INFORMATION MANAGEMENT: STRATEGY, SYSTEMS, AND TECHNOLOGIES

KNOWLEDGE MANAGEMENT AS A COMPETITIVE ADVANTAGE

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INTRODUCTION
The world is experiencing a dramatic shift toward knowledge-based organizations and a knowledge-based society. The importance of knowledge as a critical resource continues to gain recognition in the business world. According to Peter Drucker, knowledge is the only sustainable source for competitive advantage. The management of knowledge supports the competitive advantage of organizations. As of the mid-1990s, senior information systems (IS) executives perceived knowledge management to be among the most critical technologies that would drive business growth and innovation by the year 2000. Companies that develop best practices for managing knowledge capital will be the ones that ride the competitive wave. Furthermore, it is widely claimed that for organizations to have a lasting competitive advantage, they will have to be knowledge driven.

The term "competitive advantage" means anything that favorably distinguishes a firm, its products, or services from those of its competitors in the eyes of its customers or end users, in such a way that the consumer chooses to purchase that product or service over another. A monopoly has absolute competitive advantage.

PAYOFF IDEA
Peter Drucker stated in his book Post-Capitalist Society that "The basic economic resource is no longer capital, nor natural resources. It is and will be knowledge." Managers are trying to understand what this means as they move their companies and information technology departments from strategies of data management, to information management, to knowledge management. Organizations are now striving to establish knowledge management systems to assist in the dynamic business environment. This article provides definitions and discusses the relationship of data, information, knowledge, and knowledge management, in order to help organizations do so.
A firm operating in pure competition has none. Thus, one objective of any firm competing in the marketplace is to have a product, service, or strategy that makes the market choose that firm over all others. Organizations gain and sustain a competitive advantage via four basic strategies: (1) low-cost leadership, (2) focus on market niche, (3) product and service differentiation, and (4) linkages to partners.

The purpose of this article is to define knowledge management (KM) and its relationship to the traditional management information system (MIS), while identifying how KM can create a competitive advantage. To achieve a clearer understanding of knowledge, the concepts of data, information, knowledge, expertise, the “information food chain,” and their relationship to knowledge management are included.

**INFORMATION FOOD CHAIN AND KNOWLEDGE MANAGEMENT**

Writers in biology described the food chain to illustrate how larger and potentially more advanced species live off lesser species. In the field of information technology, the “information food chain” term is used to discuss the evolution of organizations’ emphasis on information that leads to competitive advantage. Exhibit 1 illustrates this chain, from the days before computers to now, when it is just becoming possible to extend past the classical definition of information. All references are to computer-based systems.

*Data* is defined as numerical or other information represented in a form suitable for processing by computers. Data is often the record or result of a transaction; that is, the facts of the activities of the organization. *Information*, in its simplest form, is processed data that is meaningful. By processing, summarizing, or analyzing data, organizations create information. Information may be viewed as a message that has a sender and receiver, and an intent to inform or change perspective. Therefore, because data is objective, information should be tailored to enhance or increase the understanding of the recipient, ultimately being tailored to the needs of the recipient. *Knowledge* is the state or fact of knowing; understanding gained through experience or study; the sum or range of what has been perceived, discovered, or learned. Knowledge can also be defined as the capacity and competence to perform, or the capacity to act. Thus, the contention is that knowledge is similar to potential ener-

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**EXHIBIT 1 — The Information Food Chain**

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data - information - knowledge - expertise
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Expertise has been defined as extensive, task-specific knowledge acquired from reading, training, and experience. It is expert advice or opinion: a skill or knowledge in a particular area that has been enhanced by depth of reading, training, and experience. While knowledge is the potential to perform, expertise includes the experience that enables superior performance. Accumulated knowledge and experience becomes expertise: the ability to apply knowledge in a variety of situations where the impact is effective and enables superior performance. Thus, it is knowledge with experience (i.e., expertise) that provides a competitive advantage. Exhibit 2 places these elements in perspective.

Each of the resources of data, information, and knowledge requires management. Resources always involve cost; however, effectively utilized resources may become an investment for the organization. The management of data has the specific intent of reducing the cost of activities. In the process of day-to-day operations, not only does every organization use data, but most have also developed computer-based systems for data acquisition, storage, and utilization (i.e., manipulation and display). Therefore, data management is an efficiency function. Most organizations are very comfortable in the belief that they have stable systems for managing data. This comfort level stems from the length of time these organizations have dealt with this resource. They have experienced the learning curve while acquiring systems that allow them to efficiently and effectively manage data resources. In addition, the maturity of data management is vital to conduct business (e.g., accounting functions).

**Traditional MIS**

Management information systems (MIS) are all systems and capabilities necessary to manage, process, transport, and use information as a resource to the organization. MIS are computer-based capabilities employed to collect, store, process, manage, and distribute data and
information for the organization. The management of information has the intent of better decision making. Therefore, information management is an effectiveness function. Finally, as presented herein, the management of knowledge supports the competitive advantage function of organizations. Therefore, knowledge management is a survival function.

By summarizing or performing other statistical functions on a group of data records, the organization is creating information. This process results in the reduction of bulk storage with the intent of increasing its content. Organizations began the attempt to create enterprisewide information systems during the 1960s with little success. This unsuccessful attempt was due to lack of resources and unclear directions. However, the problems are solved because organizations now have relatively stable information systems despite a turbulent environment. Although these systems are fairly structured and repetitive in nature, they support the decision processes at middle and upper management levels. This led to the requirement for information resource management (IRM): a collection of subfunctions, the objectives of which are to perform and manage the acquisition, storage, manipulation, retrieval, and communication (distribution) of information. The purpose of delivering information can be viewed as increasing the knowledge of the recipient.

Beyond Data and Information Management to Knowledge Management

Information systems have become essential to the modern organization. This is substantiated by the fact that many organizational theorists refer to current organizations as competing in the information society. Organizations are in the second phase of the information food chain because they formally and explicitly capture and manage information by way of computer systems such as management information systems, decision support systems, and expert systems. However, the information technology described thus far is only one element of that necessary to evolve further up the food chain, that is, onto knowledge and its management.

As stated earlier, knowledge is the state or fact of knowing; understanding gained through experience or study. Knowledge management (KM) is the utilization of “the collective knowledge, experience, and competencies available internally and externally to the organization whenever and wherever they are required.” It is the process of capturing a company’s collective expertise. Thus, just as data and information management were systems to capture, store, manipulate, and make available these resources, KM proposes to do the same with the more elusive resource of knowledge. This becomes even more important as the workforce ages and the human knowledge bases prepare to leave the organization.

Many leading firms are employing systems aimed at capturing critical knowledge, placing it in knowledge bases, and facilitating access for those in the organization who need to learn from and use that knowledge. One of the core principles of the KM movement is that of capturing
expertise and making it accessible to those in the organization who need it. The process of harvesting the knowledge of the expert and converting it to a form that is available and useful is the ultimate goal. The process is similar to the knowledge engineering activity in the expert system field.

To appreciate the problem with expertise retention or knowledge management, consider the dilemma that suddenly arises when a highly valued employee decides to leave the organization, due to retirement or other opportunities. One wants to retain that person’s expertise, generally viewed as his or her knowledge. A field that attempts to do this overtly is that of expert systems, where knowledge engineers interview the expert and attempt to embed his or her expertise into a computer-based system — often in the form of rules. The process is anything but simple because experts often do not know how they perform tasks, nor how they come to solutions.

Another facet of KM is capturing written but unformatted information and knowledge, such as that in departmental memos, or meeting notes that reside in notebooks and even on pieces of paper in desk drawers. Added to this is the unwritten information and knowledge which, as with expert systems, resides in the minds of employees, not as expert solutions to problems but as general expertise of organizational procedures. At one end is the “this is how we do things around here,” and at the other end is how one person captures a disproportionate portion of the market for a new item.

An informal form of a knowledge base is the personal information management (PIM) software for PCs. One form allows a user to enter text in any random format, such as names and telephone numbers, thoughts, observations, guesses, etc. When that person wishes to retrieve the knowledge, he or she enters a likely word and the system does a text search over the entire base. This qualifies as a knowledge base because it is personal information, gained through experience, providing expertise in specific areas.

To make a knowledge base valuable to the organization, it must capture knowledge from the entire organization and make it available to the same breadth of personnel. The access must be intuitive, just like the text search of the PIM. It must capture all forms of information and knowledge, which is a nontrivial undertaking because some of the forms are not computer storable. For example, movies and videotapes would have to be entered by way of text notations, which would lead the interested party to the appropriate resource.

**COMPETITIVE ADVANTAGE THROUGH KNOWLEDGE MANAGEMENT**

It was previously indicated that knowledge management would lead to a competitive advantage. Referring to Exhibits 1 and 2, one can see how the organization develops a competitive advantage, causing a customer
to choose one product or service over that of a competitor. Data management provides the element of efficiency, leading to lower costs — one form of competitive advantage. Information management directs the organization’s efforts to be more effective, providing the competitive advantage of niche markets and customer support. With knowledge management, the organization uses its history in terms of its learning to address the correct market, support customers more appropriately, and deal with competitors more aggressively. Where the information of competitors’ actions or even customers’ and vendors’ activities may not be appropriate for a database, it is very appropriate for a knowledge base. As those close to the market (such as customers, suppliers, and competitors) are able to store their information, knowledge, and expertise in a place and format that is retrievable by others, the idea of a competitive advantage becomes more apparent. Consider any environment in which there is something close to perfect information, tempered with experience, and one will be a fierce adversary; that is, one will have a significant competitive advantage.

CONCLUSION

The driving force behind any change in organizational processes or infrastructure is competitive advantage. The computer-based processes that started in the 1950s with data management are culminating in the area of knowledge management. Organizations have learned through failures as well as successes in managing data and information. These experiences are being recalled in an effort to manage what is now called the only corporate resource: knowledge. Large investments have and are continuing to be made in computer-based systems. To date, these investments have dealt with data, resulting in cost reductions; and information, resulting in better decisions. With the elicitation, storage, and application of knowledge, this large cost becomes an investment in the corporate future; that is, its competitive advantage.

Notes

Further Reading

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