

Knowledge Management Software

Capturing the Essence of Know-How and Innovation

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The intersection of business practice, organizational culture, and technology comprising a knowledge management solution sets knowledge management (KM) apart from other information/document management initiatives. While KM systems represent an enhancement of existing technologies, they differ in several important aspects. These differences constitute a KM checklist that can be used to distinguish KM solutions from other more traditional workflow, document management, intranet, and groupware solutions. The essence of knowledge management can only be viewed within the context of a knowledge complexity continuum and the level of intermediation, externalization, internalization, or cognition that is needed within an organization.

A Cherokee elder once said, "Look at everything three times: once with the right eye; once with the left eye; and once from the corners of the eyes, in order to capture the essence of what you're looking at." So it is with knowledge management (KM). Only after establishing a working definition of knowledge

management, gaining an understanding of the component technologies of a knowledge management solution, and analyzing the state of the market, can the essence of knowledge management in today's business environment be understood.

Knowledge management refers to the practices and technologies that facilitate the efficient creation and

exchange of knowledge on an organizationwide level. The end result of this creation and exchange is measured by an organization's ability to make quality decisions, decisions that position one organization ahead of its competitors. Put succinctly, KM involves leveraging collective wisdom to accelerate responsiveness and innovation. Although such a working definition is important to establishing a common understanding of KM, it is also important to gain an appreciation for KM from various perspectives.

One can gain immediate insight into the technical complexity of knowledge management and the role it can play in an organization by examining the practices that best-of-breed organizations have adopted when introducing knowledge management to the broad base of their employees. It does not take long to realize that it is the complexity of the various KM tools and end-user applications of these tools that sets knowledge management apart from all other records and document management trends experienced in the last decade. In order to understand the broad range of tools available for

managing an organization's knowledge assets, one must first consider the complexity of knowledge and the types of problems solved by KM software.

The Complexity of Knowledge

All knowledge can be classified according to its complexity on a continuum from explicit to tacit. Michael Polanyi identified the distinction between these two types of knowledge in his book *The Tacit Dimension* (1966).

Explicit knowledge can be articulated in formal language and transmitted among individuals. Tacit knowledge, on the other hand, can best be described as personal knowledge embedded in individual experience and involving such intangible factors as personal belief, perspective, and values. Furthermore, one must appreciate the difference between knowledge and information.

Unlike information, which can be dormant, knowledge is connected. That is, it must be placed in a context or framework in order to execute its purpose, which is to "accelerate organizational responsiveness and innovation." It is context management, or these connections, that differentiate KM from information management (IM) and is at the heart of KM applications (Polanyi 1966).

The key applications of knowledge management are based on a framework that positions knowledge management's primary role as the connection of knowledge throughout the organization among different entities. In each case, the focus is on ensuring that each individual or group understands the knowledge available with sufficient depth as to apply it effectively in decision making and innovation.

The four functions performed by knowledge management systems are:

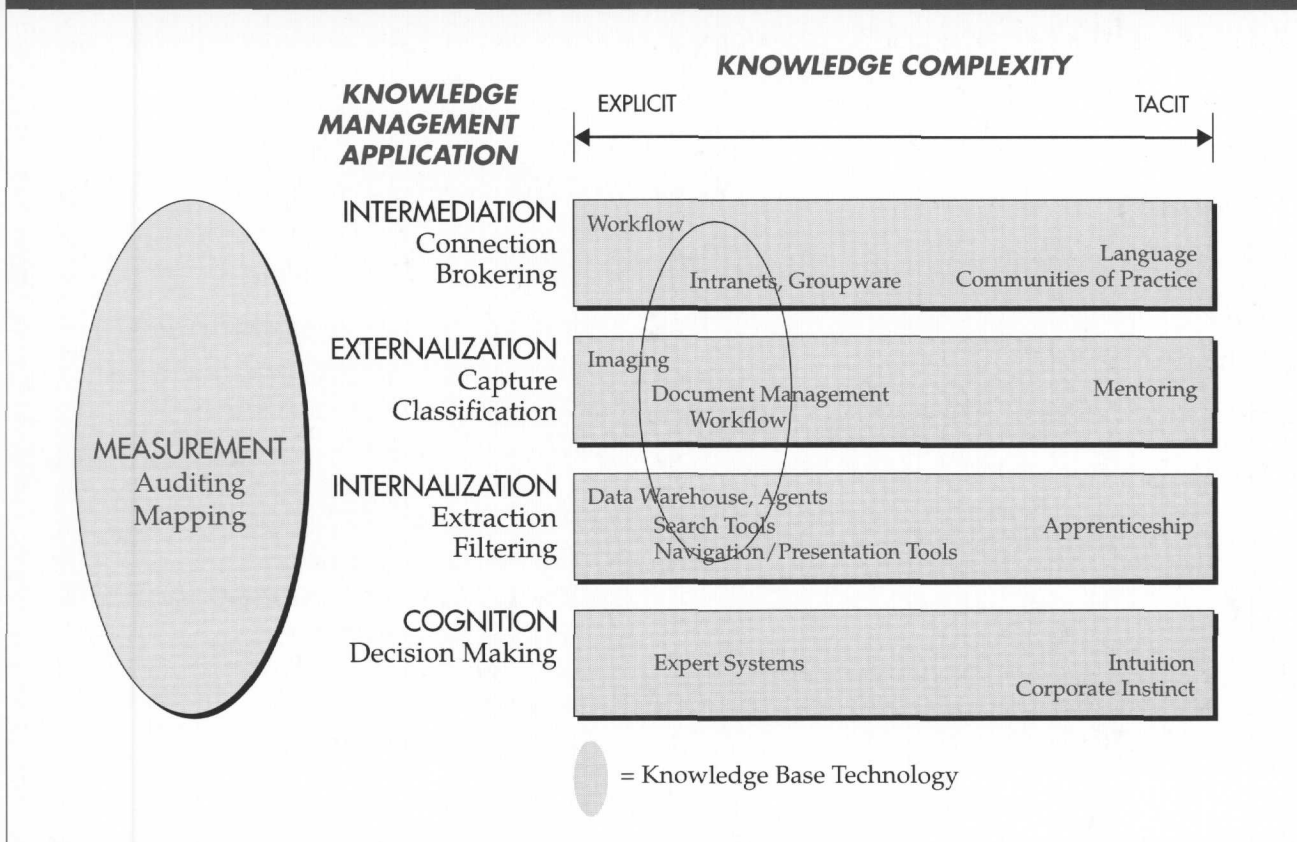
- **Intermediation**, which refers to the connection of people to people. It is the brokerage function of bringing together those who seek a certain piece of knowledge with those who are able to provide that piece of knowledge. Its interpersonal focus positions intermediation primarily within the realm of tacit knowledge.

- **Externalization**, the connection of information source to information source. It focuses on explicit knowledge and provides a means to capture this knowledge in a knowledge repository and, most importantly, to organize the knowledge according to some classification framework or ontology.

- **Internalization**, the connection of explicit knowledge to people or knowledge seekers. It involves extraction of knowledge from the external repository and

Figure 1

Technology Tools and Applications in Knowledge Management



subsequent filtering, which provides greater relevance to the knowledge seeker.

- **Cognition**, which connects knowledge to process. It is the function of systems to make decisions based on available knowledge (The Delphi Group 1997).

As depicted in Figure 1, the technologies comprising a knowledge management solution can be categorized by the type of knowledge management function they support. It is also important to note that although knowledge management technologies and software products are commanding a great deal of attention today, one need not attempt to capture *all* tacit knowledge in order to make it explicit. Organizations that start out with this emphasis soon learn that they have set out on a journey without a destination. There is ample room for the human role in knowledge exchange, which is represented on the knowledge complexity continuum by that knowledge which is, and may always remain, tacit.

When considering the technological components of a knowledge management system, a question often arises with regard to whether "knowledge management" is merely a new label placed on technologies that have already been deployed in organizations, in some cases for years. While KM tools are enhancements of existing technologies, they differ in several important aspects. These differences constitute a knowledge management checklist that can be used to distinguish knowledge management solutions from other more traditional workflow, document management, intranet, and groupware solutions. True knowledge management solutions are characterized by being:

1. **Context sensitive.** The solution should be able to "understand" the context of the knowledge requirement and tailor the knowledge accordingly. For example, it should be able to understand

the difference between "animal reproduction" and "document reproduction" and to respond differently in each case.

2. **User sensitive.** The solution should be able to organize the knowledge in the way most useful to the specific knowledge seeker. For example, it should give knowledge relevant to the user's current knowledge level, making understanding easier.
3. **Flexible.** The solution should be able to handle knowledge of any form as well as different subjects, structures, and media. It should also be able to handle forms that do not yet exist. For example, if the user wants to learn about gramophone records, it should supply knowledge on the technology as well as purchasing trends and examples of famous recordings.
4. **Heuristic.** The solution should constantly learn about its users and the knowledge it possesses as it is used. A heuristic-based solution is one that continually refines itself as a user's pattern of research is tracked by the system. Its ability to provide a user with relevant knowledge should thus

improve over time. For example, if the system responds to many requests on a particular subject, it should learn how to assist multiple users in more depth on that subject.

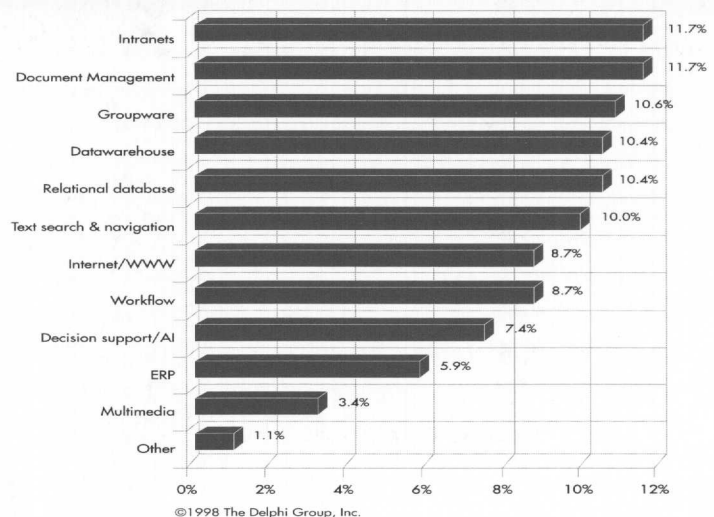
5. **Suggestive.** The solution should be able to deduce what the user's knowledge needs are and suggest knowledge associations the user is not able to do.

Component Technologies

Research with end-user organizations conducted by The Delphi Group revealed that document management (DM) and intranets were perceived to be the most important contributing technologies to knowledge management (see Figure 2). This finding indicates the central role document management is expected to play as a foundation technology for knowledge management implementations. This perceived importance of DM, however, should be tempered by the recognition that knowledge management is not simply an extension of document management but rather a new and emerging application area characterized by the knowledge management factors mentioned above. Additionally, many

Figure 2

Perceived Value of Component Technologies



forward-thinking DM vendors are now tracking people (i.e., tacit knowledge) as entities in the repository along with traditional documents.

The high level of importance given to intranets supports the fact that most knowledge management applications are designed to leverage internal information. Secondly, the intranet is recognized as the critical pipeline for delivering knowledge throughout an organization. It was the universal access mechanism of intranets that triggered interest in KM. Armed with these and other component technologies, organizations are finding that knowledge management is most useful in areas such as customer service, marketing, sales, and information technology. This view of the world is changing rapidly though, as internal knowledge management systems are being integrated with e-commerce, extranets, and other external processes.

KM Software – What Does It Really Do?

By reviewing the products of today's knowledge management software market leaders (see Figure 3) as well as other emerging vendors, one can gain an understanding of how knowledge management can increase an organization's know-how and innovation.

Inference Corporation's case-based reasoning (CBR) technology is designed to meet the needs of customer support and service call centers, including help desks. The information needed to respond to customer requests is organized in cases so that users can search for similar cases and their outcomes. Unlike traditional text retrieval engines, the user of CBR Navigator does not need to know how to conduct a search. As long as the user has an idea of what information is needed, the system can identify the appropriate diagnosis and sales dialogue as well as products or services information. Inference's approach to customer service applications has made it one of the early pioneers in knowledge-based customer relationship management.

Dataware integrates intermedia-tion functionality in its Dataware II Knowledge Management Suite, which is an extension to Dataware's document management system. Dataware II tracks information about queries executed, documents reviewed, documents authored, and documents read, as well as project involvement of each user. This input is used to build user profiles that capture the experience level of each user in various subject areas. As a result, knowledge seekers who pose

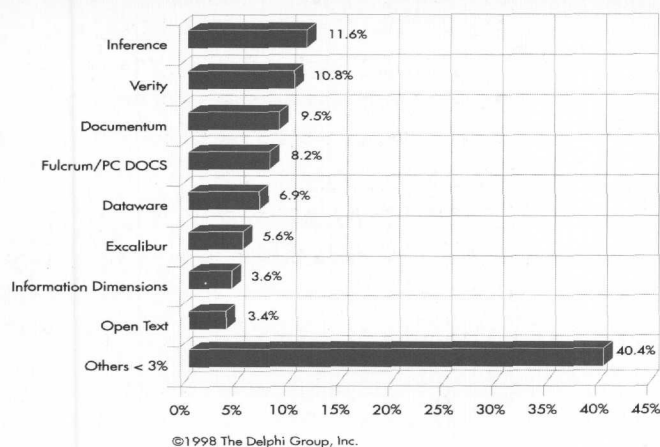
questions to the knowledge base are not only provided with explicit sources of relevant knowledge (e.g., a document) but also with individuals in the organization whom they can contact to garner additional expertise. The challenge to this approach to internalization is the ease with which the user profiles are created and maintained and the robustness of the profiles.

Products such as Fandango from InSystems, PowerOffice from EZ Power, and RightSite from Documentum will dynamically reformat and construct documents based on whatever knowledge is available about the current knowledge seeker. For example, a Web page may be constructed which is comprised of sections of information embedded in several documents. The construction of the Web page is based on the user's previous experience with the knowledge base and the organization, any known special interests/education level, etc. Thus by *leveraging* knowledge about the user, the information is customized in a manner to expedite its consumption and comprehension, promoting increased responsiveness.

In evaluating this approach to internalization, attention must be again focused on the mechanics of building user profiles and the depth of these profiles as well as the efficacy of how this knowledge subsequently determines knowledge content and presentation.

Other tools offer the ability to encapsulate knowledge about how the information has been or needs to be processed along with the knowledge. This is the direction knowledge management tools have taken within the past year. That is, more and more knowledge management vendors are offering vertical application-specific solutions. Examples of products designed for specific work environments include Aurigin in patent and intellectual property management, Cipher Systems in competitive intelligence, Serviceware in just-in-time technology training, and

Figure 3 KM Vendor Market Share – Software License Revenue



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Contextware for supporting professional services personnel. Despite their relatively low market share (less than 20 percent), application-oriented packages are expected to be the high-growth segment in knowledge management over the next several years, quickly outpacing development tools.

Technology vendors have only recently begun to specifically address the knowledge management market. In this as-yet-immature market, constant vigilance is needed on the

direction of existing products and technologies and the emergence of new players and approaches in the market. Vendors over the next two years, both existing and new entrants, will continuously evolve technology to support more readily the precept of knowledge management.

Because of the opportunistic nature of this market and the amorphous nature of the term "knowledge management," one must be skeptical of products and technology that tout the knowledge

management label. Instead, the concepts and guidelines presented here can provide a starting point for evaluation of knowledge management systems. The essence of knowledge management can only be seen within the context of the knowledge complexity continuum (explicit to tacit) and the level of intermediation, externalization, and internalization or cognition that is needed in an organization. **U**

EDITOR'S NOTE:

The figures and much of the information presented in this article are taken from "Knowledge Management in Perspective," a presentation at the Delphi Insight Series on Knowledge Management (1997).

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