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RELATING KNOWLEDGE MANAGEMENT CAPABILITY TO
ORGANIZATIONAL OUTCOMES

by

Ronald D. Freeze

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of the Requirements for the Degree
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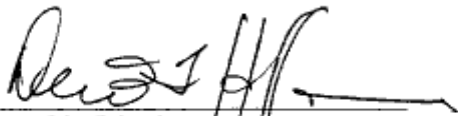
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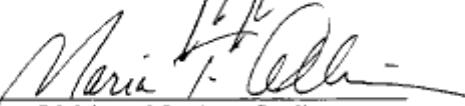

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ABSTRACT

Placing knowledge in the right hands can increase an organization's capacity for effective action. Knowledge Management (KM) is about moving knowledge to where it is needed in an organization to increase effective decision making. The ability to place knowledge where it is needed is referred to as an organization's KM Capability.

KM Capability is viewed as a firm level resource that must be built within an organization. KM Capability provides an important impact on how effective and efficient an organization is at converting inputs into outputs of greater value. The composition of KM Capability is presented as a higher order construct comprised of lower order capability constructs. The similarity of structure of the lower order KM capabilities represents different ways in which knowledge is transferred. Four KM capabilities are hypothesized and measured in terms of differences derived from characteristics unique to each KM capability. The different KM capabilities are identified in terms of the knowledge processes of Acquire, Store, Present, and Apply.

An exploratory field experiment was conducted resulting in data collected from several business units of a large, southwestern US technology manufacturer. Validation of various lower order KM capabilities reflected by the overall organization's KM Capability is presented. Moreover, support for KM Capability's relationship to organizational outcome measures and how an organization's "knowledge sharing culture" relates to adjust this relationship is presented.

This research contributes to the understanding of KM Capability, provides a method to assess the impact of KM improvements, and has implications beyond the

current organization. First, the construction, testing and validation of a generalizable instrument provide the opportunity to migrate this assessment to multiple business units, organizations and industries. Second, the methodology of assessing KM capability increases the understanding of how well knowledge is managed within an organization and provides a roadmap to improve the intermediate and organizational outcomes. Third, appropriate analysis can be conducted for each business unit to compare differing levels of capability. Finally, with the use of the roadmap, an efficient allocation of scarce resources can be achieved by targeting specific KM capability improvements within a business unit or an organization.

This dissertation is dedicated to my father and mother,

Ronald Dean and Pearl Marie Freeze

who have supported me in my life pursuits
encouraged me in my aspirations
and always believed in my success

To my wife,

Cynthia

who has learned and grown with me through this endeavor
was willing to take this leap of faith
and who supported both me and our children through these years

and finally to my children

Alexandria and Aaron

who have continued to teach me the wonder of discovery

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Introduction

An exciting development in the world of business is the practice known as Knowledge Management (KM). Knowledge, in the right hands, increases the capacity for effective action. KM can put that knowledge in the right hands and cost savings can result. \$6 million was saved by a single Community of Practice at the Federal Highway Administration. This savings was based on savings accrued through less time spend seeking out information (Lamont, 2006). The ability to manage knowledge is called the KM Capability of an organization and can help managers understand how to achieve these savings in their organization.

Knowledge Management (KM) Capability¹ is an existing organizational ability (precondition) that has the potential to influence the management of knowledge. While KM Capability is conceptually viewed as an internally developed firm resource used to transform inputs into outputs of greater worth, the use, identification and measurement of knowledge within KM Capability remains difficult and illusive. With knowledge so difficult to quantify, increases in understanding the composition of knowledge within KM Capability is vital to enhancing the comprehension of their relationship to organizational outcomes. KM Capability is comprised of different knowledge types and the organization's cultural attitudes toward their importance. Describing the knowledge processes that maintain, support and facilitate the use of these different knowledge types would increase the understanding of KM Capability, provide insight into the organization's cultural attitude towards knowledge and provide a theoretical and empirical link to organizational outcomes.

¹ See Table 1 – Key Term Definitions

The understanding and operationalizing of KM Capability is facilitated by taking a resource based perspective. The Resource Based View (RBV) addresses the resources and capabilities that support an organization's performance to obtain a sustainable competitive advantage. The causal mechanism for KM Capability to obtain a competitive advantage resides in capability building and not resource picking (Makadok, 2001). Capability refers to a firm's capacity to deploy resources. In the case of KM Capability, the resource the firm is deploying is knowledge. The knowledge resources are dynamic and may reside in various aspects of the organization's structure. Wherever the knowledge resources reside, the knowledge processes to transfer or deploy those resources can be consistently defined, identified and improved. The focus of management to build the organization's ability to deploy its knowledge resources can lead to a high level of KM Capability, improved firm performance, and sustained competitive advantage.

RBV has been used in the IS literature (Bassellier et al. 2004; Sambamurthy et al. 2003; Zhu et al. 2004) and more specifically in the KM domain (Ordonez de Pablos 2002; Smith et al. 2002; Spring 2003; Tanriverdi 2005) to identify and describe firm capabilities and posits that firm resources and capabilities, (i.e. KM Capability) are assembled to positively affect firm performance. However, Wade et al. (2004) indicated a lack of research in measuring the resources and capabilities represented in the resource based view. This research addresses this gap by investigating KM Capability, its composition, and its link to organizational effectiveness and firm performance.

Prior IS literature is replete with examples that identify organizational capabilities as single constructs (Harter et al. 2000; Morrison et al. 2000; Sine et al. 2003). An

investigation of KM Capability must recognize that knowledge is a broad concept and differing types of knowledge must be managed distinctively. This implies a KM Capability composition of individual capabilities that reflect differences in knowledge sources, types, uses and workers. In this research, KM Capability, as a firm resource, is viewed as a complex higher order construct consisting of lower order KM capability constructs. KM capabilities are viewed as dynamic, internally developed abilities that determine an organization's effectiveness at using knowledge for creating value. These abilities can be exhibited via different processes to obtain knowledge such as: procuring reports of prior projects, availability of templates to assist knowledge distribution, contacting domain experts, accessibility of summarized aggregated data, applying previously learned lessons to improve specific business processes, etc. The KM capabilities represent a spectrum of knowledge types, can be identified through differences exhibited in their knowledge processes and demonstrate different interactions with the organization's human and technological capital. The complexity and diversity of knowledge, organizational processes to support knowledge use and skills inherent in the workforce indicate a necessity to segregate the investigation of KM Capability into separate KM capabilities to facilitate learning and understanding.

The KM capabilities and their organizational impact can be recognized by investigating the composition and ownership of knowledge. The implication for Knowledge Management¹ (KM) is to emphasize building core competencies and understanding know-how. The perspective of knowledge taken in this investigation is as a capability (Alavi et al. 2001) with the potential to influence action. Knowledge, in this perspective, is defined as uniquely human, only existing in the context of human interpretation and

processing (Holsapple 2003) and assumes value only when it affects decision making and is translated into action (De Long et al. 2000).

To contrast the perspective of knowledge as a capability to the more widely recognized perspective of knowledge as an object, it should be recognized that knowledge as a capability encompasses knowledge as an object¹. To illustrate, an individual will recognize a need, search for the appropriate knowledge (object), discover the needed knowledge (object) and take subsequent action. This entire process represents knowledge as a capability and illustrates the KM capabilities under investigation. Further understanding of knowledge as a capability can be achieved using the analogy of a relay team. The baton represents the knowledge object. The individual relay members pass the knowledge object from one team member to the next. Knowledge as a capability represents the process of one team member passing the baton to the next team member. Knowledge as an object, in this sense, cannot be separated from knowledge as a capability. Thus, to further the understanding of KM Capability, investigating various KM capabilities within a firm can increase our understanding of how competencies are built.

The perspective of knowledge as a process is illustrated by the baton metaphor in the following example. A process must exist by which each member of a relay team passes the baton during the race. Certain constraints are placed on how the race is run, i.e. location of the baton transfer, how the team members hold and receive the baton, e.g. hand down to pass and palm up to receive. However, there can be a multitude of batons that are not used in a particular race. Some of these batons are stored in the equipment room, a sports bag or the trunk of the trainer's vehicle and must be retrieved prior to use.

The different location that the batons may be stored is similar to how knowledge is stored within an organization. Tacit knowledge will be stored in the minds of individual knowledge workers while explicit knowledge may be stored in various repositories and systems. Additionally, the team members responsible for conducting the race may not be the individuals who originally retrieve the batons to be used in the race. The coach of the relay team must coordinate all of the processes involved in getting the batons to the starting lineup and making smooth the operation of passing of the baton from team member to team member. An organization's upper management must recognize the complexities of where the knowledge objects reside and what knowledge processes are involved in getting the knowledge to the appropriate team member in order to start the race. Knowledge as a capability represents all of the processes involved with a team starting and completing a race.

The resource based view focuses on how capabilities can create a sustainable competitive advantage. The exploration of this phenomenon must begin by recognizing that social capital is considered an inseparable part of a firm's knowledge development capabilities (Davenport et al. 2004). A plant's workforce possesses a *broad spectrum* of knowledge that includes an understanding of diverse scientific and engineering information, as well as specific skills necessary to effectively operate the technical systems (Carrillo et al. 2004). The view of knowledge as personal and connected to the individual indicates that a study of KM capabilities must be undertaken as a set of dimensions that, as lower order constructs, create lower level effects because the personal knowledge of an individual directly influences these lower level effects. However, positioning and identifying KM capabilities as so integral to individuals creates a distance

from firm performance that may impair the ability to detect an impact (Barua et al. 1995). In order to eliminate the confounding influences that would obfuscate this effect, more immediate measures of firm performance must be used. These immediate measures are referred to as *intermediate measures* of success. A positive impact on these organizational perceived outcome measures from improved KM capabilities would support the resource based view. The intermediate measures would contribute to improved organizational outcomes. Furthermore, since KM Capability is comprised of various lower level KM capabilities, each individual KM capability may have a varying impact on the composition and improvement of the organizational resource of KM Capability. Concurrently, various organizational outcomes may be impacted differently by each KM capability. These varying relationships give insight into how the nature of KM capabilities affects the goals of overall firm performance.

Beyond these direct effects, existing “capability” research has incorporated potential exogenous influences. The investigation of KM capabilities and their link to organizational outcomes must incorporate existing theories within the KM research domain to account for exogenous factors. The predominant influence cited for effective knowledge management is that of the relevant organizational culture. These influences include the commitment exhibited by an organization’s leadership in valuing knowledge resources, the willingness of knowledge workers to contribute to and reuse knowledge and the incentives provided by the organization’s structure to promote free exchange of knowledge. Organizational culture and the strong ties that it may promote are more likely to facilitate the transfer of tacit knowledge since they are governed by the norms of reciprocity (Argote et al. 2003). For Knowledge Management Systems (KMS) that

encompass both tacit and explicit knowledge, the primary effectiveness determinant relates to the nature of the organization's culture (Adams et al. 2003).

An organization's culture is a broad, widely researched area of study. A narrow, more judicious focus of an organization's culture is reasonable to begin the investigation of the impact on a newly developed construct. A culture which is supportive and encouraging of knowledge-related activities (Davenport et al. 1998a) has been viewed as an antecedent to KM Process improvement² (Grover et al. 2001), Knowledge Infrastructure Capability³ (Gold et al. 2001) and Knowledge Processes⁴ (Lee et al. 2003). While culture and capabilities are not time-invariant, an organization's culture exhibits greater stability than individual capabilities and may provide support in the building of each KM capability. The support provided by an organization's culture to the building of KM capabilities may enhance or limit the impact of each capability on various organizational outcomes. According to the capability-building view of Makadok (2001), each capability dimension may be more easily modified/improved than the culture that supports these endeavors and therefore it is important to understand the role of an organization's culture in the development of KM capabilities.

It is recognized that some organizational outcomes are directly influenced by an organization's culture. The organization's culture would also have an indirect effect through the development of each KM capability. With this in mind, Figure 1 provides the

² KM Processes – include 1) Individual/Work (Emergent) Processes of Acquisition/Creation, Codification/Documentation and Transfer and 2) Organizational (Deliberate) Processes of Acquisition/Creation, Codification/Documentation and Transfer

³ Knowledge Infrastructure Capability – Technical, structural and cultural infrastructures enable maximization of social capital

⁴ Knowledge Processes – A structured coordination for managing knowledge effectively

overview of the research questions. The organization's culture has an indirect (mediated by the firm's various knowledge capabilities) and direct effect on organizational outcomes, along with the direct effect of the knowledge capabilities on an organization's outcomes.

This research addresses KM Capability by positing the existence of various capabilities within the firm. It is asserted that KM capabilities, following the resource based view of the firm, positively impact organizational outcomes. Finally, an organization's culture is studied from a theoretical and empirical perspective to demonstrate the impact of KM Capability in organizations. This investigation, while describing differing perspectives to KM capabilities, also informs on how they relate to organizational outcomes, and addresses how an organization's culture may influence these relationships. The resulting three research questions guide the theoretical development and empirical testing of my thesis.

1. *What are the major KM capabilities that are amenable to building competencies?*
2. *How do KM capabilities relate to organizational outcomes?*
3. *How does organizational culture relate to KM capabilities and organizational outcomes?*

Data collection for this investigation is conducted in a single organization as a field study that targets populations of knowledge workers with differing business units. This selection capitalizes on the richness of data collected that is inherent in a field study. This richness is required in the situation where individuals view themselves as owning the knowledge. A field study is also a judicious choice when attempting to increase the granularity of understanding of a complex phenomenon like KM Capability.

The following section presents the research model supported by the literature review along with the theoretical basis for KM capability construction. Starting with a resource base perspective, an assessment of how capabilities can provide a sustainable competitive advantage is described. A short review is provided on how causal ambiguity, in the internal development of capabilities, creates barriers to both duplication and mobility. Four different KM capability constructs are developed (Expertise, Lessons Learned, Knowledge Documents, and Data) and definitions are presented for each capability. Conceptual dimensions of each KM capability are provided along with reviews of intermediate firm performance indicators from prior research. A review of prior research establishes the importance of a knowledge sharing organizational culture both theoretically and empirically. Supporting research is presented as to the antecedent nature of culture along with the identification of the culture constructs selected for investigation as to their impact on KM capabilities. The research design and methodology for conducting capability research is then presented in which support for the research model is identified on both firm and individual levels. The next section provides the analysis of data for each of the three research questions, shows support for the relationships provided in the research model and provides a discussion of each of the research question results. The final section reviews the discussion and conclusions including: Contributions and Implications, Limitations and Future Research.

Literature Review & Theoretical Basis

The literature review identified significant potential KM capabilities through the recurrent KM themes in which consistent knowledge processes were recognized. Four themes emerged as significant areas for the description of KM capabilities (See Table 2).

These themes (capabilities) should not be considered either mutually exclusive or collectively exhaustive. Their discussion and presentation as separate capabilities are for analytic convenience since knowledge generated from one capability may flow through one or more of the other capabilities. The four themes recognized as KM capabilities are referred to as: Expertise capability, Lessons Learned capability, Knowledge Documents capability and Data capability. Their definitions are driven by the unique aspects of knowledge and its interaction with the organization's human capital.

Resource Based Perspective

The Resource Based View (RBV) is premised on two underlying assertions: 1) that the resources and capabilities possessed by competing firms may differ (resource heterogeneity), and 2) that these differences may be long lasting (resource immobility) (Mata et al., 1995). Early applications of RBV focused on firm resources, also considered tangible assets. For IS research, these tangible assets most frequently were specific applications or complete systems that were designed to transform the organization. Unfortunately, most IS assets (infrastructure) are easily replicable (Wade et al., 2004) and are therefore poor at sustaining a firm's competitive advantage. The inadequacies of resources or tangible assets to provide a sustainable competitive advantage led to a focus on capabilities, or intangible assets, that can be built uniquely within an organization.

The investigation of capabilities and application of RBV in IS research has a rich research stream to draw upon both empirically and conceptually. Bharadwaj et al. (1998) empirically demonstrated the formation of IT capability as consisting of six elements, but did not test the link between the capability construct and performance. Nine core IS capabilities were conceptually presented by Feeny et al. (1998) and were organized into

the four categories of: business and IT vision, delivery of IS services, design of IT architecture, and core IS capabilities. Ravichandran et al. (2002) examined complementarity from a resource based view and found support for the relationship between IT and non-IT firm capabilities in achieving superior firm performance. The movement of IS research away from tangible assets to a greater focus on capabilities associated with managing and leveraging these resources has an extended and strong conceptual basis. However, empirically measuring and connecting capabilities to performance is still needed (Wade et al., 2004).

The strong conceptual foundations in IS research provide guidelines to construct the various KM capabilities and their potential to contribute to a sustainable competitive advantage. Mata et al. (1995) presented a model developed using the resource based perspective to suggest types of IT investments most likely to be sources of sustainable competitive advantage. This series of three questions concerning resources and capabilities were designed to assess, in terms of value, rarity, imitability and substitutability, IT investments as a source of sustainable competitive advantage. These questions are modified to focus specifically on capability and answered in terms of KM as below:

- 1) Does a particular capability add *value* to a firm?
 - a. No – Means lack of competitive advantage and may result in disadvantage
 - b. Yes – Means go to question 2
- 2) Is a particular capability *heterogeneously distributed* across competing firms?
 - a. No – Means competitive parity
 - b. Yes – Means go to question 3
- 3) Is a capability *imperfectly mobile*?
 - a. No – Means temporary competitive advantage
 - b. Yes – Means sustainable competitive advantage

To address each question in order, the perspective of knowledge as a capability focuses on the subsequent actions taken or decisions made based on that knowledge. Effective decision making is imperative for a firm and is a consistent and continual source of *value* to a firm. Secondly, all firms can be said to possess some level of KM Capability. However, similar to the Management IT Skills described by Mata et al. (1995), the level of these capabilities and especially high levels of capability, may be *heterogeneously distributed* across firms. Hence, while a mean level of capability may indicate only competitive parity for a firm, a high level of capability is *heterogeneously distributed* across competing firms. Finally, the premise that each capability is internally developed or built over long periods of time inherently provides a cost and time disadvantage to a competing firm to acquire that capability. Understanding the role of causal ambiguity inherent in the development of capabilities further establishes the *imperfect mobility* of each KM capability.

Causal ambiguity is the situation where it is hard or even impossible to relate the consequences or effects of a phenomenon to its initial states or causes. The phenomenon in this situation is a high level of KM capability. There are at least two reasons why causal ambiguity supports the possibility of the various KM capabilities becoming a source of sustained competitive advantage. First, an enhanced KM capability improves the decision making of a multitude of knowledge workers. The initial state or source of this multitude of “improved decisions” is difficult to determine and costly to imitate. This causal ambiguity creates a barrier for competing firms to duplicate and obtain a high level of capability. Second, the fact that a high level of capability within a firm is slow to develop and build, is good for the firm that has obtained a high level of capability. The

improvements in knowledge based decision making attained over time may result from tacit attributes of the firm, procedures that are taken for granted, or principles supported by the organization's culture. These improvements may be unspoken, undocumented and taken for granted within the firm and increase the *immobility* of each KM capability. The influence of the lengthy development of an unspoken but understood knowledge culture and the minute improvement in "every" knowledge based decision indicates that a firm can build a competitive advantage based on their KM capabilities.

KM Capabilities

The knowledge-based perspective postulates that the services rendered by tangible resources depend on how they are combined and applied, which is in turn is a function of the firm's knowledge (Alavi et al. 2001). How a firm manages knowledge determines the level of its KM Capability and therefore how effective the services they render. Definitions and descriptions of each KM capability are provided to begin the understanding of the knowledge processes that require a differing management orientation. While each capability is posited to have unique characteristics that allow its consistent management, it should be recognized that there may be multiple knowledge processes within an organization that, when coordinated or managed effectively, provide value that contributes to firm performance. With potentially many processes for each KM capability, the examples provided are not exhaustive. They are intended to provide a starting point for understanding the differences existing in each KM capability. Table 2 has been provided to outline the literature sources of the different KM capabilities.