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A Framework for Successful Knowledge Management Implementation

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Abstract

This paper examines how an organization can use information technologies, in the form of a knowledge management system (KMS), to leverage the knowledge base of the firm. This paper proposes that one aspect of knowledge management is the capture and integration of intellectual capital, residing in a firm's employees, through the expansion of social capital, residing at the level of the firm. Based on this proposition, the success of a knowledge management system can be measured. A model of KMS Success is developed drawing from literature in the fields of information systems and strategic management. This model proposes that there are three main components to determine KMS success: system quality, knowledge quality, and organizational environment. A theory is presented that predicts if the technology and the knowledge fit the needs of the users, and if there is proper alignment of the organizational environment, the result will be high system usage. KMS success, a measure of the increase in the firm's social capital, can be determined by examining system usage.

Why is Knowledge Important?

Knowledge has been identified as a key organizational resource for generating competitive advantage over other firms (Penrose 1959; Winter 1987). Knowledge has also been recognized by some researchers as being the most critical resource that a firm possesses, proposing that all resources within a firm are simply an embodiment of this firm's specific knowledge. The knowledge of the firm is unique, valuable, difficult to imitate and the result of a firm's history, structure and culture over time (Dierickx et al. 1989). Although knowledge has been identified as a key resource, the issue at hand is how to leverage the knowledge of the firm to exploit its earning potential. Although it has been widely recognized that the tacit, situated knowledge of the firm is the most difficult to imitate, thus making it more valuable as a resource, tacit knowledge is very difficult to capture, codify and transfer. In addition, the knowledge of the firm has also been shown to be path dependent, an accumulation of experience over time, and embedded in the social experiences of the firm. Thus, even codified, knowledge is difficult to imitate outside of the specific social context and the shared experiences of individuals within an organization. Szulanski (1996) called this difficulty "stickiness", and found that even codified knowledge was difficult to transfer within the same firm. Once codified, the incremental cost of sharing knowledge is low, however, the costs of codifying and replicating knowledge, as well as the costs for establishing and maintaining networks are substantial.

What are the Knowledge Assets of the Firm?

The knowledge assets of the firm are part of the intangible assets of that firm. The knowledge assets are composed of both explicit and tacit knowledge (Polanyi 1962), and reside in the firm's people and social structures. The knowledge held by individuals is expanded through combination and exchange that occurs through the processes, routines, structures, roles and norms of the firm. Through combination and exchange, knowledge assets are leveraged to create more knowledge assets. The intangible assets of the firm, assets that are not represented by physical capital recorded in the book value, have been recognized as assets of the firm and can be measured indirectly by comparing the market value of the firm to its book value. The book value accounts for the physical assets of the firm, and the value of the firm over and above its book value, recognized as valuable by shareholders, is composed of intangible assets such as name recognition, goodwill, reputation and knowledge assets. One way to measure the intangible assets of the firm is to examine Tobin's Q, the ratio of market value to book value (Montgomery et al. 1988). Thus, firms must recognize that they are composed of both tangible and intangible assets, and should also recognize that their knowledge assets, a component of the intangible assets, have the greatest potential to create competitive advantage.

This paper adopts the framework proposed by Nahapiet and Ghoshal (1998). Knowledge assets include both social and intellectual capital. Social capital is the sum of the actual and potential resources embedded within, available through and derived from the network of relationships possessed by an individual or social unit. There are three dimensions of social capital: the structural, the relational and the cognitive dimensions. Intellectual capital refers to the knowledge and knowing capability of a social collectivity. Intellectual capital is composed of individual explicit, individual tacit, social explicit and social tacit knowledge. Social capital is concerned with the creation and maintenance of network connections between parties, establishing shared cognitive dimensions composed of codes, language and narratives, and establishing relationships between these parties that promote trust, norms, obligations and identification.

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                    │ Market Value│
                    └──────┬──────┘
              ┌────────────┴────────────┐
       ┌─────────────┐          ┌─────────────┐
       │ Book Value  │          │  Intangible │
       └─────────────┘          │   Assets    │
                                └──────┬──────┘
                          ┌────────────┴────────────┐
                   ┌─────────────┐          ┌─────────────┐
                   │  Reputation │          │  Knowledge  │
                   │Brand Name etc.│        │   Assets    │
                   └─────────────┘          └──────┬──────┘
                                      ┌────────────┴────────────┐
                            ┌─────────────┐          ┌─────────────┐
                            │Social Capital│◄─────────│ Intellectual│◄──────
                            │  And KMS    │          │   Capital   │
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                                     Objective of Knowledge
                                          Management
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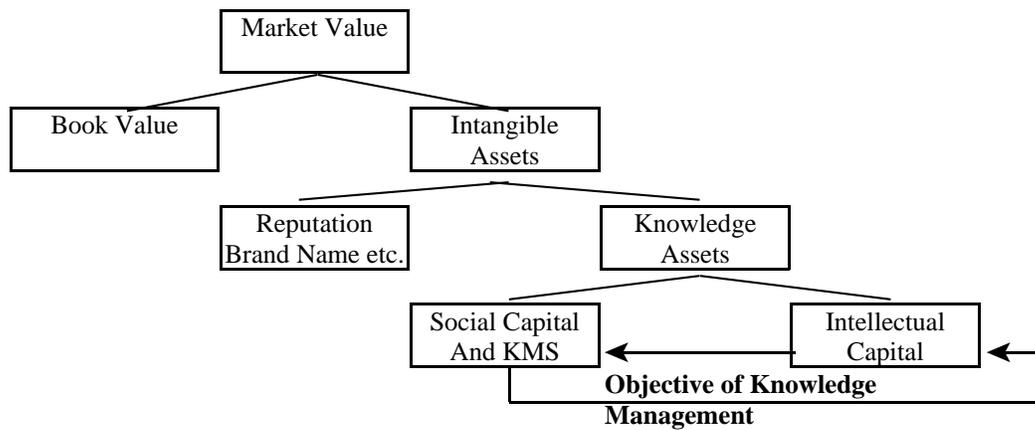
Figure 1. Breakdown of Assets

The social capital facilitates the combination and exchange of intellectual capital. The intellectual capital is only partially recovered by the firm. People have choices about how to distribute their knowledge at work and these choices range from full disclosure and codification to tacit disclosure, or through the action required to perform the job. Social capital is part of the firm, and embedded in the organization's structure, routines, culture and memory and includes the communication channels individuals use to share information and ideas. As part of the firm's structure, social capital is held by the firm and can be stored, retrieved and transferred across individuals. Even if an employee leaves, the organization still retains its social capital as part of its structure. So, a key for managing knowledge assets, (i.e. knowledge management) is to convert intellectual capital, residing in its people, to social capital, residing in the firm's structure. The firm is then able to leverage its increased social capital across all employees to promote combination, exchange, and the creation of new intellectual capital.

What is a Knowledge Management System?

In the past, organizations have transformed knowledge into structural assets through the use of written documents and procedures, as well as through informal routines and cultures. Recently, information technologies have advanced dramatically in both capability and affordability, and are recognized for their capacity to capture, store, process, retrieve and communicate knowledge. Thus, firms are examining ways to use information technologies to support knowledge management by substituting data and information, with firm specific knowledge. Technology, in the form of a knowledge management system (KMS), can be used to codify, store, and distribute the knowledge base of the firm. A KMS can serve as a repository for knowledge as long as the knowledge can be codified. The KMS supports the social capital of the firm by establishing structural ties between people, regardless of time and geographic barriers, thus improving the capability for the combination and exchange of intellectual capital. In addition to creating network ties, a KMS also serves as a repository for the knowledge base of the firm, a structural repository for the intellectual capital. Thus, a KMS must be evaluated two ways: how intellectual capital increases through combination and exchange, and how efficiently the KMS converts intellectual capital, residing in people, into structural assets, stored in the KMS. Both of these dimensions can be measured by KMS usage. KMS usage includes new acquisitions of knowledge, transfer of knowledge within the firm, and postings and queries within the system. Usage is measured by the size of the database, the "hit rate" or traffic on the database, and the posting activity on the system. System usage not only determines the quantity of structural assets, but also how these assets are being used. However, the effective implementation of a KMS represents a major challenge, and research on other types of information technologies has repeatedly demonstrated that technology implementation is a complex social and organizational process that is often difficult and unsuccessful.

How to Implement a Successful KMS

Recent research on information technology implementation such as the IS Success Model from DeLone and McLean, (1992), the Updated IS Success Model (Seddon 1997) as well as the Process of Technology Structuring from Orlikowski et al, (1995) show that there are many dimensions to a system's success. In addition, the model for Social Capital in the Creation of Intellectual Capital from Nahapiet and Ghoshal (1998) shows how combination and exchange are complicated processes that require more than just network ties. Using these models as a foundation, a KMS will have three main components that determine its usage: system quality, knowledge quality, and the organizational environment. Usage in this paper is a reflection of structural assets, thus it is a quantity measure. Usage of the KMS is a proxy for the use/reuse of the knowledge the system contains. Seddon (1997) points out that there are other ways to define usage, such as evaluating perceived benefits of use. However, in this KMS paper, the term usage is acting as a proxy for benefits from use. This KMS theory combines the IS Use model with the organizational environment (relational dimensions of social capital) as a critical component to KMS success. The characteristics of a KMS are fundamentally different from other information technologies because capturing the knowledge of individuals,

rather than business resource and planning data, is critical. Currently, individuals are compensated based on what they know, and how valuable this specialized knowledge is to the organization. Encouraging employees to codify their knowledge and then share it with others requires a fundamental change in the value systems of both the firm and its people. In addition to access to others, people also must anticipate value, have motivation, and have the capability to combine new knowledge. The organizational environment must undergo a significant transformation from valuing individuals to valuing collaboration. As with many organizational changes, there is certain to be some level of resistance or inertia. Therefore, the organizational environment will be a critical factor.

Organizational Environment

The environment is how the firm is structured. The organizational environment includes how work is processed, how people and divisions are structured, how people interact and perceive the culture, as well as how people are compensated. The organizational environment is what determines the system quality and knowledge quality as well as provides the motives for use. Included in the environment are the relational dimensions of social capital (trust, norms, obligations and identification) as well as the anticipation of the value of exchange and motivation. The organization must provide an atmosphere of knowledge awareness that includes incentives for participation and use of the KMS. If users are not compensated adequately for disclosing their knowledge, there is little individual motive to do so.

Proposition 1: When the organization environment supports the objectives of knowledge management, system usage will be high.

System Quality

The KMS is composed of computers, data storage, and networks, which in turn have components that are hardware (physical assets) and software (the processes and rules for how the hardware can be used). System Quality is a measure of how closely the technology meets the needs of the users by being accessible, reliable, tying together critical parties, and easy to use.

Proposition 2: When the KMS system quality meets the needs of the users, system usage will be high.

Knowledge Quality

The KMS is the storage place for the knowledge base of the firm. The knowledge is codified and entered into the system for retention, processing and retrieval. Knowledge quality is an assessment of whether the knowledge contained in the system meets the needs of the users, as well as whether the knowledge can be processed efficiently.

Proposition 3: When the quality of the knowledge in the KMS meets the needs of users, system usage will be high.

These three components: system quality, knowledge quality, and organizational environment will have a direct impact on system usage. The usage can be measured directly from the system. There are three types of system usage: additions to the database, searches of specific knowledge in the database, and knowledge refinement through postings/conversations. The amount of system usage will depend upon the quality of the system, the quality of the knowledge within the system, and the incentives to use the system as determined from the organizational environment. If these components are not properly aligned to meet the needs of the users, KMS usage will be low. Individuals will still have access to knowledge, but they will use those resources that they were familiar with and considered reliable before the KMS.

Concluding Remarks

The goal of this paper was to bring attention to the potential benefits of a KMS, give an example of one way to determine system success, and show the complexity involved with implementing a KMS. KMSs are a new phenomena in the IT field and provide researchers another way to examine IT in business use. Due to space constraints, this paper does not adequately reflect the complexity of knowledge management and issues underlying the implementation of a KMS. Just some of these issues are: what level of knowledge is the most critical to capture in a KMS, if the cognitive maps used by decision makers can be adequately codified, could they be mapped into a KMS, which intangible assets should be converted to structural assets and stored in the KMS, what kinds of knowledge can be usefully codified, and once codified, how can knowledge be protected from imitation outside of the organization? There is opportunity to bring into consideration a wide range of research from other areas to study KMS including individual and social cognition, strategy, motivation and communication. Given the complexity and potential of these systems, KMSs will be an important and interesting research phenomena to examine now, as they evolve, as well as their individual and organizational impacts in the future.

References

References available upon request from author.