management system, the levels of knowledge management support, and how knowledge management support systems can be technically implemented. This chapter is organized as follows. In the next section, some theoretical issues about knowledge management are reviewed. Then, it is justified why Web technology is an enabling technology to the effective knowledge management and why Web-based knowledge management is desirable. Then, the four types of Web-based knowledge management models are discussed and compared. Finally, the conclusion section summarizes the results of this chapter and discusses future directions of Web-based knowledge management.

## BACKGROUND

### Traditional Information Systems versus Knowledge Management Systems

Traditional information systems were developed to capture data about daily business transactions (transaction-processing systems), and to access, process, and analyze those internal and external data to generate meaningful information to support management [management information system (MIS), decision support system (DSS), or enterprise integration system (EIS)]. These traditional systems help make an organization operate smoothly. However, they were developed at a time when the importance of knowledge management was not recognized.

They all emphasize quantitative data processing and analysis. But an effective organization does not rely on quantitative analysis alone to deal with its problems. The nonquantitative side, such as knowledge creation and management, mental models, document sharing, human communications, information exchange, and meaning making, play a great role in an organization's growth and development. Thus, the nonquantitative areas also need to be supported. Knowledge management systems are supposed to fulfill this role. In other words, knowledge management systems should complement traditional systems in providing nonquantitative side support. A difficult task is to define what needs to be contained in the knowledge management system. A lot of existing studies provide only theoretic suggestions. A study described and discussed 10 knowledge management frameworks (Holsapple & Joshi, 1999). These frameworks are generally concentrated on conceptual knowledge creation or knowledge-building activities. They may be useful in deciding what functions a knowledge management system should eventually provide, but they fall short in suggesting what should be contained in a knowledge management system and how such a system may be implemented. In this chapter, the study of four types of Web-based knowledge management models should provide some practical advice about the content of a knowledge management system.

### Knowledge versus Information versus Data and Knowledge Management

Commonly agreed, data is often defined as the raw facts, and information as the processed data. Davenport and Prusak (1998) defined knowledge as "a combination of experience, values, contextual information, and expert insight; and knowledge provides a framework for evaluating and incorporating new experiences and information." On the other hand, Applehans and coresearchers (1999) defined knowledge as the ability to turn information and data into effective action, which brings desirable outcomes for an organization. In this chapter, we follow a compromised approach to define knowledge: it is about the application of data and information for a given task so that the given task can be effectively performed.

The traditional view about the relationship between knowledge, information, and data is that knowledge is above data and information; data is a prerequisite for information; and information is a prerequisite for knowledge. This theory can be simply illustrated by the following diagram:

Data → Information → Knowledge

The second view, also a different view, is called a reversed knowledge hierarchy, which suggests that we first need to have the knowledge about what information we want, and then we will know what data to look for (Tuomi, 1999). In other words, data emerge only after we have information, and that information emerges only after we already have knowledge. This view can be simply illustrated by the following diagram:

Knowledge → Information → Data

The third view is also possible. We have a large amount of data collected but fail to make use of the data to create information because of our lack of relevant knowledge. An historical example is at point, which is about the making of the everyday weather map. For a long time in history, weather data were collected, and there were rich data available. But the usefulness was limited when these data are not combined with a map (Monmonier, 1999). Once we have the relevant knowledge about how to process data, how to visualize data, the boring data start making sense and generating meanings. In this situation, the knowledge is the catalyst that transforms data into information. This process can be simply illustrated by the following diagram:

Data → Knowledge → Information

These differing logics and understandings about the relationships and the sequences between data, information, and knowledge are meaningful, depending on the context. The development of the traditional information systems (TPS, MIS, DSS) basically follows the traditional view of data, information, and knowledge, while scientific research and inference statistics generally follow the second view (the reverse hierarchy) on data, information, and knowledge. In terms of knowledge management, the third view bears more impacts and implications. This third view suggests a fundamental fact in many organizations—there are a lot of documents (data) accumulated over years, and we need to know what to do to turn them into information to support a given task. All knowledge is tacit in nature and largely resides in the human mind, and to articulate knowledge is to create information about knowledge (Stenmark, 2002). The document is one place where information about knowledge can be found. Another place is the human mind, and the identification of the right human mind (expert) for a given task must be a responsibility of knowledge management. This help explains why the awareness of corporations to identify and utilize inside expertise for a given task has increased in recent years.

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