

2010

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Recommended Citation

Khalifa, Mohamed and Shen, Kathy Ning: An integrated approach in developing knowledge management process capabilities 2010.
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AN INTEGRATED APPROACH IN DEVELOPING KNOWLEDGE MANAGEMENT PROCESS CAPABILITIES

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Keywords: Knowledge management process capabilities; leadership; technology fit; organizational culture.

Abstract: It is widely accepted that effective KM requires both infrastructural and process capabilities. However, very little research has been conducted to understand how either kind of capabilities are developed. In this paper, we focus on KM process capabilities, identify and empirically examine the important factors in that influence the development of KM process capabilities. Particularly, relying on the institutional theory and technology-task fit theory, we propose that KM process capabilities are driven by both organizational, i.e., leadership and organizational culture, and technological factors i.e., technology fit. An empirical study was then conducted with KM practitioners to validate the hypotheses. On the theoretical side, this study entangles the relationship between two KM capabilities proposed in (Gold, Malhotra, & Segars, 2001). On the practical side, the results provide valuable guidelines for developing KM process capabilities, with a balance between both managerial and technical infrastructures.

1 INTRODUCTION

According to the knowledge-based perspective (Spender, 1996) firms are viewed as knowledge system, integrating multiple knowledge streams to apply for operation as well as create new knowledge. As competition becomes increasingly knowledge-intensive, the capabilities of integrating and applying knowledge become one of firms' long-term competitive advantages. Gold et al. (2001) proposed knowledge management (KM) infrastructural capabilities and process capabilities as direct determinants of organizational effectiveness. They argued that an organization must leverage its existing knowledge management capabilities and apply the knowledge in its operations in order to sustain competitiveness.

Since knowledge infrastructural capabilities, cannot be leveraged unless KM processes are in place for that are needed for knowledge creation, storage, transfer and application (Alavi & Leidner, 2001). In this paper, we aim to identify and examine the important factors that influence the development

of KM process capabilities. Particularly, relying on the institutional theory and technology-task fit theory, we propose that KM process capabilities are driven by both organizational, i.e., leadership and organizational culture, and technological factors i.e., technology fit. An empirical study was then conducted with KM practitioners to validate the hypotheses. The major contribution of this study is two folds. First, while most prior studies on KM processes examined various processes in isolation, this study takes a more integrative approach to survey the KM processes practiced in firms. Second, although KM process capabilities have been considered as an important antecedent for overall organizational effectiveness (Gold, et al., 2001), very little research has been done to understand how to develop such capabilities. Thus, this study will entangle this problem by examining the antecedents of KM process capabilities. Practically, the results of this study will provide practitioners a better understanding of the necessary KM processes and how to develop KM process capabilities.

2 KM PROCESS CAPABILITIES

The concept of KM process capabilities is developed based on the knowledge system framework that views organizations as “knowledge systems”, consisting of a series of socially enacted “knowledge processes” (Berger & Luckman, 1967). Such processes are an ongoing set of practices embedded in the social and physical structure of the organization with knowledge as their final product (Pentland, 1995). Numerous endeavours have been made to distinguish the main KM processes, as sampled in Table 1.

Table 1: Classifications of Knowledge Processes

Classifications	Knowledge Processes
Alavi and Leidner (2001)	Creation – storage – transfer – application
Gold et al. (Gold, et al., 2001)	Acquisition – conversion – application – protection
Ernst & Young (1999)	Generate – Represent – Codify – Apply
Holsapple et al. (1997)	Acquire – Select – Internalize – Use – Generate – Externalize
Young (1999)	Acquire – Develop – Retain – Share
Wiig (1998)	Leverage existing knowledge – Create – Capture and Store – Organize and Transform – Deploy
Liebowitz (2000)	Transform – Identify and Verify – Capture and Secure – Organize – Retrieve and Apply – Combine – Learn – Create – Distribute/Sell
Liebowitz et al. (1998)	Identify – Capture – Select – Store – Share – Apply – Create – Sell
Saint-Onge (1998)	Gather – Learn – Transfer – Act
Van der Spek et al. (1997)	Develop – Secure – Distribute – Combine

Based on previous findings, knowledge process capabilities can be classified into seven major categories, i.e., identification, acquisition/generation, organization, storage, distribution or sharing, application and measurement. Each of these processes is described below.

The identification process prioritizes the knowledge to be captured in KM activities in

support of the organizational business strategy. Identification processes include determining the experience to be ratified or converted to be knowledge, the existing internal knowledge to be tapped, the external sources of knowledge that can fulfil knowledge gaps, the new sources of knowledge, and the relative importance of knowledge identified.

When identified as important, knowledge must be acquired or generated within/outside an organization and subsequently be integrated with existing knowledge (Alavi & Leidner, 2001). Acquisition/generation processes are therefore sometimes described as creation, capturing or collaboration (Gold, et al., 2001).

The third process is knowledge organization which refers to the classification, structuring, coordination, linkage, integration, indexing and editing processes of the acquired knowledge (Alavi & Leidner, 1999). Acquired knowledge must be organized and represented in a systematic/consistent format before it becomes useful for the organization.

Knowledge must be stored properly to avoid loss. In addition to saving knowledge, knowledge storage processes also encompass security aspects. Knowledge must be safeguarded from unauthorized access and usage (Porter-Liebskind, 1996). While specific intellectual properties such as copyrights and trademarks are explicitly protected by law, security measures should be developed to protect other knowledge to sustain the competitive advantage of an organization (Porter-Liebskind, 1996).

To exhibit business value, knowledge must be distributed to organizational members. The distribution/sharing process ensures all organizational members are aware of the availability of the tacit/explicit knowledge on hand. Distribution takes place across individuals, groups, departments or organizations (Alavi & Leidner, 2001). Through this sharing process, individual knowledge is transformed into organizational knowledge (Nonaka, 1994).

Knowledge must be utilized or applied into practice to improve organizational performance. Knowledge guides decision-making and action planning (Grant, 1996). In some cases, knowledge application can also trigger knowledge creation and initiate a new knowledge generation cycle (Gopal & Gagnon, 1995).

Finally, it is important to measure whether the progress and performance of existing KM activities achieves the intended objectives. This evaluation process enables managers to take prompt corrective actions or to revise strategies (Bontis, 1999).

Measurement processes must be sufficient but not excessive otherwise growth and development may be hindered.

Hence, KM process capabilities reflect the focuses of KM efforts and enable the above KM processes in an organization, e.g., acquisition, reconciliation, transfer, and application. Such focuses are represented through the frequency, consistency, scope and flexibility in practicing these processes (Grant, 1996).

3 THEORETICAL MODEL

The study of Gold et al. (2001) provides one of very few frameworks that attempted to investigate the role of knowledge capabilities in an integrative framework. In their framework, they distinguish between KM infrastructures, including structural, cultural and technical infrastructures, and KM processes, namely, acquisition, conversion, application and protection. Their study, however, overlooked the interrelationships among the different capabilities of KM infrastructure and their relationships with KM process capabilities.

Built upon this framework, we argue that the development of KM process capabilities requires the support from KM infrastructural capabilities, which help mobilize actual and potential resources, catalyze the formation of knowledge norms, and enable KM processes. More specifically, we identify the following KM infrastructural factors as driving forces for KM process capabilities, i.e., leadership, culture and technology fit (see Figure 1). In this following section, we will discuss each factor and justify the hypotheses.

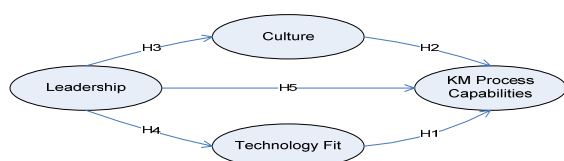


Figure 1: Research Model.

3.1 Technology Fit and KM Process Capabilities

Many major organizational mechanisms for KM activities are mainly enabled and/or supported by information technologies, as reviewed by Alavi and Leidner (2001). However, mere adoption of technologies, in particular, does not necessarily lead to improved performance in KM. According to the

task-technology fit theory (Goodhue & Thompson, 1995), IT infrastructures can enhance quality and speed of KM activities only when the technologies are selected for tasks they are intended to support (Ruggles, 1998). Task-technology fit denotes the congruence between task and technology characteristics (Goodhue & Thompson, 1995; Zigurs & Buckland, 1998). KM process capabilities depend not only on usage but also on the degree of fit between the functionality of the employed information technologies and the requirement of a particular KM activity being supported (Goodhue & Thompson, 1995). We therefore argue that the degree of technology fit rather than IT adoption affects the development of KM process capabilities. Accordingly, we hypothesize that:

H1: Technology fit has a significant positive effect on KM process capabilities.

3.2 Organizational Culture and KM Process Capabilities

Organisational culture refers to “a pattern of shared basic assumptions that was learned by a group as it solved its problems of external adaptation and internal integration, that has worked well enough to be considered valid and, therefore, to be taught to new members as the correct way to perceive, think and feel in relation to those problems” (Schein, 2004) pp. 17). Prior studies have demonstrated that organizational culture plays an important role in either catalysing or hindering knowledge creation and sharing (Brockman & Morgan, 2003). The congruency between organizational culture and KM objectives is critical for developing KM process capabilities (Bennett & Gabriel, 1999). An organization which recognizing the value of knowledge will more likely develop processes to store and manage its knowledge assets. Especially when KM has been supported by intensive information technologies, profound cultural renovations are necessary to secure the success implementation of KM processes (Alavi & Leidner, 2001). Thus, recognizing the critical role of organizational culture in KM, we hypothesize that:

H2: Organizational Culture that is congruent with KM objectives has a significant positive effect on KM process capabilities.

3.3 Leadership and KM Process Capabilities

Leadership refers to the leader's incremental influence over and above general compliance with routine organizational directives (Wakefield, Leidner, & Garrison, 2008). In this context of KM, leadership is represented through leader's taking ownership of KM initiatives in an organization and actively and explicitly champions these initiatives (Khalifa, Liu, & Lee, 2009). First, leadership helps develop desired organizational culture. Prior literature supports the top-down approach in forming or changing organizational culture (Schein, 2004), where leaders define assign value to KM initiatives and signal such value to other members of the firm. Moreover, senior managers can also manipulate prevailing institutional structures to induce individuals to engage in individual structuring actions. They may, for example, implement reward systems that are consistent with KM objectives. Second, by defining and clarifying strategic rationale, the leader of a firm makes it possible to mobilize resources, acquire the suitable information technologies and motivate their appropriate use. Accordingly we hypothesize that:

H3: Leadership has a significant positive effect on organizational culture.

H4: Leadership has a significant positive effect on technology fit.

In addition to the above two indirect effects of leadership on KM process capabilities, we also hypothesize a direct effect of leadership as organizational culture and technology fit may not capture all implications of leadership played in developing KM process capabilities.

H5: Leadership has a significant positive effect on KM process capabilities.

4 EMPIRICAL STUDY

We conducted a survey study with KM practitioners to validate our research model. Table 2 shows the demographic information. The survey was distributed online to 1,000 KM practitioners. A total of 191 respondents participated with valid response, giving an overall response rate of about 19%. Table 2 reports the demographic information.

Table 2: Demographic Information.

Business Nature	Consulting	34%
	Education	17%
	Manufacturing	17%
	Service Industries	12%

	Information Technology	12%
	Not specified	8%
Number of Employees	0-100	31%
	101-500	15%
	501-1000	7%
	1001-2000	9%
	Above 2000	38%
Nature of Involvement in KM Activities	Regular Participant	44%
	Member of KM Team	9%
	Managerial/ Leadership Activities	33%
	Other	14%
Position	CKO	25%
	Equivalent Position	75%

All items were developed according to the procedure introduced by (Moore & Benbasat, 1991). The instrument consisted of 15 items using a 5-Likert scale (1=strongly disagree; 5=strongly agree). The data analysis was done with the Partial Least Squares (PLS) procedure (Wold, 1989), using Smart PLS (Ringle & Sven/Will, 2005). The standard approach for evaluation, requiring path loadings from construct to measures to exceed 0.70, was used. For checking internal consistency, we relied on composite reliability measures (ρ) and on the average variance extracted (AVE) as suggested by Fornell and Larcker (1981). We tested the discriminant validity by comparing the square root of the AVE for a particular construct to its correlations with the other constructs (Chin, 1998).

5 RESULTS AND DISCUSSION

As indicated in Table 3 all reflective items are significant at the 0.01 level with high loadings, therefore demonstrating convergent validity. The composite reliability scores of all constructs are higher than the recommended value of 0.80 (Nunnally & Bernstein, 1994), supporting internal consistency. As for formative items, they all contribute significantly to the formation of the construct of KM process capabilities. Table 4 presents the discriminant validity statistics. The square roots of the AVE scores (diagonal elements of Table 4) are all higher than the correlations among the associated constructs, verifying discriminant validity.

Table 3. Measurement Model Statistics

	Variables	Weights	Loadings
KM_PC	Identification	0.12*	

	Variables	Weights	Loadings
	Acquisition/Generation	0.17*	
	Organization	0.21*	
	Storage	0.24*	
	Distribution/ Sharing	0.25**	
	Application	0.16*	
	Measurement	0.17**	
T_Fit ($\rho = 0.92$)	Item 1		0.91**
	Item 2		0.90**
	Item 3		0.85**
Culture ($\rho = 0.89$)	Item 1		0.87**
	Item 2		0.92**
Leadership ($\rho = 0.93$)	Item 1		0.90**
	Item 2		0.87**
	Item 3		0.91**
KM_PC: KM Process Capabilities; T_Fit: Technological Fit **: $p < 0.01$, *: $p < 0.05$			

Table 4. Correlations and Average Variance Extracted (AVE) (Diagonal)

	T	C	L
Technology Fit (T)	0.89		
Culture (C)	0.40	0.89	
Leadership (L)	0.39	0.46	0.90

The results of the PLS analysis are presented in Figure 2. Our research model explains 68% of the variance of KM process capabilities, demonstrating a good explanatory power. Both culture and technology fit emerge as the key drivers of KM process capabilities. Leadership was also found to be significant but less important. Rather, the effects of leadership were mainly channelled through culture and technology fit.

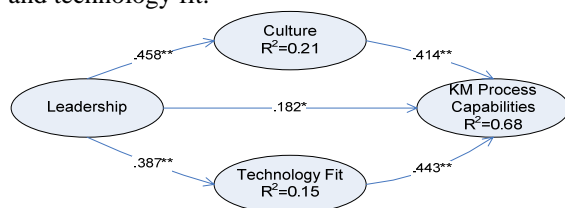


Figure 2: Results of the PLS Analysis.

Technology fit has a significant positive effect on KM process capabilities confirming H1 (path coefficient = 0.443**). These results support our argument for not studying the role of IT in isolation but rather in relation to KM process capabilities. Culture emerges as the second important driver of KM process capabilities (path coefficient = 0.414**), as hypothesized in H2. A supportive

culture as characterized by collaboration and sharing is particularly important for the management of tacit knowledge, which is usually transferred through informal means such as social interaction among employees (O'Dell & Grayson, 1998).

As for leadership, the magnitude of its direct effect is not as important as that of technology fit or culture, but is nevertheless significant (path coefficient = 0.182**), confirming H5. Also, as stipulated in H3, leadership has a significant direct effect on culture with the path coefficient of 0.458** and a sizeable R^2 (21%), verifying H3. Furthermore, our results show that leadership is a significant determinant of technology fit (path coefficient = 0.387**) explaining over 15% of the variance of the construct, supporting H4. These results suggest that it is crucial to establish a leadership position to take ownership of the KM program and to operate the necessary metastructuring actions, such as defining the appropriate KM strategy to orient individuals' behaviour towards the KM objectives.

6 IMPLICATIONS AND FUTURE RESEARCH

In this study, we examined the effects of key KM infrastructural factors on KM process capabilities. Leadership, organizational culture and technology fit were identified and empirically validated to be significant factors for KM process capacities. On the theoretical side, this study entangles the relationship between two KM capabilities proposed in (Gold, et al., 2001). On the practical side, the results provide valuable guidelines for developing KM process capabilities, with a balance between both managerial and technical infrastructures.

This study also implies several opportunities for the future research. First, the future studies could take a longitudinal approach to uncover the dynamic nature of the transformation and interaction among different KM capabilities. Second, the other capabilities should be integrated to provide a more holistic picture of understanding KM effectiveness and overall organizational performance. Finally, while this study focuses on the organizational level; the future research on KM process capabilities can also be conducted at the individual or group level. In this way, we will understand how organizational actions inform individual attitudes and behaviour, vice versa.

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