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# TOWARD AN ELABORATION OF THE KNOWLEDGE CHAIN MODEL

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## Abstract

*Several books and articles give glimpses into the knowledge management (KM) phenomena. However, none have identified the specific types of KM activities that can be contributors to competitiveness. The recently advanced knowledge chain (KC) model took the first steps in trying to do this. The KC model identified nine distinct and generic KM activities. The intent of this research is to further explore the KC model from the standpoints of substantiating it, refining it, and extending it. It will try to identify those specific types of activities performed within each of the KM activities in the KC model. Ultimately, a portfolio of KM methodologies, which reflect the KC model, could be utilized by practitioners as a guidebook when attempting to perform KM. This study will also provide avenues for future research which can be conducted. One such avenue could be to identify methods for which these types are performed and how the different methods may contribute to competitiveness.*

## Introduction

Major developing trends such as pervasive computing, mass customization, continuous learning, globalized competition, collaborative partnering, and virtual enterprise have left a mark on the 21<sup>st</sup> century knowledge economy. In this economy, value flows from the technology and practices used to harness an organization's knowledge resources and knowledge processing skills. Effectively managing knowledge has emerged as a vital source of competitive advantage (Dutta 1997). Researchers in the field of sustainable competitive advantage contend that knowledge, including what the organization knows, how it uses what it knows and how fast it can know something new, is the only factor that offers an organization a competitive edge (Prusak 1996). Knowledge and the management of knowledge are more valuable and more powerful than natural resources, big factories, or fat bankrolls (Stewart 1997).

Empirical studies are consistent with such assertions about competitiveness through knowledge management (KM). Over 90% of respondents perceived their organizations to be knowledge intensive, as reported in a survey conducted by the *Journal of Knowledge Management* (Chase 1997). However, only 6% of the respondents believed their organizations to be "very effective" in leveraging knowledge to yield better performance.

In order to improve the leveraging of knowledge, a model that identifies the possible fulcrums is needed. When designed and executed better than those of other organizations, these fulcrums are the KM activities that can yield a competitive advantage. The recently introduced knowledge chain (KC) model is just such a model (Holsapple and Singh 2000). The KC model presents nine generic activities that an organization performs in the course of managing its knowledge resources.

The KC model is a promising start. However, further research is needed to explore the nature and uses of the KC model. Ultimately, a portfolio of KM methodologies, which reflect the KC model, could be utilized as a guidebook for organizations when attempting to perform KM. As a preliminary step to building this portfolio, distinct types of activities need to be identified and classified within the KM activities.

Although several books and articles give various glimpses into KM phenomena, none has answered the following fundamental question: Specifically, what are the types of KM activities that can be contributors to competitiveness? An answer to this important question would identify key types of activities that deserve careful attention in enterprise planning and assessment.

Each such type of activity can be a focal point for improvements that match or surpass competitors' executions of the same type of activity. Each is a candidate for enhancements that add value to an organization. The recently advanced KC model begins to answer this question and, as such, serves as the starting point for this research which will explore this model from the standpoints of substantiating it, refining it, and extending it.

## Knowledge Management

Porter and Miller (1985) were among the first researchers to indicate that information is a source of competitive advantage. However, KM deals with much more than just information. Indeed, information is commonly used interchangeably with one type of knowledge: descriptive knowledge, which refers to characterizations of past, current, or hypothetical states of some world of interest. However, there are other types of knowledge: procedural, which characterizes how to do something, and reasoning, which characterizes the extent to which particular conclusions are valid under particular circumstances (Holsapple 1995).

The start of a KM episode is signaled by a recognition of a knowledge need (or opportunity) within an organization. The episode culminates with either the satisfaction of that need or abandonment of the effort (Joshi 1998). Processors manipulate knowledge within a KM episode, but not in a random fashion. At a meta level, the patterns of the manipulation activities and KM episodes are orchestrated by other KM activities. Therefore if KM is a means to competitiveness for knowledge-based organizations in the emerging knowledge economy, then the KM activities that consist of the dynamic fabric of such organizations are also means in determining competitiveness.

In the knowledge economy, knowledge resources are becoming more importance relative to traditionally recognized resources and new technologies, the value of knowledge as input and output is growing, knowledge plays a key role in what is bought and sold (both explicitly and implicitly), and new techniques for managing knowledge resources are budding (Stewart 1998). KM is concerned with ensuring that the right knowledge is available in the right form to the right processor at the right time for the right cost. Implementation of the KM activities performed to reach this objective result in a panorama of knowledge flows within a knowledge-based organization. In many cases, technology is used to help perform, enable, or facilitate the manipulation activities and the flows that connect them.

The ability to properly execute KM activities can promote growth by allowing a firm to launch marketing and business initiatives, as well as gain cost and other advantages by improving and facilitating operational ideas (Trussler 1998). The knowledge economy is forcing companies to look for ways to reinvent themselves. Those companies that value knowledge and have a strategy for systematically managing it will be successful (Tapp 1997). KM allows companies to innovate along the competitive edge of today's business environment (Dykeman 1998). However, a report by consulting firm KPMG states that while most firms have the technology for a KM program, few are exploiting it fully (Black 1998). IBM's Larry Prusak stated: "Every company does manage knowledge to some degree, but they can do it more effectively and more efficiently" (PC Week Executive 1996).

A model that identifies value-adding KM activities is a key to more fully exploiting the competitive potential of KM. The model could be used by practitioners to structure their consideration and evaluation of KM initiatives. The model could be used by researchers to structure their exploration of connections between KM and competitiveness. Educators could use the model in order to structure coverage of KM activities and impacts. These motivations, coupled with the absence of such a model in the literature, led to the creation of the KC model and to this research to build upon it via a follow-up exploration of its nature and its application.

## Knowledge Chain Model

The KC model is based on a KM ontology developed via a Delphi-study involving an international panel of prominent KM practitioners and academicians (Joshi 1998). This ontology identifies five major knowledge manipulation activities that occur in various patterns within KM episodes: acquisition, selection, generation, assimilation, and emission. It also identifies four major managerial activities which influence and govern the conduct of the KM episodes: measurement, control, coordination, and leadership. Respectively, these form the five primary and four secondary KM activities in the KC model (Holsapple and Singh 2000). The model holds that various combinations and implementations of these activities yield organizational *learning* (i.e., changes in an organization's state of knowledge) and *projections* (i.e., organizational resources being released into the environment) (see Figure 1). As noted in the figure, we acknowledge that organizational resources and environmental factors may also lead to organizational learning and projections in addition to the primary and secondary activities. A basic premise of

the KC model is how well an organization learns and how well it projects are important determinants of its viability and success in a competitive environment. The following two subsections describe each of the KM activities in more detail.

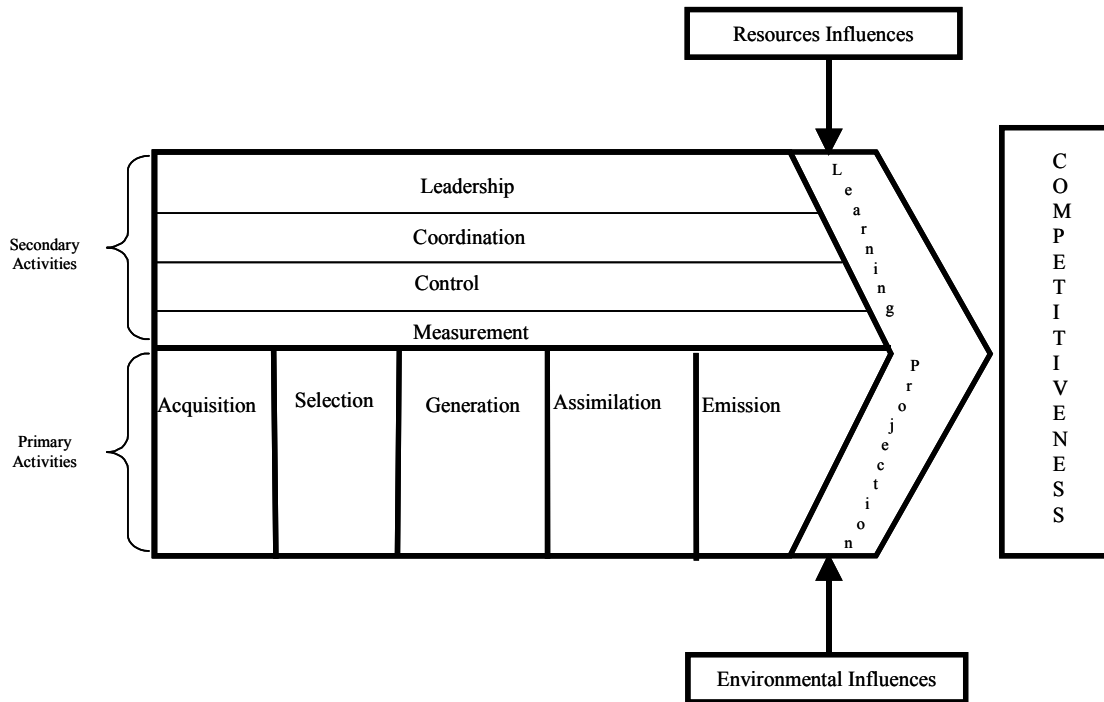


Figure 1. The Knowledge Chain Model (adapted from Holsapple and Singh 2000)

### Primary Activities

*Knowledge acquisition* begins with identifying knowledge in the organization’s external environment and concludes with transforming it into a representation that can be employed by the organization. Sub-activities involved in knowledge acquisition include identifying appropriate knowledge from external sources, capturing the identified knowledge from the external sources, and transferring the organized knowledge to a processor that either immediately uses it or internalizes it within the organization for subsequent use.

*Knowledge selection* is the counterpart to knowledge acquisition. Knowledge selection refers to the activity of identifying needed knowledge within an organization’s existing knowledge resources and providing it in an appropriate representation to an activity that needs it. Sub-activities involved in knowledge selection include identifying appropriate knowledge within the organization’s existing knowledge resources, capturing the identified knowledge from internal sources, and transferring the organized knowledge to a processor that immediately uses it or internalizes it within the organization for subsequent use.

*Knowledge generation* refers to the activity of producing knowledge by discovering or deriving it from existing knowledge. Sub-activities involved in knowledge generation include monitoring the organization’s knowledge resources and the external environment by invoking selection and/or acquisition activities as needed, producing knowledge from a base of existing knowledge, and transferring the produced knowledge for externalization and/or internalization.

*Knowledge assimilation* (originally termed internalization) refers to the activity that involves storage and/or distribution of acquired, selected, or generated knowledge within the organization. Sub-activities involved in knowledge assimilation include assessing knowledge to be internalized, structuring knowledge to be conveyed into representations appropriate for the targeted resources, and delivering the knowledge representations to targeted knowledge resources.

*Knowledge emission* (originally termed externalization) is an activity that uses existing knowledge to produce organizational outputs for release into the environment. Sub-activities involved in knowledge emission include producing the output by applying, embodying, controlling, and leveraging existing knowledge to produce the output for the target, and transferring the output by packaging and delivering the projections that have been produced for targets in the environment (Joshi 1998).

### **Secondary Activities**

*Knowledge measurement* is an activity that involves the assessment of knowledge resources, knowledge processors, and knowledge manipulation activities. It is a basis for evaluation of control, coordination, and leadership; for assessing and comparing the execution of KM activities; and for evaluating the impacts of an organization's conduct of KM on bottom-line performance.

*Knowledge control* is concerned with ensuring that needed knowledge resources and processors (including human and/or computer based processors) are available in sufficient quantity and quality subject to constraints and required protection. Controlling the quality of knowledge is a significant issue for KM, because the value of knowledge and returns achieved from knowledge resources depend on its quality. Protection involves protection from loss, obsolescence, unauthorized exposure, unauthorized modification, and erroneous assimilation.

*Knowledge coordination* refers to guiding the conduct of KM in an organization. It involves managing dependencies among knowledge resources, among knowledge manipulation activities, between knowledge resources and other resources (i.e., financial, human, and material), and between knowledge resources and KM activities.

*Knowledge leadership* is an activity that establishes enabling conditions for a fruitful KM. It qualifies the expression of each primary activity. In short, leadership establishes enabling conditions for achieving fruitful KM through the other eight activities. The distinguishing characteristic of leadership is that of being a catalyst through such traits as inspiring, mentoring, setting examples, engendering trust and respect, instilling a cohesive and creative culture, establishing a vision, listening, learning, teaching, and knowledge sharing.

Evidence in the literature suggested that each of the nine KM activities could contribute to competitiveness (Holsapple and Singh 2001). The competitive roles of the activities were reviewed in terms of one or more of the following standpoints: improving productivity, enhancing organizational agility, fostering innovation, and enhancing reputation. The next step is to break each activity down into distinct types and explore if and in what way each of the types can contribute to competitiveness.

## **Methodology**

People who are experienced in leading or directing KM initiatives will be asked to participate in this research. These individuals will primarily be KM practitioners based in North America; however an attempt will also be made to solicit the views of experienced practitioners from other regions as well. As an incentive to participate, respondents are offered a summary of the research results at the completion of the study.

This study drills down each of the KM activities to explore the different types of each activity and their individual contributions to organizational competitiveness. Over 200 KM practices have been identified in the literature so far. Those practices are in the process of being categorized under the appropriate KM activity and further consolidated into distinct types within the activity. For example, Table 1 shows some of the KM practices found in the literature which have been identified as Knowledge Acquisition. Some of the activities within the list overlap one another, for example, practices 1 and 3. So they will be grouped together to form a distinct type of Knowledge Acquisition. The same process will be done for each of the nine KM activities.

A questionnaire will be developed to distribute to the survey participants. It will contain two sections for each activity. The first section will consist of a table containing the distinct types of the particular KM activity. Within the table will be questions to measure each type's contribution to the organization's overall competitiveness, each type's effect on specific aspects of competitiveness (productivity, agility, innovation, and reputation), and the importance of technology support for each type of activity. The second section will consist of an optional open-ended portion where respondents can share examples of how the use of computer-based technology to support the particular activity affected the organization's competitiveness. Frequency

distributions, regression analysis, correlations and mean comparisons can be used to analyze the data obtained from the instrument.

**Table 1. Sampling of Knowledge Acquisition Practices**

Knowledge Acquisition Practices	
1	Conducting external surveys
2	Gathering knowledge via competitive intelligence
3	Conducting customer satisfaction surveys
4	Licensing patents and processes
5	Hiring an employee

## Conclusion

The intent of this research is to identify specific types of activities performed within each of the KM activities in the KC model. Practitioners will want to use these specific activities as a checklist when performing KM. While they are not prescriptive in nature, perhaps they can help practitioners to avoid blind spots and missed opportunities. For activities and types of activities which are indicated by a high number of respondents as contributing to competitiveness, practitioners will realize that these are activities they will want to include in their KM initiatives. On the other hand, activities that have proven to be contributors to competitiveness by a small number of respondents may prove to be activities for which a competitive advantage can be found.

For researchers, this study will help to further substantiate the existence of the activities found in the KC model and help to build a portfolio of KM methodologies for organizations to utilize when performing KM. This study will also provide avenues for future research which can be conducted. Some such research could be to further explore the types of activities. Perhaps to identify methods for which these types are performed and how the different methods may contribute to competitiveness. Another research avenue could be to change the level of analysis to an individual rather than organizational level. For example, how does performing these types of activities increase an individual employee's performance?

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