

Implementing Knowledge Management

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Abstract

The growing reliance on intellectual assets to gain competitive advantage has necessitated the development and implementation of knowledge management systems in order to collect, organize and transfer all of the knowledge accumulated by modern organizations. This study is presented as a consolidation of previous research performed in this area, and integrates this work with a meta-analysis of two real life case studies. The corresponding results suggest that the tacit/explicit dimension of knowledge is a strong indicator of the type of knowledge management strategy a given company should follow.

Introduction

Knowledge management (KM) is one of the most innovative and important management concepts to emerge in the last 25 years.¹ KM reflects the high value of intangible assets, especially intellectual property. With the dawn of the Information Age, economists and business people have increasingly regarded intellectual property as the single most important asset of the firm, surpassing conventional balance sheet items such as land, labor, and capital. Because of the changing role of intellectual property, the astute management of knowledge has been dramatically amplified.²

Researchers in the field of strategic management agree on the key role of knowledge as a source of sustainable competitive advantage and economic prosperity in today's business environment.³ People inside the firm, along with the firm's various stakeholders, collectively know everything that the business needs to know.⁴ What an organization knows, how it uses what it knows, and how fast it can know something new dictate the extent of competitive gap that can be established in order to distance the firm from its competitors. From this perspective, knowledge serves as the very foundation upon which core competences are established.⁵ As such, the efficient management and processing of organizational knowledge have become critical to organizational success. From a strategic management perspective, what has been missing is a methodology for the systematic organization of all the knowledge accumulated by an organization, as well as a mechanism for tapping those mines of knowledge and efficiently transferring this knowledge within and between organizations.⁶

KM presents a solution to this dilemma. This study introduces the various aspects of knowledge management, and focuses on the tacit nature of knowledge and the impact that this dimension has on the efficient transfer of information between various organizational structures.

Conceptual Background

What is KM?

Knowledge management is a methodology that exercises a set of procedures and technology tools to provide an integrated, systematic approach to identifying, managing and sharing all of an enterprise's intellectual assets.⁷ Its primary function is to plan, implement, operate, and monitor all of the knowledge-related activities and programs required for effective intellectual asset management.⁸ At its core, the goals of KM are to make the collective information and experience of an enterprise available to the individual knowledge worker, and to facilitate and manage knowledge related activities such as the creation, capture, transformation, and use of knowledge.⁹

Businesses incorporating a KM philosophy capture the knowledge embedded within their organization.¹⁰ KM is a bottom up process that accounts for even the most minute bits and pieces of disparate knowledge scattered around a company, which add up to an enormous amount of knowledge. Managers need to learn what local knowledge exists. Then if the knowledge looks valuable, they need to put it into wider circulation.

The earliest adoption of KM was deeply rooted in computer and networking technology. It entailed sharing data via groupware systems, Internet portals, databases and corporate intranets.¹¹ Beyond consolidating data and offering unified search capabilities, these tools significantly improved the flow of information within an organization, ensuring its availability to the rest of the enterprise. The resulting benefits included better collaboration and sense of community, reduced redundancy on new bids and projects, faster time to market, and the ability to share past mistakes.¹² While these tools have proven to be extremely helpful in facilitating the sharing of knowledge, they should not be considered a panacea for all types of knowledge transfers.

Databases are the most basic of KM tools. As we shall see, hardware and software are actually quite limited as a transfer mechanism for certain types of knowledge. As an example, in practice, people working in small groups often develop very rich knowledge. Depending on the richness and complexity of this knowledge, a computer may or may not be the best vehicle for disseminating this information. The question then becomes, "How best to spread this local knowledge around into wider circulation." This is an issue requiring a broader perspective involving the communication and coordination within an organizational system. It is at this point that KM becomes a primarily a person-to-person activity that revolves around human relations.¹³

Intellectual Assets

During the latter part of the 20th century, developed economies have undergone a transformation from primarily raw material processing and manufacturing activities to the processing of information and the development, application, and transfer of knowledge. In advanced nations, these assets may take the form of a company's portfolio of patents, trademarks, trade secrets, copyright, processes, manuals, drawings, reports, research, technical data and other explicit proprietary information. Add to this list the historical and ongoing transactional data gathered through regular customer interaction - including best practices and competitive intelligence. Then there is the unspoken, tacit information residing within every employee's head - learned skills, intuition, experience and insights.

The development of many new products and markets increasingly exploit knowledge assets as their salient differentiating feature and source of competitive advantage. This development implies that intellectual assets now have greater upside potential than physical and financial assets. As such, it naturally makes good business sense to leverage every kernel of what a company knows, as well as the people who create, capture and use it to generate. As an asset, intellectual property should neither be ignored nor wasted. It should be nurtured, cultivated and harvested. To this end, effective management of intellectual assets has become a key component for establishing competitive advantage.

Types of Organizational Knowledge

Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information. It originates and is applied in the minds of knowers. In organizations, it often becomes embedded not only in documents or repositories but also in organizational routines, processes, practices and norms.¹⁴ Prior to initiating a rationale discussion on how knowledge is organized, assimilated, and transferred within and between organizational hierarchies, it is instructive to first break this definition down in order to gain an understanding of the different types of knowledge that exist within an organization. Certain types of knowledge lend themselves to communication and transfer better than others. We categorize organizational knowledge into information and know-how-based components.¹⁵

Polanyi defined tacit knowledge, or know-how, as knowledge that is nonverbalizable, intuitive, and difficult to articulate in a way that is meaningful and complete.¹⁶ Put another way, know-how is the accumulated practical skill or expertise that allows one to do something smoothly and efficiently.¹⁷ The term 'accumulated' implies

that know-how must be learned and acquired. Know-how is a description of knowing how to do something. The fact that we know more than we can tell speaks to the tacit dimension. Tacit knowledge is highly context specific and is usually acquired through personal experience.¹⁸ Examples of tacit knowledge include scientific expertise, operational know-how, insights about an industry, business judgement, and technological expertise.

On the other hand, explicit knowledge, or information, is knowledge that is capable of being communicated in a formal, systematic language and may include explicit facts, axiomatic propositions, and symbols. It can be codified or articulated in manuals, computer programs, training tools, and so on.¹⁹ Information includes all knowledge that can be transmitted without loss of integrity once the syntactical rules required for deciphering it are known.²⁰

A key challenge facing organizations is how to convert tacit knowledge to explicit knowledge. Knowledge that is tacit and highly personal has little value until it can be converted into explicit knowledge such that other members of the organization can benefit from it. The properties of tacit knowledge suggest that, compared to information, know-how is typically more valuable than explicit knowledge and more likely to result in advantages that are sustainable.²¹

Knowledge can be analyzed along other dimensions as well. Spender provided further granularity of tacit and explicit information. Explicit knowledge stored in databanks, standard operating procedures, manuals, and so on is known as objectified knowledge.²² Automatic knowledge is knowledge that is implicit that “happens by itself” and is often taken for granted.²³ Conscious knowledge may be codified, perhaps as a set of notes, and is potentially available to other people. Collective knowledge is tacit knowledge of a social or communal nature.

Codifiability of Knowledge

The transferability of a firm’s knowledge, whether it is in the form of information or know-how, is strongly influenced by its codifiability. Codifiability refers to the ability of the firm to structure knowledge into a set of identifiable rules and relationships that can be easily communicated.²⁴ Information is defined as being easily codifiable if it can be transmitted without loss of meaning or clarity once the rules required for deciphering it are known.

The ability to transform knowledge into a code understood by a wide set of users has some important implications. In order for a firm to prosper and grow, it must become efficient at replicating, or transferring knowledge. In order to accomplish this, the firm must develop a widely held and shared code by which it can coordinate large numbers of people across varied functions. From this perspective, knowledge transfer is simply the replication of existing activities. The goal of the firm is to reduce the costs of this transfer while preserving the quality and value of knowledge. Because personal and small group knowledge is expensive to re-create, firms may desire to codify and simplify such knowledge as to be accessible to the wider organization, as well as to external users.

Not all types of knowledge are amenable to codification. Information including facts, propositions, and symbols represent information that is easily codified. Conversely, know-how involves knowledge that is tacit, ‘sticky,’ complex, and difficult to codify.

There appears to be a simple but powerful relationship between codification of knowledge and the costs of its transfer. Uncodified, or tacit knowledge, is slow and costly to transmit.²⁵ Ambiguities surrounding interpretation abound and can be overcome only when communications take place in face-to-face situations. The transmission of codified knowledge, on the other hand, does not necessarily require face-to-face contact and can often be carried out largely by impersonal means, such as when one computer “talks” to another or when a technical manual is passed from one individual to another.

KM Strategies

For simplicity, two KM strategies will be discussed and their possible applications explored.²⁶ Some companies automate knowledge management; others rely on their people to share knowledge through more traditional

means. The codification strategy uses networked computers to codify and store knowledge while the personalization strategy relies on person-to-person contact to convey knowledge. The personalization strategy uses computers only as secondary communication support tools.

The rise of networked computers has made it possible to codify, store, and share certain kinds of knowledge more easily and cheaply than ever before. Explicit knowledge is carefully codified and stored in databases, where it can be accessed and used easily by anyone in the company. Companies that follow a codification strategy rely on the “economics of reuse.”

In contrast, some companies emphasize a personalization strategy. They focus on dialogue between individuals, not knowledge objects in a database. Knowledge that cannot be codified is transferred in brainstorming sessions and one-on-one conversations. The personalization strategy relies on the logic of “expert economics” to share advice that is rich in tacit knowledge. The process of sharing deep knowledge is time consuming, expensive, and slow.

Dilemmas Confronting KM

Management Buy-In

The greatest barrier to knowledge management is mustering support for it among IT managers and CEOs.²⁷ A study commissioned by Microsoft Canada Co. solicited inputs from 402 IT and business decision makers in organizations with no few than 50 personal computers. The study found that enterprise portals are among the most common means of implementing a knowledge management strategy for explicit knowledge.²⁸ While 91 percent of those surveyed agreed the KM practices had helped to improve organizational efficiency, only five percent were able to calculate a return on investment from their KM initiatives. Convincing high-ranking executives who are focused on their bottom line to invest time and capital into projects that typically yield a marginal ROI is a very tough sell.

Motivation To Participate

Mistrust within corporations and motivating members to participate and openly share valuable knowledge also represent significant challenges to KM.²⁹ For KM to be successful, sharing is essential, but sometimes difficult to implement. This is especially true in Old Economy environments where the culture of hoarding knowledge dominates and often remains a major obstacle. Many individuals and groups (especially those with proprietary know-how) are reluctant to participate in knowledge-sharing activities. The knowledge that is most likely to be valuable to others is often exactly the kind of knowledge that individual(s) want to keep proprietary. Most of these individuals have a tendency to treat knowledge as a personal asset rather than as something to share, i.e., to give away. There is a great deal of experience in trying to get personal knowledge out of people while developing expert systems. On the flip side, there are real problems in getting people to reveal tacit knowledge.

Knowledge is power. Many people believe that sharing knowledge is giving up their power.³⁰ In this respect, many corporate environments leave workers feeling vulnerable to the theft of their ideas - they’ve previously experienced managers and supervisors running with their ideas and getting the reward. Often there is a certain amount of gamesmanship going on where knowledge workers do not share as fully as they might in a different climate.

To overcome this problem, pockets of knowledge currently stored in personal vaults and segregated business units need to be opened and their contents disseminated across the entire organization. Such collaboration can’t happen unless top management commits the organization to the learning effort. KM requires the adoption of a culture dedicated to the creation and sharing of information by every individual in the company. KM invokes the use of technology in concert with a change in corporate culture to encourage employees to communicate openly and share their ideas and experiences for the good of the company. The biggest trick is finding a method to measure and reward participation, one that carefully balances monetary and other traditional incentives with recognition of the

value of teamwork and knowledge reciprocity. Installing the system is just the first step; persuading employees to adopt it is the real challenge.

Incentives

People need incentives to participate in the knowledge sharing process. The two knowledge management strategies outlined above call for different incentive systems. In the codification model, managers must develop a system that encourages people to take inventory of what they know and to enter this information into an electronic repository for the whole enterprise to access. Real incentives - not token rewards - are required to get people to take those steps.³¹ In fact, the level and quality of employees' contributions to the document database should be part of their annual performance review. Incentives to stimulate knowledge sharing should be very different at companies that are following the personalization approach. Managers need to reward people for sharing knowledge directly with other people. This can be accomplished by tying the amount of direct help provided to annual compensation.

South Korean fashion retailer E-Land has taken this approach. Their knowledge management incentive program is based on a points system. It gives employees an incentive to share what they know rather than hoard knowledge to protect their standing in the organization.³² E-Land requires every employee to submit a knowledge resume when they're being considered for a promotion. In addition, the extent to which an employee has shared knowledge constitutes a key part of their performance rating.

Free Riders

Another impediment to KM is the 'collective action' or 'free rider' problem associated with the collaboration of multiple self-interested parties with a common goal.³³ Successful collaboration may produce collective or public outputs (e.g., knowledge) that are accessible to all members of the collaboration. Free riders are members who enjoy the benefits of the collective good without significantly contributing to the end result.

Maximizing Efficiency

A successful KM program strives to reduce the costs associated with finding and accessing different types of valuable knowledge. This effort entails maximizing the efficiency of knowledge transfers among a large group of individual members. In this context, efficiency refers to the speed and ease with which network members can find and access valuable knowledge. Explicit knowledge may be easily codified and transferred in a group setting (e.g., through meetings), whereas tacit knowledge may require intense interaction and is likely to be successfully transferred only in a small group setting at the specific location where the knowledge is used.³⁴ Conversely, if the various actors only convene in large group meetings to share information, it is likely that the transfer of tacit knowledge amongst members will be inefficient. A network setting will likely require multilateral ties among members (and a variety of processes for transferring knowledge) in order to reduce search costs and to maximize the speed and ease with which both explicit and tacit knowledge is transferred amongst members. As explained earlier, sometimes the tacit element is hard to difficult to make explicit.

The Toyota Case - Managing A Knowledge Sharing Network

Inter-organizational learning enhances competitiveness. Organizations are capable of learning faster by collaborating with other firms as well as by observing and importing their practices. A production network with superior knowledge transfer mechanisms among users, suppliers, and manufacturers will be able to out-innovate networks with less effective knowledge sharing routines.³⁵ An excellent example of an enterprise that has created a high performance, world-class KM program is Toyota.³⁶ Toyota has developed a knowledge-sharing network with all of its suppliers that at least partially explains the relative productivity advantages enjoyed by all participants. Toyota has accomplished this by creating a strong network identity, with specific rules for participation and entry into the network.

What firms do better than markets is the sharing and transfer of the knowledge of individuals and groups within an organization.³⁷ This knowledge consists of both information and of know-how. Knowledge is held by individuals, but it is also manifested in social interaction (i.e., group, organization, or network). Knowledge is most effectively generated, combined, and transferred by individuals who identify with a larger group.³⁸ Creating an identity for a group, whether it be a firm or network, means that the individual members feel a shared sense of purpose with the collective whole. The identity of the firm is defined by its members, by common goals and values, and by a shared language. Furthermore, the aggregated knowledge that resides within a network is much greater than that which resides in a single firm. Consequently, if the network can get its members to cooperate in a social community, it will create learning opportunities far superior to firms that do not participate in such a network.

Toyota promotes the philosophy of *kyoson kyoei* (coexistence and co-prosperity) and creates a shared network identity by developing network-level knowledge acquisition, storage, and diffusion process with its suppliers.³⁹ The most important of these network-level process are: (1) the supplier association (a network-level forum for creating a shared social community, establishing network norms, and sharing mostly explicit knowledge), (2) Toyota's operations management consulting division (a network-level unit given accountability for knowledge acquisition, storage, and diffusion within the network), (3) voluntary small group learning teams (*jishuken*), or a sub-network forum for knowledge sharing that creates strong ties and a shared community among small groups of suppliers, and (4) inter-firm employee transfers (some job rotations occur at the network level). These four network entities help to create an identity for the network and also facilitate knowledge transfers among network members.⁴⁰ As suppliers increasingly identify with the network, they begin to engage in knowledge-sharing activities without thinking twice about it. Apparently the sentiment, "what's good for the network is good for me, and what's good for me is good for the network" becomes embedded in their psyche.

To encourage suppliers (groups) to participate and openly share knowledge, Toyota has heavily subsidized the network (with knowledge and resources) during the early stages of formation to ensure that suppliers realize substantial benefits from participation. Suppliers are motivated to participate in the network because they quickly learn that participating in the collective learning processes is vastly superior to trying to isolate proprietary knowledge on their own. Previous research on collaboration suggests that the effectiveness of collaboration increases when stakeholders have a shared purpose.⁴¹

Toyota eliminated the problems associated with protecting or hiding valuable knowledge and free riding by establishing some undeviating rules within the network. They established network rules/norms that prevent suppliers from accessing Toyota's knowledge unless they first explicitly agree to openly share knowledge with the other network members.⁴² The second rule simply eliminates the notion that there is proprietary knowledge within certain pre-defined limits. Production knowledge is viewed as the property of the Toyota network. By establishing these rules of engagement, Toyota is willing to accept the fact that some valuable knowledge that they provide to their suppliers for free will spill over to benefit competitors.

Another rule instantiated by Toyota mandates that members must reciprocate by opening their plants to other network members if they choose to receive Toyota consulting assistance. As more and more suppliers have an intensive knowledge transfer experience with Toyota's consultants, they become comfortable with knowledge transfer activities. The norm of reciprocity has the snowballing effect of getting suppliers to open their operations to one another. This requirement also effectively minimizes the free rider problem because the 'price of entry' into the network is a willingness to open up your operations for inspection. Toyota's willingness to freely share its valuable knowledge with other network members acts a starting mechanism for reciprocity. The implied message is, "We will help you, but you must help the network."

To ensure that the network is efficient at transferring tacit knowledge, Toyota has created a highly interconnected, strong-tie network with a variety of processes that facilitate knowledge transfers.⁴³ To maximize the speed and ease with which various types of knowledge are transferred, a variety of pathways for knowledge flow is required. The network has multiple pathways among members, with a variety of bilateral and multilateral processes. Each process was designed to facilitate the sharing of different types of knowledge (both explicit and tacit) within the network. Some processes are designed primarily for knowledge diffusion, while other processes result in both

knowledge creation and diffusion. The many avenues for communication create a high degree of interconnectedness among members in Toyota's network, providing individual members a choice of medium for communicating.

Knowledge Transfer

A final element in the characterization of the properties of organizational knowledge that must be understood is the distinction between the knowledge of an individual and that of the organization.⁴⁴ The firm can be viewed as a repository for knowledge – the knowledge being embedded in business routines and processes. The pressing question is how individuals and groups interact to facilitate transfer of this knowledge, and hence, further contribute to organizational knowledge creation. Unless individual knowledge is shared with other individuals and groups, the knowledge will have a limited impact on effectiveness.

Inkpen and Dinur conducted a study to test the horizontal knowledge transfer mechanisms used by American parent firms and their Japanese joint ventures (JVs).⁴⁵ Four key processes were identified: technology sharing, group-group interaction, personnel transfers, and strategic integration that represent opportunities for knowledge connection (transfer).⁴⁶ Each process represented a knowledge connection, which created the potential for individuals to share their observations and experiences. Summarizing comments are provided below:

Technology sharing is based on shorter-term knowledge relationships and as such, is less effective in transferring tacit knowledge. Technology sharing can be effective as a means of acquiring explicit, objectified knowledge.

JV-parent interactions are based on shorter-term knowledge relationships and as such, are less effective in transferring tacit knowledge. They can be effective as a means of acquiring explicit, objectified knowledge.

Personnel transfers can be considered a means of mobilizing personal knowledge. Transfers and rotation of personnel help members of an organization to understand the business from multiple of perspectives, which in turn makes knowledge more fluid and easier to put into practice. Transfers may encourage bleed though of ideas and can be an effective process through which to acquire tacit knowledge that can only be acquired through time and experience. The risk with personnel transfers is that if the knowledge remains individual, the potential social impact of the learning is lost. Systems may have to be established to ensure that knowledge goes beyond the individual level. The results suggest a long-term basis for knowledge sharing and potentially allow for the largest amounts of knowledge to travel inter-organizationally. Such long-term processes create the potential for a continuous flow of knowledge, which in turn can lead to continuous learning and change.

Strategic integration is a process through which a group strategy is linked to another group's strategy (i.e., common goals). Receptivity to learning is enhanced if the two groups are closely related. Integration can be an effective higher level knowledge-sharing tool. It enables meaningful communication and collaboration between organizations at the group and organizational levels rather than at the individual level. The results suggest a long-term basis for knowledge sharing and potentially allow for the largest amounts of knowledge to travel inter-org. Such long-term processes create the potential for a continuous flow of knowledge, which in turn can lead to continuous learning and change.

Organization Levels And Knowledge Movement

A fundamental problem arises when knowledge must be shifted vertically in an organization. The problems of different professional languages are magnified as the shared codes of functional groups are different.⁴⁷ What is the relationship between organizational levels, knowledge types, and the transfer of knowledge? Although a variety of knowledge management strategies can be viable, some strategies lead to more effective knowledge transfer than others. The study conducted by Inkpen and Dinur provides some insight to this question as well.⁴⁸

Inkpen and Dinur's study further shows that as knowledge becomes more tacit, it becomes less teachable, less codifiable, and less transferable. The risk, particularly with tacit knowledge, is that knowledge transferred will

dissipate as it spirals up the organization level.⁴⁹ The results of this portion of the Inkpen/Dinur study can be summarized as follows:

- The more tacit knowledge is, the lower the organizational level through which successful transfers will occur. Highly tacit knowledge is intuitive, nonverbalizable, and related to individual experiences. First-hand experiences with tacit knowledge are critical to its successful transfer. Knowledge that is low in tacitness is often related to product and process technology transfers that can occur on a higher, more collective level.
- When knowledge transfers are initiated at the group and organization levels (i.e., team visits or group seminars), the transfers will be less effective when the knowledge has a high tacit element.
- Western firms focus primarily on explicit knowledge. This is consistent with the argument that in their approach to organizational learning, Western firms tend to focus on explicit knowledge that can be created through analytical skills and concrete forms of oral and visual presentation.
- Firms most successful in knowledge transfer recognize that important knowledge could not be internalized without substantial interaction between the people in one group and those in another.

Conclusion And Implications

Organizations must be cognizant of the tacit dimension of knowledge and how it impacts the codifiability and transfer characteristics of knowledge. This point is undeniably supported with case study. Managers and knowledge workers alike must also be aware of the transferability of knowledge as it spirals up through the organizational hierarchy.

Knowledge has emerged as one of the key drivers of competitive advantage in developed nations. Because intangible assets are now one of main basis of competitive differentiation, the effective management of these assets are of paramount importance. As ex-IBM Chairman Louis Gerstner, Jr. testified, “In the Information Age, the most successful companies will be those that exploit knowledge about customer behavior, markets, economies, and technology faster and more effectively than their competitors. They will use knowledge to adapt quickly, seizing opportunities and improving products and services, of course, but just as important, renewing the way they define themselves, think, and operate.”⁵⁰ Obviously Lou knows a little something about KM. 📖

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Notes

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