The concept of knowledge management (KM) emerged about 15 years ago as computer users sought to turn the deluge of information they were receiving into meaningful knowledge.

KM is designed to capture documentary, personal, and other types of knowledge and make it available in ways that can help an organization accomplish its goals (see the sidebar “Getting to Know KM”).

For years, proponents touted KM as the Information Age’s wave of the future. However, some industry observers said KM was a vague concept that would neither deliver what it promised nor add to the bottom line.

Many organizations implemented KM systems with little thought to deployment methodology, which led in part to the failure of 50 to 60 percent of all deployments, said KM pioneer Larry Prusak, executive director of IBM’s Institute for Knowledge Management.

Now, however, vendors are releasing new products, which an increasing number of users are adopting. In fact, Prusak noted, 80 percent of the largest global corporations now have KM projects.

Industry observers wonder whether this means KM will finally become a mainstream technology, after years of hype.

“If KM is overhyped, then this is the longest hype cycle that I have ever seen,” said French Caldwell, an analyst with Gartner Group, a market research firm. “It is real, and it is a long-term strategic field.”

However, surveys by Bain & Co., a consultancy and market research firm, indicate that IT executives have not been satisfied with KM’s overall performance and that US adoption of KM has not increased appreciably in recent years.

Moreover, KM faces potential obstacles, such as a lack of standardization.

KM APPLICATIONS AND TECHNOLOGIES

KM is not a single technology but instead is a collection of indexing, classifying, and information-retrieval technologies coupled with methodologies designed to achieve results desired by the user. This is illustrated in Figure 1, which shows a model KM architecture.

For example, a company could implement KM with a process-tracking methodology to log the life cycle of a critical piece of equipment and help determine maintenance needs and potential problems.

KM’s key underpinning technologies enable content and workflow management, which categorize knowledge and direct it to workers who can benefit from

Getting to Know KM

Organization and management guru Peter Drucker first used the term knowledge management in the mid-1980s. However, the concept was not translated into commercial computer technology for almost a decade.

In 1994, professional-services firm Ernst & Young held the first KM conference. At that time, the concept was not well defined, said Larry Prusak, executive director of IBM’s Institute for Knowledge Management.

In fact, once the term knowledge management caught on, search-engine, portal, and AI vendors started rebranding their technologies as KM, causing confusion. “I think vendors did KM a great disservice by labeling every tool that came out as KM. People got disillusioned with it,” said Alan Pelz-Sharpe, a senior analyst at Ovum, a market research firm.

KM took off between 1995 and 1997, after the proliferation of the Web browser. The browser simplified the development of KM applications because it let developers build to a standard interface.

Today, there are even PhD programs in KM at such schools as the University of California, Berkeley and George Washington University.

Meanwhile, a number of major governmental organizations and private companies—such as the US Central Intelligence Agency, Intel, and Shell Oil—have launched major KM projects.

Buckman Laboratories was a KM pioneer, with some initiatives going back a decade. Vanja King, Buckman’s manager of discovery groups, said, “We believe that no data, information, or knowledge should reside in someone’s file system. Everything should be accessible so that we can learn from what people have already done.”
it; search functionality, to let users look for relevant knowledge; and collaboration, to help workers share knowledge, said Alan Pelz-Sharpe, a senior analyst at Ovum, a market research firm.

KM technology can be delivered in various ways. For example, users can run KM from a server, PC, or laptop. They can also use LANs or the Internet to access information, categorized via indices or portals, from databases. Some organizations run KM software from their own computer systems, while others use outsourced KM services.

Numerous KM applications have been developed for enhancing customer-relationship management, research and discovery, and businesses processes, as well as group collaboration for design and other purposes.

Today’s KM Technology

There are a number of narrowly focused new products with specific functionalities, such as document indexing, that can be useful in KM applications.

Meanwhile, Internet-enabled KM products let employees in different locations share information and let companies gather and index important information from sources scattered across the Web.

Leading vendors of commercial KM systems include Autonomy, Business Objects, Cognos, Hewlett-Packard, Hummingbird, and Invention Machine. Some companies also use custom-built KM applications.

Innovative KM

Today’s KM products use a number of innovative techniques. For example, the underlying technology is evolving beyond simple Boolean searches so that companies can automatically classify information more usefully and employees can find relevant information more reliably.

Two technologies illustrating this trend are Autonomy’s Bayesian probabilistic search-based ActiveKnowledge technology and Invention Machine’s semantic-processing technology.

ActiveKnowledge. David Appelbaum, Autonomy’s director of product marketing, said, “Our core technology is a probability and statistical-analysis engine. We analyze any kind of unstructured information and identify the parts that form ideas. Using statistical analysis, we come back with a high probability that a document is about a certain concept.”

Users can submit a document and ask ActiveKnowledge to find other documents on similar topics in databases and on the Internet. Autonomy’s technology analyzes the frequency of character strings in documents that it finds to determine which strings address the same topics as the submitted document.

Invention Machine. Invention Machine released its first semantic-processing engine, TechOptimizer, in 1995. Several companies, including Intel, have used it to find information that helped them develop new products.

The company also uses its technology in new products, Knowledgist and Co-Brain, for the individual and the enterprise, respectively.

Ellen Dorian, Invention Machine’s director of marketing, said, “Our technology takes a large collection of documents, and picks out the fundamental keywords that relate to the meaning and relationship of objects in a sentence.”

The software semantically analyzes documents by breaking sentences into noun-verb-adjective trees and then applying such tools as synonym indexes.

Challenges and Obstacles

Although KM technology is improving, it faces several hurdles to widespread adoption.

For example, Bain & Co.’s survey of US IT executives found that 18 percent of respondents discontinued KM projects in 1999, almost twice the average for all tools addressed in the survey.

IBM’s Prusak said two main reasons KM systems have failed are that users either managed documents and systems, rather than meaningful knowledge, or they did not carefully determine their goals before implementing projects.

For example, said Bain & Co. analyst Darrel Rigby, some companies have collected every scrap of information about a topic and put it into their KM systems, creating an unmanageable and expensive project.

“Most knowledge-management programs have failed,” he said, “because the financial and organizational costs swamped the benefits, usually as a result of inadequate attention to strategic priorities.”

Security

One potential problem with KM products is that they can open a security back door, enabling hackers to gain access to a system.
In response, many companies survey their systems to determine the information that needs to be secured. They can then implement security tools, including those that run on top of file systems and define different security-clearance levels for various types of users.

**Overemphasis on technology**

Some organizations have gotten carried away with KM technology and failed to focus on the methodology.

“Technology is a key ingredient, but it is not the heart of KM,” said IBM’s Prusak.

The technology will merely implement the knowledge-gathering, -classification, and -distribution methodologies an organization uses. Without a sound methodology, it will be difficult for KM technology to meet the goals of obtaining good content and making it available in a form useful to the organization, said Bain & Co.’s Rigby.

**Getting employees to input knowledge**

Organizations sometimes have trouble getting employees to regularly enter and update information in KM systems. Employees frequently complain they either don’t have time or don’t want to share information they have developed.

“The big issues that everyone talks about are the cultural ones,” Ovum’s Pelz-Sharpe said. “Prying knowledge out of people is tough.”

David Gilmour, CEO of Tacit Knowledge Systems, added, “The people you most want to share information have the least time to do that.”

Tacit has developed the KnowledgeMail family of products to address some of these concerns. The proprietary technology, using advanced statistical techniques, analyzes e-mail and saved documents to determine employees’ knowledge, skills, and work focus. KnowledgeMail then distills this information into profiles, which companies can use to determine employee expertise.

Gilmour said the profiles are encrypted and stored and cannot be accessed by anyone but the user or people authorized by the user.

**Lack of standards**

Some industry observers say the lack of standards is fragmenting deployment of enterprise-wide KM products.

Microsoft and Lotus are working on the Tahoe and Raven projects, respectively, to standardize various aspects of KM functionality, such as document sharing and collaboration.

Stowe Boyd, chief knowledge officer at the Knowledge Capital Group, said the initiatives are taking similar but not necessarily compatible approaches to creating a comprehensive architecture that lets companies manage data flow and plug in various tools for facilitating KM.

**WILL KM BE OK?**

Bain & Co. surveys of US executives indicate that only 29 percent of respondents used KM in 1999, a slight increase from 27 percent in 1996 and 1997 and 26 percent in 1998. However, the 1999 survey indicated that 44 percent of respondents planned to use KM in 2000.

As Figure 2 shows, Ovum projects that between 1999 and 2004, the market for KM software will grow from $515 million to $3.5 billion, and the market for KM services will increase from $2.6 billion to $8.8 billion.

Meanwhile, increased network bandwidth and faster servers with more storage capacity will let companies incorporate video and voice into the KM infrastructure, said Mark Meyers, director of product marketing at Excalibur Technologies, which makes knowledge-retrieval products such as RetrievalWare and Screening Room. The latter already supports video-file indexing and management.

Other experts say methodology improvements will contribute more to KM’s evolution than technology improvements.

It is possible, Prusak said, that KM “could go the way of reengineering, which became a fad.”

Bain & Co. partner Mark Horowich said the approach could become a fad if companies believe they can simply install some hardware and software and make KM happen. He said KM will succeed only if companies have knowledge-management processes, as well as technologies, that improve the company’s operation.

Moreover, Prusak said, “In order to take off, there will need to be successful cases that show that KM is the right thing to make a more profitable and effective organization.”

“Back in 1986-1987,” Meyers said, “people were saying this is a management fad. But it has really become persistent. I think it will simply be integrated into overall management practices as a recognized part of doing business. It is intrinsic to maintaining the value and competitiveness of a company.”

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