
Managing organizational knowledge as a strategic asset

Audrey S. Bollinger and Robert D. Smith

The authors

Audrey S. Bollinger is an Instructor in Management Information Systems at The Pennsylvania State University, DuBois, Pennsylvania, USA.

Robert D. Smith is Professor of Management and Leadership in the Graduate School of Management, Kent State University, Kent, Ohio, USA.

Keywords

Knowledge management, Organizational learning, Assets, Strategic management, Resource management

Abstract

Knowledge is a resource that is valuable to an organization's ability to innovate and compete. It exists within the individual employees, and also in a composite sense within the organization. According to the resource-based view of the firm (RBV), strategic assets are the critical determinants of an organization's ability to maintain a sustainable competitive advantage. This paper will combine RBV theory with characteristics of knowledge to show that organizational knowledge is a strategic asset. Knowledge management is discussed frequently in the literature as a mechanism for capturing and disseminating the knowledge that exists within the organization. This paper will also explain practical considerations for implementation of knowledge management principles.

Electronic access

The current issue and full text archive of this journal is available at

<http://www.emerald-library.com/ft>

Introduction

Knowledge is a critical factor affecting an organization's ability to remain competitive in the new global marketplace. Organizations therefore need to recognize it as a valuable resource and develop a mechanism for tapping into the collective intelligence and skills of employees in order to create a greater organizational knowledge base. Knowledge management accomplishes this goal.

In one sense, knowledge management has existed for many years. Yet it is only within the past few years that it has gained noteworthy attention. Some practitioners question whether it is yet another management fad or whether the concept truly has strategic value for the firm.

A review of current literature reveals numerous definitions of knowledge management due to the wide range of interests, perspectives, and issues represented by various authors. There is also much variation in what organizations refer to when they initiate knowledge management programs. Because so many different disciplines are interested in knowledge management, the resulting ambiguity in terminology leads to fragmented dialogue on the topic.

In addition to the technological and systems variables involved in any type of management process, there is also the human aspect. This paper combines the resource-based view of the firm (RBV) and the assertion that employee know-how and organizational culture possess the characteristics of strategic assets (Michalisin *et al.*, 1997). Our goal is to demonstrate that organizational knowledge possesses the characteristics of a strategic asset and thus contributes to competitive advantage. In addition, a discussion of current knowledge management theory and group dynamics will illustrate which types of knowledge can and should be managed.

The first section of this paper describes the different types of knowledge. The second discusses knowledge management, what it is and how it should be managed. The third section explains why organizational knowledge possesses the characteristics of a strategic asset and discusses its relationship to sustainable competitive advantage. The fourth section provides practical examples and some of the barriers to implementing knowledge management systems. In the

concluding section we offer suggestions regarding implementation of knowledge management in organizations.

Definition of knowledge

First we make a critical distinction between information and knowledge. Information is processed data and can reside within computers. Because of the far-reaching effects of globalization, it is increasingly available to everyone (Harari, 1997). Humans inherently possess knowledge (Malhotra, 1998). We define knowledge as the understanding, awareness, or familiarity acquired through study, investigation, observation, or experience over the course of time. It is an individual's interpretation of information based on personal experiences, skills, and competencies.

To the organization, knowledge is defined as what people know about customers, products, processes, mistakes, and successes (Grayson and O'Dell, 1998). It resides in databases or through sharing of experiences and best practices, or through other sources both internal and external to the organization. Organizational knowledge accumulates over time, and enables firms to attain deeper levels of understanding and perception that lead to business astuteness and acumen, all characteristics of wisdom. Wisdom is acquired as organizations gain new knowledge through the transformation of collective experiences and expertise. A model of this process is illustrated in Figure 1. Each stage requires processing and transforming that which was acquired in the previous step to achieve growth and learning.

Types of knowledge

There are two types of knowledge, explicit and tacit. Explicit knowledge is clearly formulated or defined, easily expressed without ambiguity or vagueness, and codified and stored in a database. Tacit knowledge is the unarticulated knowledge that is in a person's head that is often difficult to describe

and transfer. It includes lessons learned, know-how, judgment, rules of thumb, and intuition (Grayson and O'Dell, 1998). There are so many nuances involved that it can be difficult, if not impossible, for individuals to describe what it is that they know. However, the sharing of tacit knowledge is a key characteristic of team-based, learning organizations.

Wiig *et al.* (1997) identify several additional characteristics of knowledge that set it apart from other resources. To them, knowledge is intangible and difficult to measure, volatile, increases with use, can be used by different processes at the same time, often has long lead times, is usually embodied in agents with wills, and has wide-ranging impacts on the organization.

Knowledge management

Organizations are interested in managing knowledge for several reasons. Core competencies are based on the skills and experience of the people who do the work, and may not exist in physical form (Manville and Foote, 1996). Therefore, it is important that organizations find a way to tap into this knowledge base in order to preserve and expand their core competencies. Some believe that knowledge is the driving force in today's economy. If this is true, then it becomes critical for an organization to find ways of accessing existing knowledge and creating new knowledge. Certainly, effective management of knowledge will enable an organization to provide better customer service.

When knowledge within the organization is shared, it becomes cumulative. It becomes embedded within the organization's processes, products, and services (Demarest, 1997). Grant (1997) asserts that tacit knowledge is demonstrated only in its application. The goal should not be to capture what everyone knows so that everyone has the same knowledge, but to combine the various levels of expertise present to create new organizational knowledge. This will require networking and communication channels that encourage sharing and collaboration.

As noted by Wiig *et al.* (1997), the term "management" implies that "something" has to be managed, and by extension, that "something" is an object. An object is usually

Figure 1 Model of learning progression



presumed to be tangible – something concrete that can be observed with the senses. However, knowledge is not tangible, but it is measurable. An individual's knowledge is a part of who he or she is. Organizational knowledge is also intangible. It defines the organization, and is a reflection of the organizational culture.

Knowledge management is usually concerned with capturing an organization's know-how and know-what through creation, collection, storage, distribution, and application (Miller, 1999). It means identifying and harnessing the collective knowledge of the organization gained through experience and competencies.

Wiig (1997) has identified two objectives of knowledge management:

- (1) to make the organization act as intelligently as possible in order to secure its viability and overall success; and
- (2) to otherwise realize the best value of its knowledge assets.

If this is the case, then the goal of knowledge management for an organization should be to create a learning organization that is capable of measuring, storing, and capitalizing on the expertise of employees to create an organization that is more than the sum of its parts.

There are currently three major schools of thought on what knowledge management is (Poynder, 1998). One school suggests that knowledge management is primarily an information technology issue, with networks of computers and GroupWare being the keys. If you build extensive computer networks and add communications tools that allow group collaboration, people will be more inclined to share information and knowledge. A second school suggests that knowledge management is more of a human resource issue with emphases on organizational culture and teamwork. A strong, positive organizational culture is critical to promoting learning, development and the sharing of skills, resources, and knowledge. The third school promotes the development of processes to measure and capture the organization's know-how. Processes do not necessarily need to involve the use of information technology.

The definition of knowledge management as used in this paper is:

... the identification and communication of explicit and tacit knowledge residing within processes, people, products, and services.

There are several benefits of knowledge management that can be anticipated (Lank, 1997). Employees will spend less time looking for information and expertise. This will enable highly paid professionals to concentrate on their areas of expertise. A knowledge management process will help employees to improve their performance and employability, by expanding resources immediately available to them and enabling them to make more intelligent decisions. An effective knowledge management process will also generate less stress for employees trying to do more with fewer resources. Knowledge management will help organizations become more competitive by using new knowledge to reduce costs, increase speed, and meet customer needs (Grayson and O'Dell, 1998).

Organizational knowledge as a strategic asset

In the literature, employee know-how and organizational culture are said to possess the characteristics of strategic assets (Michalisin *et al.*, 1997). Employee know-how is one component of organizational knowledge and a crucial strategic resource (de Hoog and van der Spek, 1997). If the process of knowledge management is a function of the organizational culture and employees' collective knowledge, then it follows that organizational knowledge is almost certainly a strategic asset.

To be a strategic asset, the resource must possess four characteristics[1]. It must be:

- (1) valuable;
- (2) rare;
- (3) inimitable; and
- (4) nonsubstitutable.

We argue that it is the collective and cumulative organizational knowledge embodied in wisdom rather than the knowledge of mobile individuals that is a strategic asset. Organizational knowledge meets the characteristics of a strategic asset in the following ways. It is:

- *Inimitable*: each individual in the organization contributes knowledge based on personal interpretation of information. Group interpretations and assimilation of knowledge are dependent on the synergy of the total membership of the group. In addition, organizational

knowledge is built on the unique past history of the organization's own experiences and accumulated expertise. Therefore, no two groups or organizations will think or function in identical ways.

- *Rare*: organizational knowledge is the sum of employee know-how, know-what, and know-why. Since it is dependent on the knowledge and experiences of current and past employees, and is built on specific organizational prior knowledge, it is rare.
- *Valuable*: new organizational knowledge results in improved products, processes, technologies, or services, and enables organizations to remain competitive and viable. Being the first to acquire new knowledge can help the organization attain a valuable strategic advantage.
- *Nonsubstitutable*: the synergy of specific groups cannot be replicated. Thus the group represents distinctive competence which is nonsubstitutable.

Based on the logic of the preceding paragraphs, organizational knowledge is a strategic asset. This conclusion then suggests that organizations that wish to remain competitive should develop mechanisms for capturing relevant knowledge, and disseminating it accurately, consistently, concisely and in a timely manner to all who need it.

How are organizations managing knowledge?

There are many techniques and technologies currently being used to manage knowledge. Some organizations are concerned mainly with capturing explicit knowledge and others are attempting to collect tacit knowledge through the use of expert systems and artificial intelligence. Knowledge-based systems (KBS) perform knowledge processing based on expert systems or deductive databases to help users find acceptable solutions to problems (Hayes-Roth and Jacobstein, 1994; Wielinga *et al.*, 1997; Basu, 1998). This approach allows firms to capture knowledge by culling it from experts. Limitations to implementation include the need to overcome cultural barriers related to

giving up information and relatively high expenses.

Collaborative hypermedia (Shum, 1997) is good for informal knowledge types and linking ideas without specifying relationships or roles. It is useful for documenting discussions and related documents for organizational memory. Learned lesson databases involve articulation of the assumptions and processes that are followed when determining a solution to a particular problem, in a format that can be later retrieved. These types of systems are software and database tools that capture and codify tacit knowledge.

Intelligent tools can be used to anticipate user needs and to cull new knowledge from existing knowledge bases. Collaboration tools such as GroupWare are useful for facilitating team meetings, particularly when project teams are composed of participants from diverse locations. Important computer information technology tools being used to manage knowledge are listed in Table I.

Most knowledge management systems involve some aspect of computer information technology. However this is not a prerequisite. Organizational knowledge can be effectively managed by employing traditional mechanisms such as cross-functional project teams. Formal mentoring programs will allow senior employees to share their expertise with junior employees. Some mechanisms, such as project management systems or customer management systems, employ a mix of technology and non-technology. These tools are identified in Table II. It should be noted that there is no "one-size-fits-all" solution for knowledge management although some software products are represented in that manner.

Barriers to effective knowledge management

Most of the barriers to effective knowledge management involve people. Humans are complex with diverse psychological needs. Most knowledge management systems require that data and documents be stored in knowledge bases. From an organizational perspective, the process of building these knowledge repositories can be very time-consuming, labor intensive, and costly. People are already busy, and sharing

Table I Computer information technology tools for knowledge management

Tool category	Tool
Hardware technologies	Investment in information technology (IT) Networks Intranet
Software and database tools	Knowledge-based systems (KBS) Collaborative hypermedia for documentation of discussions Learned lessons databases Data warehouses Databases for classification, codification, and categorization of information Storage of e-mail threads to create a repository of best practices Corporate memory databases also known as knowledge archives Corporate yellow pages such as the Deere & Co. "People who know" project (Stewart, 1997) Employee home pages on an intranet
Collaboration tools	Electronic meeting systems Video-conferencing GroupWare Electronic bulletin boards
Intelligent tools	Decision support tools using neural networks Virtual reality Genetic algorithms Intelligent agents Internet search engines Knowledge mapping

Table II Technology/non-technology tools for knowledge management

Tool category	Tool
Non-technology mechanisms	Formal mechanisms for sharing information Research and development (R&D) management Cross-functional project teams Formal mentoring program
Mechanisms involving both technology and non-technology	Project management systems Customer management systems Vendor management systems

knowledge may mean changing the way they work or adding extra steps to the process to extract the data and enter it into a repository (Cole-Gomolski, 1999). There has been a proliferation of jargon concerning knowledge management, which adds to the confusion. In addition, there have been significant limitations to the achievement of knowledge processing and knowledge-based systems (KBS) to date. Tools of knowledge engineering are being adapted for use in knowledge management but the technology is not yet sophisticated enough for large-scale application. Keeping track of discussions, decisions, and their rationale can be difficult when teams work on temporary projects (Shum, 1997). It is difficult to codify tacit

knowledge. In addition, knowledge is constantly changing both at the individual and organizational levels. The gap between what people actually do to perform their jobs and how it is documented is difficult to bridge due to the spontaneous actions people take in response to unexpected challenges and problems (Brown and Duguid, 2000). Knowledge bases that require a great deal of upkeep may tend to fall into disuse and decay due to obsolete information. Also, information taken out of context can be misleading and misinterpreted (Shum, 1997). Sometimes, too much information is available, and people are unable to assimilate it due to sheer volume and lack of appropriate tools. This results in information overload, frustration and demoralization. If workers do not see the benefits of the application, they will not use it (Cole-Gomolski, 1997).

From a team/group perspective, team members may be reluctant to share knowledge if they fear criticism from their peers, or recrimination from management. There may also be subversion of group efforts if there is a lack of respect, trust, and common goals. Reward systems are sometimes based on what a person knows and individual effort, and may be a source of advancement within

an organization. One way to overcome this is to reward information sharing, but this can be difficult to measure. Once a reward system has been instituted, the quantity of knowledge shared is likely to increase, but the quality may decrease (Scheraga, 1998).

At the individual level, people are often reluctant to share information. Professional knowledge is perceived as a source of power (Quinn *et al.*, 1996). There is a sense of worth and status to be gained because of expertise. People tend to have feelings of “ownership” and hoard knowledge (Cole-Gomolski, 1997). There can also be fear that there will be a diminished personal value after giving up know-how (Hibbard and Carrillo, 1998). In addition, competition among professionals can be intense. Many professionals have little respect for others outside their field. People are very mobile. Thus knowledge is volatile and vulnerable to loss (Jordan and Jones, 1997).

In light of the aforementioned obstacles, we conclude that organizational culture plays a primary role in the likelihood that employees will be willing to work together and share their knowledge. If the culture is not supportive, or the reward system favors only individual effort, it may be difficult to get people to work together. There may be fear of criticism from peers or management. Some organizations use a chief knowledge officer (CKO) to coordinate the knowledge management effort. However, this could send the wrong message (Cole-Gomolski, 1999) since most knowledge sharing occurs within business units. Also, knowledge management implies controlling people, and if that is the employees’ perception, it will be destined to fail (Manville and Foote, 1996). High levels of motivation, creativity, and adaptability are required for the “care-why” level of knowledge to exist (Quinn *et al.*, 1996). This in turn is dependent on the culture of the organization. People will not use the technology, and may even subvert it, if there is a lack of trust and respect, and if they sense a lack of interest in common goals (Carayannis, 1998). Some of these problems may be averted if knowledge management is implemented within a business unit rather than organization-wide. Some of the cultural barriers about sharing information can be eliminated if a team approach is used. The major barriers to knowledge management implementation are shown in Table III.

Discussion

If organizational knowledge is a strategic asset, then the method used to implement a knowledge management system is critical. Wiig (1997) has identified five strategies that are used by organizations to implement knowledge management systems. Some pursue knowledge as a business strategy, where the focus is on knowledge creation, capture, organization, renewal, sharing, and use at each point of action. Second is the focus on intellectual asset management such as patents, technologies, structural knowledge assets, customer relations, operations, and management practices. A third method is to focus on a personal knowledge asset accountability strategy. Here, each employee is responsible for his/her own knowledge-related investments, renewal of knowledge, and sharing of knowledge assets within the employee’s area of accountability. A fourth strategy is the knowledge creation strategy, with a focus on organizational learning, research and development, and employee motivation to innovate and learn. The fifth strategy is the knowledge transfer strategy. Here the emphasis is on systemic approaches to transferring knowledge, such as acquisition, organization, restructuring, warehousing, and repackaging for distribution to the point of use. The specific method selected by an organization differs based on the individual business and its unique needs.

Wiig (1997) also indicates that management needs to focus on four particular areas. They must initiate governance functions of top-down monitoring of systems and processes to facilitate knowledge-related activities. This can include implementing incentives to encourage knowledge sharing, identification and management of knowledge assets, and restructuring operations and organization if necessary. Management also needs to focus on the staff functions involved in the creation and maintenance of a knowledge infrastructure. This could include a lessons-learned program, implementation of knowledge bases, and professional resource pools. A third area of focus is on the managerial responsibility for operational functions to create, renew, organize, and transfer knowledge assets. This includes activities such as education and training of employees, research and development, acquisition and transformation of knowledge,

Table III Barriers to KM implementation

Barriers to effective knowledge management	
Organizational perspective	Time-consuming, labor intensive, costly to build knowledge base People are busy, and KM may involve additional work Limitations to KBS technology Temporary project teams difficult to track Information can be taken out of context Information overload Workers see no benefit to system Difficult to codify tacit knowledge Proliferation of jargon KM implies controlling people Strong positive culture is needed for care-why to exist Having a chief knowledge officer (CKO) sends the wrong message
Team/group perspective	Reward for individual effort will encourage hoarding of knowledge Fear of recrimination and criticism for peers and management Lack of respect for other disciplines Will subvert efforts if lack of respect, trust and common goals Additional work is required to document team processes
Individual perspective	Reluctance to share information knowledge is source of power, advancement, or reward/punishment Competition among professionals Rewarded for know-what Sense of worth and status because of expertise Fear of diminished personal value if give up know-how

and innovation. The fourth area of focus is where the value of knowledge is realized by leveraging knowledge assets. This means that knowledge assets are distributed and applied effectively. This focus includes collaboration, use of best knowledge and best practices, and knowledge sharing.

We suggest that instead of being a management focus (e.g. chief knowledge officer), perhaps the coordination of a knowledge management implementation effort should be a human resources (HR) function. This department is not competitive with other organizational functions, and its responsibilities cross all departmental boundaries. HR usually has responsibility for employee selection, job design, succession planning, designing and administering compensation and reward systems, as well as maintaining data on employee skills and education. HR is in an excellent position to promote a culture that supports knowledge management by designing compensation and reward systems that nurture and encourage knowledge sharing, and by educating employees about knowledge management and its benefits (Greengard, 1998). The knowledge management process is not so

much about control as it is about sharing, collaboration, and making the best possible use of a strategic resource.

Leadership's primary focus should be on establishing a culture that respects knowledge, reinforces its sharing, retains its people, and builds loyalty to the organization. The loyalty and caring of a workforce organized in teams that share individualized know-how comprise the heart of long-term competitive advantage. Whereas traditional knowledge management systems focus on know-what and know-how, loyalty and caring reflect the care-why, which is the essence of a successful knowledge management system.

A second area of focus should be on ensuring that line supervisors receive adequate training, empowerment, and support to promote the desired culture. Often the changes desired by leadership do not filter down to the lower levels of the organization. Third, leadership should focus on establishing a knowledge infrastructure and support system that enhances and facilitates the sharing and application of knowledge at the appropriate levels. Sociotechnical systems theory suggests that changes to the social system should occur in parallel with changes

to the technology infrastructure. Carayannis (1998) suggests that knowledge management represents a sociotechnical system of explicit and tacit business policies and practices.

Organizations should use the technology to increase efficiency and innovation in order to improve operations.

The knowledge management process cycle, as developed by van der Spek and de Hoog in 1995, typically follows four phases (Wielinga *et al.*, 1997; Wiig, 1997). The cycle consists of four tasks, to:

- (1) conceptualize;
- (2) reflect;
- (3) act; and
- (4) review.

Conceptualization refers to the process of identifying, representing, and classifying knowledge with respect to organizational processes and employees. The outcome for this phase is a model of the current knowledge infrastructure. Reflection involves an analysis of strong and weak points, and determining where opportunities for improvement to the knowledge infrastructure lie. The outcome for this phase is the design of a new infrastructure. The act phase consists of the actual consolidation, integration, development, and distribution of knowledge. The outcome for the act stage is the actual implementation of a new knowledge infrastructure. The fourth phase of the knowledge management process cycle is the review of the results of actions taken, using assessment criteria. Criteria should consider whether the infrastructure contains the right knowledge, whether the knowledge infrastructure is stable or susceptible to change, whether it is in a form that permits easy use, and whether the people who need the knowledge can easily access it (Wielinga *et al.*, 1997).

However before conceptualization can occur, an organization must have experience. We suggest that the knowledge management process cycle is actually a reflection of the cycle of organizational learning. Kolb's (1976) adult learning model whereby knowledge is created through the transformation of experience can also be applied to organizations. In step 1, the organization engages in concrete experience, where it gathers knowledge based on the experiences and expertise of its people. Step 2 involves reflective observation, in which the

organization analyzes the current infrastructure from a sociotechnical viewpoint to ensure systems are sufficient to meet the needs of the organization and encourage knowledge sharing. In step 3, we engage in conceptualization to determine an appropriate course of action. Step 4 involves active experimentation, where we implement our plans for the knowledge infrastructure. This process is cyclical, since learning occurs as a continual loop.

The success or failure of an organization's knowledge management cycle rests more heavily on the company's ability to manage and motivate its employees, as people are at the heart of the knowledge management philosophy. Organizational culture is critical to promoting learning and development, and the sharing of skills, resources, and knowledge. As noted in some of the barriers to implementation, employee attitudes are shaped to a large extent by the organizational culture. In the study of group dynamics, there is general acceptance that behavior is a function of the person and the environment. Interaction is the key in managing knowledge. Innovation, cooperation, and teamwork thrive in a strong, positive, supportive culture. Assessment of organizational culture will identify any barriers to knowledge sharing. For employees to feel comfortable sharing what they know, the culture must exude trust, honesty, respect, and integrity. Although this environment might seem to be somewhat Utopian, knowledge creation, innovation, and customer collaboration depend on integrity (Miller, 1999). Integrity is the unity or totality of thoughts and actions that is reflected in honesty and adherence to an authentic code of values. This in turn will be reflected in the organizational culture.

A practical example of modern knowledge management is found in the Zara Corporation, a chain of 937 retail stores located in 31 countries. Zara competes side by side with GAP in large malls throughout Europe and Asia. Unlike other fashion retailers, Zara uses an accelerated fashion schedule to take a trend from "catwalk to store shelf" in as little as two weeks. GAP takes about a year to do the same.

Zara uses a knowledge management system to achieve its rapid time to market cycle time. According to Echikson (2000), the chain's most potent advantage is its army of sales personnel who serve as grass roots market

researchers. Each one carries a Casio wireless organizer that is used to communicate trends, customer feelings and orders. If a new item does well, designers know immediately and can churn out new versions in a week. (Of course, the opposite also holds true.)

Suggestions for action

Knowledge management should be directed at two goals:

- (1) effectively managing explicit knowledge in the form of know-what, know-how, and know-why with easily accessible databases and systems; and
- (2) ensuring that a supportive culture will encourage and facilitate the sharing of tacit knowledge (care-why).

To that end, we are managing information and communication. This will be reflected in the organization's processes.

The following process is offered as a guide for actions that should be considered when implementing a knowledge management system:

- (1) Assess the organizational culture to ascertain the values, mind sets, behaviors, and outputs. Determine whether some areas may need reengineering. Areas to consider are organizational structure, reward system, networks available, and performance appraisals (Miller, 1999).
- (2) Identify stakeholders. Determine who needs to know. When do they need it? How do they get the knowledge they need now? What can be done from a human resource perspective to facilitate the acquisition and transfer of the knowledge needed? Establish buy-in from those involved ensuring cooperation and contribution.
- (3) Determine what knowledge or types of knowledge are critical to the organization. For example, is the interest primarily in knowledge assets (intellectual capital) such as patents, trademarks, etc., or is it in capturing idea-generating processes? Is the concern with product-related knowledge, or strategy?
- (4) Determine where the knowledge currently resides, i.e. databases, people, documents, and external sources. Is it available internally now, or will an investment in people or equipment be

necessary? Does it come from communities of practice? If so, how can other such groups be encouraged?

- (5) Determine how the knowledge is created. What processes are currently in place for generating new knowledge? Are they formalized, or haphazard and incidental?
- (6) Select a business area or process to initiate knowledge management. Keeping the project small will help to keep it focused, and will enable management to better assess the success/failure of the program. Scheraga (1998) suggests breaking the value chain into discrete pieces from raw materials through distribution and examining the knowledge involved in each piece in order to determine which aspect to focus on first. The Dow Chemical Company chose to start with an area within the corporation that was familiar to many, had a high probability of success, would be an obvious value contributor, and could be implemented quickly (Petrash, 1996).

The process is evolutionary. Sustainable change cannot be expected to happen immediately (Petrash, 1996). It must be supported by top management to ensure that interest is not lost, and that the effort is not pushed on to a back burner to fade away. It also needs to have user support, which can be accomplished by involving users in the development process (Cole-Gomolski, 1997). There is danger in making the knowledge management process too complicated. It needs to be natural and easily engage participants, not difficult to implement or maintain, or bogged down in rules and process, or it will be abandoned.

To facilitate the capture of tacit knowledge, teams made up of people with the expertise to get the current project done should be selected. Ideally, employees should not be mandated to be on project teams. Volunteers are preferable, because they will have more enthusiasm for the project. Tacit knowledge cannot be captured explicitly, but its sharing can be encouraged and facilitated. Promotion of communities of practice within the organization, with tools for collaboration accessible to users, will facilitate benchmarking and sharing of best practices, and promote organizational learning.

Incentive structures should reward the team, and encourage the “care-why”.

One thing managers can do to facilitate learning and the acquisition of new knowledge is to offer training to individuals in areas where knowledge is needed or desired. If the type of knowledge to be transferred is tacit knowledge, traditional training methods may not suffice. Tacit knowledge is difficult if not impossible to codify and store. For transferring tacit knowledge, active learning will be more effective (Ellerman, 1999). This can include the use of mentors, apprenticeship, imitation, and guided learning-by-doing. The active learning process outlined by Ellerman (1999) requires that the learner have an active role in acquiring the knowledge, rather than having it fed to them. Since learning is contextual and builds on prior knowledge, the new knowledge gained by the student will differ from that of the teacher.

Another step managers can take is to create an environment, systems, and internal processes that facilitate the creation and transfer of knowledge. One concept that is widely discussed in the literature is that of communities of practice. Communities of practice are informal groups of people who share their ideas and expertise, similar to professional organizations (Manville and Foote, 1996; Hibbard and Carrillo, 1998; Stewart, 1997). These groups encourage the development of a learning organization. The important knowledge is in the greater group and how it behaves (Dove, 1998). By storytelling and collaboration through chatting, participants can tap into each other's knowledge, thus transcending the organization's documented knowledge (Brown and Duguid, 2000). Communities of practice are usually drawn to each other by social and professional interests; they are not mandated to meet and discuss issues (Stewart, 1996). Although these groups are easy to destroy, human resources management can help them by recognizing their existence and facilitating communications. However for the most part, organizations are not aware of the importance of communication methods of knowledge workers, or the social processes of collaboration, sharing, and building on each other's ideas (Malhotra, 1998).

On the organizational level, research and development programs are valuable. They

provide a formalized mechanism for research and new knowledge generation. This can be valuable because these groups usually have access to funding and time, two factors that are usually missing in other types of groups.

The technology is a *tool* to help us capture and organize what we know, and enable collaboration among people who may not otherwise be able to discuss their ideas and problems. The type of technology used will be determined by the types of knowledge captured, and will be specific to the organization. If the goal is to capture tacit knowledge, the technology should be used to provide a means of communication to encourage networking and discussion groups of people with common interests or problems. Knowledge management systems are rooted in social interactions supported and encouraged by the technology (Tuomi, 2000). A mechanism for sharing information is the expert system. Expert systems are useful tools for disseminating knowledge. However, they represent past knowledge (Michalisin *et al.*, 1997).

Every organization needs to begin analyzing their organizational knowledge. As a strategic asset, it is the key to competitive viability and growth of the learning organization. The culture of the organization is a critical element in determining the success or failure of any knowledge management program. Trust and respect are necessary, as are authenticity, loyalty, and caring. There must be cohesion across the organizational structure and culture, people, processes, and technology (Quintas *et al.*, 1997). Together these elements can help the organization build synergy (Miller, 1998).

Note

- 1 For an excellent and thorough discussion of RBV, intangible resources, and strategic assets, see Michalisin *et al.* (1997).

References

- Basu, A. (1998), “Perspectives on operations research in data and knowledge management”, *European Journal of Operational Research*, Vol. 111, pp. 1-14.
- Brown, J. and Duguid, P. (2000), “Balancing act: how to capture knowledge without killing it”, *Harvard Business Review*, Vol. 78 No. 3, pp. 73-80.

- Carayannis, E. (1998), "The strategic management of technological learning in project/program management: the role of extranets, intranets, and intelligent agents in knowledge generation, diffusion, and leveraging", *Technovation*, Vol. 18 No. 11, pp. 697-703.
- Cole-Gomolski, B. (1997), "Users loathe to share their know-how", *Computerworld*, Vol. 31 No. 46, p. 6.
- Cole-Gomolski, B. (1999), "Knowledge 'czars' fall from grace", *Computerworld*, Vol. 33 No. 1, pp. 1, 13.
- de Hoog, R. and van der Spek, R. (1997), "Knowledge management: hope or hype?", *Expert Systems with Applications* (Guest editorial), Vol. 13 No. 1, pp. v-vi.
- Demarest, M. (1997), "Understanding knowledge management", *Long Range Planning*, Vol. 30, pp. 374-84.
- Dove, R. (1998), "Where is your group intelligence?", *Automotive Manufacturing and Production*, December, pp. 24-5.
- Echikson, W. (2000), "The mark of Zara", *Business Week*, 29 May, pp. 98-100.
- Ellerman, D.P. (1999), "Global institutions: transforming international development agencies into learning organizations", *The Academy of Management Executive*, Vol. 13 No. 1, pp. 25-35.
- Grant, R.M. (1997), "The knowledge-based view of the firm: implications for management practice", *Long Range Planning*, Vol. 30, pp. 450-54.
- Grayson, C.J. and O'Dell, C.S. (1998), "Mining your hidden resources", *Across the Board*, April, pp. 23-8.
- Greengard, S. (1998), "Storing, shaping and sharing collective wisdom", *Workforce*, October, pp. 82-8.
- Harari, O. (1997), "Flood your organization with knowledge", *Management Review*, November, pp. 33-7.
- Hayes-Roth, F. and Jacobstein, N. (1994), "The state of knowledge-based systems", *Communications of the ACM*, Vol. 37 No. 3, pp. 27-39.
- Hibbard, J. and Carrillo, K.M. (1998), "Knowledge revolution – getting employees to share what they know is no longer a technology challenge – it's a corporate culture challenge", *Informationweek* (Online), 5 January, No. 663, <http://techsearch.techweb.com>
- Jordan, J. and Jones, P. (1997), "Assessing your company's knowledge management style", *Long Range Planning*, Vol. 30, pp. 392-8.
- Kolb, D. (1976), "Management and the learning process", *California Management Review*, Vol. 18 No. 3, Spring, pp. 21-31.
- Lank, E. (1997), "Leveraging invisible assets: the human factor", *Long Range Planning*, Vol. 30, pp. 406-12.
- Malhotra, Y. (1998), "Knowledge management for the new world of business", @brint.com (Online). <http://www.brint.com/km/whatis.htm>
- Manville, B. and Foote, N. (1996), "Harvest your workers' knowledge", *Datamation* (Online), July, <http://www.datamation.com/PlugIn/Issues/1996/July/07know1.html>
- Michalisin, M.D., Smith, R.D. and Kline, D.M. (1997), "In search of strategic assets", *The International Journal of Organizational Analysis*, Vol. 5, pp. 360-87.
- Miller, W. (1998), "Fostering intellectual capital", *HRFocus*, January, pp. 9-10.
- Miller, W. (1999), "Building the ultimate resource", *Management Review*, January, pp. 42-5.
- Petrash, G. (1996), "Dow's journey to a knowledge value management culture", *European Management Journal*, Vol. 14, August, pp. 365-73.
- Poynder, R. (1998), "Getting to the nuts and bolts of knowledge management", *Information World Review*, April, p. 20.
- Quinn, J.B., Anderson, P. and Finkelstein, S. (1996), "Managing professional intellect: making the most of the best", *Harvard Business Review*, March-April, pp. 71-80.
- Quintas, P., Lefrere, P. and Jones, G. (1997), "Knowledge management: a strategic agenda", *Long Range Planning*, Vol. 30, pp. 385-91.
- Scheraga, D. (1998), "Knowledge management competitive advantages becomes a key issue", *Chemical Market Reporter*, Vol. 254 No. 17, 26 October, pp. 3,27.
- Shum, S.B. (1997), "Negotiating the construction and reconstruction of organisational memories", *Journal of Universal Computer Science*, Vol. 3 No. 8, pp. 899-928.
- Stewart, T.A. (1996), "The invisible key to success", *Fortune*, Vol. 134, 5 August, pp. 173-6.
- Stewart, T.A. (1997), "Does anyone around here know...?", *Fortune*, Vol. 136, 26 September, pp. 279-80.
- Tuomi, I. (2000), "Data is more than knowledge: implications of the reversed knowledge hierarchy for knowledge management and organizational memory", *Journal of Management Information Systems*, Vol. 16 No. 3, pp. 103-17.
- Wielinga, B., Sandberg, J. and Schreiber, G. (1997), "Methods and techniques for knowledge management: what has knowledge engineering to offer?", *Expert Systems with Applications*, Vol. 13 No. 1, pp. 73-84.
- Wiig, K.M. (1997), "Knowledge management: where did it come from and where will it go?", *Expert Systems with Applications*, Vol. 13 No. 1, pp. 1-14.
- Wiig, K.M., de Hoog, R. and van der Spek, R. (1997), "Supporting knowledge management: a selection of methods and techniques", *Expert Systems with Applications*, Vol. 13 No. 1, pp. 15-27.