What Individual-level Antecedents Influence Knowledge Management Effectiveness?

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ABSTRACT:

This paper extends Smith and McLaughlin's model of knowledge management (KM) performance and considers how the antecedents (focus, will, and capability) impact on perceived KM effectiveness from an individual point of view. Adopting a socio-technical perspective, the study divides the human capability factor into technical-based KM capability (HTKMC) and social-based KM capability (HSKMC). The effects of HSKMC, HTKMC, KM focus, and KM participatory willingness on KM effectiveness are examined. The results show that (1) willingness, focus, and HSKMC are associated with high levels of KM effectiveness; and (2) the hypothesized effect of HTKMC on KM effectiveness is insignificant. The findings could help business managers and academics understand the importance of human-oriented and socio-centric knowledge management. Moreover, the proposed framework can serve as a basis for evaluating KM outcomes by providing managers with more specific criteria to interpret the relationship between the individual antecedents and perceived KM effectiveness.

Keywords: *Focus, Will, Capability, Knowledge management, Participatory willingness, Socio-technical view.*

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1. Introduction

Knowledge, an intangible resource embedded within firms, is regarded as the main source for creating organizational capabilities, and as the basis for achieving a competitive advantage (Grant, 1996). The effect of knowledge assets on organizational development is a critical strategic issue in every business (King et al., 2002); thus, this study considers that it is particularly appropriate to explore the relationship between knowledge and its outcomes. The knowledge-based perspective of a firm, which connects well with the parallel stream of knowledge management (KM) in practice, recognizes knowledge as a crucial resource and capability that influences a firm's sustainable profitability. Although the implementation of KM techniques is essential to ensure that businesses grow in the era of the knowledge economy (Chua and Goh, 2008), it is unclear how firms should measure the effectiveness of KM projects.

Scholars have considered a variety of factors that influence KM performance (Becerra-Fernandez and Sabherwal, 2001; Brachos et al., 2007; Davenport et al., 1998; Yu et al., 2007). In studies of organizational behavior, willingness and capability are considered the most significant factors in this respect (Blumberg and Pringle, 1982). Currie and

Kerrin (2003) suggest that employees often utilize their knowledge inefficiently and participate in knowledge activities unwillingly, thereby causing the failure of many KM projects. Argote et al. (2003) note that organizational capability and individual willingness can have positive effects on knowledge activities, while Smith and McLaughlin (2004) assume that KM performance is affected by three important characteristics of a firm, namely, focus, will, and capability. However, there is a general scarcity of models based on empirical studies that examine these relationships.

The concept of KM capability relates to an ability to manage and deploy knowledge resources in order to gain a competitive advantage. Organizations need to consider KM in the context of a technological and social system (Bhatt, 2001; Ekbia and Hara; 2006). The socio-technical view of KM focuses on a firm's strategy for harmonizing KM activities with technological drivers and social enablers to achieve organizational objectives. KM research based on the socio-technical view is well documented (Choi et al., 2008; Lin, 2007; Pan and Scarbrough, 1998). However, to the best of our knowledge, no studies have considered social and technical enablers from an individual point of view.

In this paper, our objective is to extend Smith and McLaughlin's work on the question of KM effectiveness. By conducting a survey and statistical tests, we build an extended framework based on a socio-technical view to identify the link between KM effectiveness and the constructs of focus, will, and capability from an individual perspective.

2. Research Background

KM is becoming increasingly important in today's business environment. To improve and sustain their competitiveness, organizations need to be aware of the importance of KM initiatives. KM initiatives can be defined as any premeditated interventions that enhance a firm's capabilities by systematically explicating, sharing and leveraging knowledge (Chua and Goh, 2008). Two critical questions must be addressed when discussing KM initiatives: (1) What factors influence the success of KM implementation? (2) What criteria should be used to measure the effectiveness of KM projects.

2.1. Factors That Drive Successful KM Implementation

Many studies have reported that a broad range of factors can influence a KM project. For example, Davenport et al. (1998) hypothesized that the effective implementation of a KM project depends on the following eight key factors: whether the project is linked to economic performance or industry values, the firm's technical and organizational infrastructure, a standard and flexible knowledge structure, a knowledge-friendly culture, clear purpose and language, changes in motivational practices, multiple channels for knowledge transfer, and senior management support. Liebowitz (2001) suggested that six key enablers drive the success of KM, namely, KM strategy, a chief knowledge officer (CKO), knowledge ontology and repositories, KM systems and tools, incentive mechanisms, and a supportive culture. The above studies of critical KM factors focus on the organizational level. From a system perspective, Jennex and

Olfman (2004) summarized a variety of studies and proposed twelve factors that drive successful KM systems (KMS). The factors are: an integrated technical infrastructure, an identifiable knowledge strategy, a common knowledge structure, incentives and training, a learning and sharing culture, senior management support, measurements for assessing the impact of KMS, a clear goal for KMS, easy to use KMS, effortless work processes, a learning organization, and security/protection of knowledge. Undoubtedly, these factors are essential for successful implementation of KMS, and firms should consider them to enhance knowledge initiatives as much as possible. However, people-centric factors are also important, but little research has focused on this aspect of KM.

2.2. Knowledge Management Effectiveness

Measuring the effectiveness of KM in terms of business benefits is difficult because the KM instrument is still not clearly defined. Chen and Chen (2006) divide KM performance into qualitative and quantitative measures from a variety of perspectives. Qualitative measures include improving employee skills, product quality, business processes, and customer (supplier) relationships; while quantitative measures include reducing operating costs, improving productivity, and increasing profits. Chua and Goh (2008) identify four elements in a KM initiative, namely, knowledge activities, knowledge assets, the impact on organizational processes, and business objectives; while Khalifa and Liu (2003) view KM effectiveness as KM's impact on achieving a firm's goals. However, these instruments focus on organizations, not KM itself.

KM effectiveness has been assessed by a number of studies using diverse criteria, such as the quality of knowledge (2007), the perceived usefulness of knowledge (Brachos et al., 2007), and the satisfaction derived by using knowledge (Becerra-Fernandez and Sabherwal, 2001; Chou et al., 2005; Lin, 2007). Corso et al. (2006) observe that satisfaction, i.e., a user's perception that the design of an organizational system meets his/her knowledge needs for solving task-related problems, is a frequently-cited construct and an individual-level perspective for measuring KM outcomes. The level of satisfaction derived from using knowledge depends on information availability and knowledge sharing. It is therefore an appropriate variable for assessing KM effectiveness (Becerra-Fernandez and Sabherwal, 2001; Chou et al., 2005).

2.3. The Relationship Between KM Factors And KM Effectiveness

The KM process and the firm's infrastructure are two distinct organizational aspects for identifying the important factors that influence KM performance (Gold et al., 2001; Khalifa and Liu, 2003). The former emphasizes the activities for implementing and integrating organizational knowledge. Lin (2007) suggests that KM effectiveness derives from the successful outcomes of KM processes. Becerra-Fernandez and Sabherwal (2001) indicate that knowledge internalization, externalization, combination, and socialization are the requisite enablers in an effective KM activity. Lee et al. (2005) claim that if the knowledge circulation process (i.e., knowledge creation, accumulation, sharing, utilization, and internalization) is efficient and effective, then it will improve KM performance. The infrastructure contains the fundamental elements of a firm that help maximize organizational capital. Donoghue et al. (1999) observe that successful KM has to connect many organizational elements

(e.g., technology, human resources practices, organizational structure, and culture) to ensure that the right knowledge is delivered to the right people. Al-Busaidi & Olfman (2005) suggest that culture, organizational and technical infrastructure, managerial support, a clear vision, and economic return are key driving forces that increase the usage of KMS. Although many researchers explore important forces that lead to successful KM performance, they report their findings from an organizational or systemic viewpoint, which includes the knowledge process and infrastructure, and lay less emphasis on the individual level.

Sabherwal and Bererra-Fernandez (2003) posit that perceived KM effectiveness at the individual level facilitates group-level KM effectiveness, which in turn affects the perceived effectiveness of KM at the organizational level. Lin (2007) suggests that KM effectiveness at the individual-level increases with the evolution (from initiation and development, to maturity) of KM practices. The more mature the KM practices, the better the perception of individual KM effectiveness will be. Smith and Mclaughlin (2004) focus on explaining the impact of people-factors on KM effectiveness and propose a framework comprised of three enablers (willingness, focus, and capability) that are essential elements for developing KM effectiveness. The framework provides a conceptual reference for exploring the human role in a KM initiative. In this study we adopt Smith and Mclaughlin's framework to examine the effect of antecedents on KM effectiveness.

The relationship between KM enablers and effectiveness has been discussed by several studies, as shown in Table 1.

Table 1: Studies That Consider The Relationship Between KM Factors And KM Effectiveness

Contributors	KM factors / enablers	KM effectiveness
Davenport et al. (1998)	Link to economic performance or industry value / technical and organizational infrastructure / standard and flexible knowledge structure / knowledge-friendly culture / clear purpose and language / change in motivational practices / multiple channels for knowledge transfer / senior management support	Growth in resources assigned to the KM project / growth in volume of knowledge content & usage / organizational initiative / financial return
Becerra-Fernandez & Sabherwal (2001)	Internalization / externalization / combination / socialization	KM satisfaction
Gold et al. (2001)	Infrastructural KM capabilities / process KM capabilities	Innovativeness / coordination / time to market / adaptability / responsiveness to changes
Khalifa & Liu (2003)	Infrastructural KM capabilities / process KM capabilities	KM objectives are achieved
Sabherwal & Bererra-Fernandez (2003)	Internalization / externalization / combination / socialization	Individual / group / organizational KM satisfaction
Al-Busaidi & Olfman (2005)	Culture / infrastructure (organizational & technical)/	An increase in resources assigned to the KMS / Number of users &

	management support / vision clarity / economic return	usage of the KMS
Chou et al. (2005)	Externalization / combination	Perceived satisfaction
Lee et al. (2005)	Creation, accumulation, sharing, utilization, and internalization of knowledge	KMPI (stock price / price earning ratio / R&D expenditure)
Corso et al. (2006)	Organizational mechanism / managerial system/ ICT tools	Work satisfaction
Brachas et al. (2007)	Trust / motivation to transfer knowledge / management support / learning orientation	Perceived usefulness of knowledge.
Huang et al. (2007)	Creation, accumulation, sharing, utilization, and internalization of knowledge	Stock price / price earning ratio / R&D expenditure
Yu et al. (2007)	team activity / reward / learning orientation / system quality	Knowledge quality / User knowledge satisfaction

2.4. Smith And Mclaughlin's PKMS

It is important that the proper factors are employed so that people participating in a KM initiative can design effective performance measurement systems. In recent years, the people-centric nature of KM implementation has been acknowledged as an essential research stream As Davenport and Prusak (1998) remark: "…the roles of people in knowledge technologies are integral to their success". Smith and McLaughlin (2004) propose an effectiveness-based personal knowledge management system (PKMS) for exploring the dynamic and interactive human-related factors that lead to the success of KM. Their model is illustrated in Figure 1.

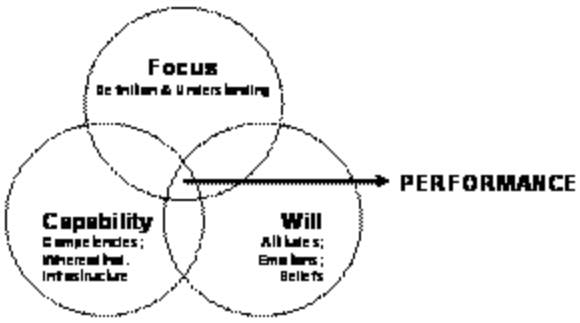

Figure 1: Smith And Mclaughlin's KM Performance Model

The objective of PKMS is to heighten awareness about the impact of people factors on KM implementation. The model considers the impact of three interrelated factors, namely focus, will, and capability, on KM performance. *Focus* is defined as the common vision that helps employees understand why their company is implementing a KM project; *will* is made up of the beliefs, attitudes, and intentions of the employees involved in knowledge activities; and *capability* consists of the knowledge resources of the firm and the competence of the employees. Smith and McLaughlin (2004) argue that if focus, will, and capability are defined appropriately, then KM will be

implemented successfully. Their model is useful for individuals, at various organizational levels, who are aware of the most important factors required to ensure the effectiveness of KM. For this reason we adopt Smith and McLaughlin's model as the basis for determining the effectiveness of KM from a people-centric perspective. There is a scarcity of models based on empirical studies from a KM viewpoint.

3. Research Model And Hypotheses

KM performance is effective when the three constructs – focus, will, and capability – form a self-reinforcing mechanism such that all fields function in harmony. We regard the three constructs as the antecedents of KM effectiveness and examine the relationships among them. The capability construct is not a single concept, but a multi-faceted aspect that can be divided into social-centric and technical-centric capabilities. A social-centric capability focuses on the relationships and interpersonal understanding among organizational members, while a technical-centric capability emphasizes the ability to use information communication technology (ICT) to obtain task-related knowledge effectively (Chuang, 2004; Yang and Chen, 2007). As mentioned earlier, we extend Smith and McLaughlin's model to build a framework that incorporates the socio-technical perspective. Our objective is to identify the link between KM effectiveness and the antecedents at an individual level. Therefore, our study differs from Smith and McLaughlin's (2004) research in two key respects. (1) We adopt a socio-technical perspective and divide the capability construct into technical-based capability and social-based capability. (2) Unlike Smith and McLaughlin, we employ an empirical method to evaluate the research model..

The research framework, shown in Figure 2, incorporates the following four essential antecedents and assesses their impact on KM effectiveness: technical-based KM capability (HTKMC), social-based KM capability (HSKMC), KM participatory willingness, and KM focus.

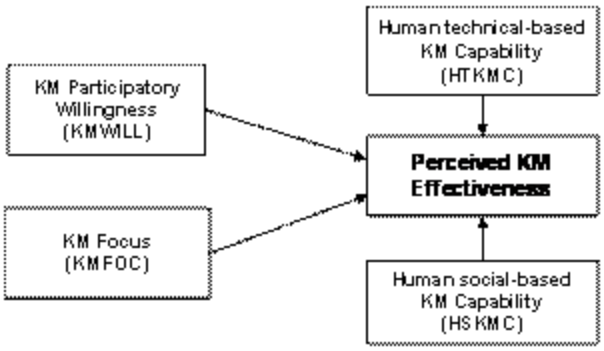

Figure 2: The Proposed Model

3.1. Knowledge Management Participatory Willingness

Willingness to participate in knowledge activities indicates the level of motivation of workers involved in the KM process (Corso et al., 2006). As a means of measuring KM success, the motivation to create, share, and reuse knowledge has been widely

discussed in the literature (Brachos et al., 2007; Davenport et al., 1998; Al-Busaidi and Olfman, 2005; Ko et al., 2005).

Smith and McLaughlin (2004) note that the willingness factor has not been emphasized in organizational KM activities, while Currie and Kerrin (2003) claim that employees lack the willingness and motivation to invest their knowledge in KM systems, resulting in project failures. A survey of KM research by King et al. (2002) shows that the issue of how to motivate individuals to participate in KM activities and contribute their knowledge is the most challenging aspect of KM. Indeed, if individuals are not motivated to accept and implement a KM project, no amount of investment on specific resources will make KM effective.

Kankanhalli et al. (2005) conclude that the success of a knowledge repository system depends on the participants (e.g., knowledge contributors and knowledge seekers) who are willing to use the system to exchange knowledge. Research shows that for a KM project to be effective and create value for the firm, employees must be willing to actively participate in KM implementation (Argote et al., 2003). This leads to our first hypothesis:

> *Hypothesis 1*：KM participatory willingness has a positive effect on perceived KM effectiveness.

3.2. Knowledge Management Focus

KM focus is one of the most important considerations when designing KM strategies. The failure or ineffectiveness of a KM project is usually the result of unfocused activities. O`Dell and Grayson (1998) identify three key factors that explain the importance of KM focus: 1) it confirms that valuable resources are being invested in high profit activities; 2) it verifies that the transferred knowledge is needed by the recipients; and 3) it ensures that managers and employees will invest the required resources in the KM project. Schulz and Jobe's (2001) show that a focused KM strategy results in superior performance. In short, KM focus, which requires a collective commitment to KM goals, is an essential factor in successful implementation of a KM project.

Al-Busaidi and Olfman (2005) suggest that there is a positive relationship between a clear vision on the part of the firm and KM success. Moreover, sharing that vision is a critical element in successful knowledge organization (Goh and Richards, 1997). The clearer the vision of KM presented to employees, the greater the benefits the firm will derive from the KM project (Davenport et al., 1998; Jennex and Olfman, 2004). Thus, we put forward our next hypothesis:

> *Hypothesis 2*：KM focus has a positive impact on perceived KM effectiveness.

3.3. Knowledge Management Capability

A firm's capability is its ability to effectively synthesize a number of the firm's drivers, such as technology, human resources, company culture, and their interaction (Drejer,

2000; Yu et al., 2007). Knowledge management capability (KMC) is defined as the ability to deploy knowledge resources effectively and implement knowledge processes efficiently in order to derive organizational benefits (Dawson, 2000). A set of drivers for developing KMC are used to examine the relationship between KMC and knowledge performance (Yu et al., 2007).

KM can best be understood in a socio-technical context, rather than as a purely technological system (Bhatt, 2001). From the socio-technical perspective, knowledge workers manage their activities with IT-related tools and applications (Ekbia and Hara, 2006). The technical aspect focuses on using information technology (IT) to manage task-related knowledge, while the social perspective stresses the importance of interpersonal understanding. Therefore, to learn how distinct human capabilities impact on KM effectiveness, we divide KM capability into technical-based KM capability (HTKMC) and social-based KM capability (HSKMC) based on a socio-technical perspective.

3.3.1. Human Technical-Based KM Capability (HTKMC)

An organization's IT infrastructure is regarded as an efficient resource that facilitates the acquisition, sharing, and transfer of knowledge (Alavi and Leidner, 2001; Bhatt, 2001; Jennex and Olfman, 2004). Davenport and Prusak (1998) argue that the value of KM lies not only in IT itself, but also in the people that use IT. In other words, the ability to deploy and align different technological resources to support KM activities is a key capability of successful firms (Bharadwaj, 2000; Chuang, 2004; Gold et al., 2001). Alavi and Leidner (1999) note that the technology-based capability related to KM is comprised of an integrated database to store knowledge properly, a navigational tool to retrieve knowledge easily, and an intelligent agent to acquire knowledge accurately.

A key ingredient of KM success is the employees' ability to use IT resources to share their knowledge (Skok and Kalmanovitch, 2005). A number of researchers have identified the positive effect of technology-based capabilities on knowledge activities (Ritter and Gemunden, 2004; Syed-Ikhsan and Rowland, 2004; Yang and Chen, 2007). Clearly, IT capabilities must be deployed effectively to enhance the KM outcome. Thus, we propose our next hypothesis:

> *Hypothesis 3*：Human technical-based KM capability has a positive effect on perceived KM effectiveness.

3.3.2. Human Social-Based KM Capability (HSKMC)

Since knowledge is socially constructed, knowledge activities involve a shared context and complex process whereby different groups interact with each other. Hence, it is essential that KM studies consider social-based knowledge capability. To develop better KMC in the social dimension, a people-centric factor is considered an important driver in a KM project (Davenport et al., 1998; Smith and McLaughlin, 2004).

Many studies have noted the importance of human factors, such as effective human interaction and shared understanding (Brachos et al., 2007; Yang and Chen, 2007) in the successful implementation of KM projects. Human interaction targets the learning and exchange of knowledge about individual values, assumptions, insights, and cognition (Inkpen and Tsang, 2005). Shared understanding - meaning that employees work closely with one another and have a degree of familiarity - shows that the values, norms, and experiences of employees are similar (Nelson and Cooprider, 1996). Moreover, shared understanding helps employees work towards a common goal, and leads to the development of a consensual interpersonal network. Effective KM requires a social context that can enrich the KM outcome. This leads to our last hypothesis:

> *Hypothesis 4*：Human social-based KM capability has a positive effect on perceived KM effectiveness.

4. Research Design

4.1. Instrument And Questionnaire Development

To examine the antecedents that impact on KM effectiveness, we designed a questionnaire comprised of three parts: (1) personal attributes; (2) company information; and (3) research items, which were assessed using a seven-point Likert scale (where 1=strongly disagree and 7= strongly agree). Respondents were asked to provide their opinions about statements made in the questionnaire. Before sending out the final version of the questionnaire, a pilot test was conducted to check the syntax and resolve semantic problems related to the content.

The questionnaire contained 18 items, which were used to measure five variables and construct the relationships among them. All the measured items are shown in the Appendix (Table A) and the results are coded in SPSS for Windows. Next, we define the variables and indicate their sources.

Human technical-based KM capability: Four items are used to assess technical-based KM capability (HTKMC). The items focus on the respondent's ability to use information communication technology (ICT) to retrieve task-related knowledge effectively (Chuang, 2004; Yang and Chen, 2007). For example, we asked respondents to indicate the extent to which they used ICT to retrieve knowledge about products, markets, or their competitors.

Human social-based KM capability: Social-based KM capability (HSKMC) is measured by integrating certain non-technical resources with human knowledge capabilities (Chuang, 2004; Yang and Chen, 2007). The three items used to assess HSKMC ask respondents to indicate the extent to which their intangible capabilities (e.g., developing interpersonal relationships) help them interact with their colleagues in KM projects.

KM focus; Three items are used to measure KM focus (KMFOC). They indicate the extent to which employees have a clear vision about the organization's KM goals and

how they can contribute to the firm's success (Davenport et al., 1998; Goh and Richards, 1997).

KM participatory willingness: KM participatory willingness (KMWILL) is assessed by three items that reflect how positively the respondents view the attitudes, intentions, and motivation of employees that participate in a KM project (Ko et al., 2005; Li, 2003). For example, we asked the respondents to indicate how willing they were to participate in such a project and whether they regarded KM as a routine activity.

Perceived KM effectiveness: The outcome measure (PKME) is assessed by five items that relate to the perceived satisfaction with knowledge availability, sharing, and management when employees participate in a KM project (Becerra-Fernandez and Sabherwal, 2001; Chou et al., 2005). For example, we asked respondents to indicate the extent to which they were satisfied with the knowledge available to support their task needs.

Control variables. Gender, age, and educational level were included as control variables and measured with one self-rated item. These variables were coded as dummy variables to conduct the statistical tests; for example, males were coded as 0 and females as 1.

Table 2 summarizes the definitions of the variables and the related literature.

Table 2: Research Variables

Variables	Definitions	Related literature
Human social-based KM capability (HSKMC)	The relationships and interpersonal understanding among organizational members.	Chuang (2004); Yang and Chen (2007)
Human technical-based KM capability (HTKMC)	The ability to use information communication technology (ICT) to obtain task-related knowledge effectively	Chuang (2004); Yang and Chen (2007)
KM focus (KMFOC)	A clear vision or understanding of the organization's KM goals	Davenport et al. (1998); Goh and Richards (1997)
KM participatory willingness (KMWILL)	The attitudes, intentions, and motivation of employees participating in a KM project	Ko et al. (2005); Li (2003)
Perceived KM effectiveness (PKME)	The perceived satisfaction with knowledge availability, sharing, and management when employees participate in a KM project	Becerra-Fernandez and Sabherwal (2001); Chou et al., 2005); Lin (2007); Sabherwal and Becerra-Fernandez (2003)

4.2. Data Collection

Anyone who participated in a KM program was regarded as a target for measurement in this study. The respondents to the questionnaire were part-time EMBA/MBA students at a number of universities in northern Taiwan. They all had comprehensive domain knowledge and had participated in KM activities in their companies. At the time of the study, the majority had worked for more than 7 years in various fields, such as semiconductors, opto-electronics, computers and communications, networking, service industries, and government. Participation in the study was voluntary.

The survey was conducted over a two-month period in classes and via e-mail. A total of 410 questionnaires were distributed and 278 students responded (an initial response rate of 67.8%). Twenty-two questionnaires were discarded because of missing data and problematic response patterns, and 125 were not relevant because the respondents' firms had not implemented KM projects. Hence, there were 131 usable questionnaires (a final average response rate of 32%). Table 3 provides detailed information about the respondents' fields of employment and demographics.

Table 3: Profiles Of The Respondents

Measure	Items	Frequency	Percent (%)	Cumulative (%)
Gender	Male	90	68.7	68.7
	Female	41	31.3	100
Age	≤30	33	25.2	25.2
	31-40	44	33.6	58.8
	>40	54	41.2	100
Education level	Graduate (above)	39	29.8	29.8
	Bachelor	88	67.2	97.0
	Others	4	3.0	100
Firm size	≤1000	35	26.7	26.7
	>1000	96	73.3	100
Department	Headquarters	20	15.3	15.3
	Marketing	11	8.4	23.7
	Manufacturing	5	3.8	27.5
	R&D	29	22.1	49.6
	Accounting	10	7.6	57.2
	MIS	24	18.3	75.5
	Others	32	24.4	100
Industry Sector	Government	30	22.9	22.9
	Finance/Insurance	5	3.8	26.7
	Semiconductor/Opto-Electronics	27	20.6	47.3
	Computer/Communication/Network	24	18.4	65.7
	Service	32	24.4	90.1
	Manufacturing	6	4.6	94.7
	Others	7	5.3	100

Most respondents were over the age of 30 (74.8%) and most were male (68.7%). The majority of the participants (67.2%) were university graduates and 29.8% had attended graduate school. In terms of occupations, 24.4% worked in the service industry, 39.0% worked in high-technology related industries, 22.9% were government employees, and the remainder worked in the finance, insurance, or manufacturing sectors.

The KM projects in our survey were implemented over a two-year period and included quality control and management, knowledge networks and platforms, intellectual capital management, and knowledge community systems.

5. Analysis And Results

The descriptive statistics and correlation matrix of the key variables are shown in Table 4. The majority of correlations are statistically significant at the p <.01level. All the measures are relatively distinct, with the highest correlation measured at .73 and the lowest at .27.

Table 4: Correlation Matrix And Descriptive Statistics Of The Measures

Measure	Mean	S.D.	1	2	3	4	5
1.HTKMC	5.9	.80	1.00				
2.HSKMC	4.7	.89	.28**	1.00			
3.KMWILL	5.0	.88	.36**	.66**	1.00		
4.KMFOC	5.1	.88	.30**	.66**	.69**	1.00	
5.PKME	4.9	.96	.27**	.66**	.67**	.65**	1.00

** Correlation is significant at the 0.01 level

The constructs used to meet the parametric requirements of the regression test were assessed for reliability and validity. The hypotheses were then tested using multiple regression analysis.

5.1. Validity And Reliability Analysis

Our analysis of the constructs' reliability and validity followed that suggested by Lee and Choi (2003). The results are detailed in Table 5. To assess the reliability of the instruments, Cronbach's alpha is used to examine the effect of each multiple scale item. The reliability of all the constructs is adequate because all alpha values are in the range 0.81 to 0.93, and therefore exceed the recommended cut-off value (0.7) (Nunnally, 1967).

Content validity refers to the representativeness of the items in the questionnaire. All constructs and their associated items in this study were designed according to the relevant literature. Therefore, the content validity requirement is fulfilled. The convergent validity was assessed by checking the item-to-total correlation scores to determine if items in the same construct correlate highly with each other. All items in the questionnaire had an item-to-total correlation higher than 0.4, thus indicating convergent validity. Discriminant validity indicates the extent to which a given construct is different from other constructs. To assess discriminant validity, factor analysis, which checks for unidimensionality among multiple items, is used to examine the factor loadings. Items with factor loading values lower than 0.5 are considered failures. The analysis results show that the factor loading on individual constructs is higher than 0.66, indicating that each measure has adequate discriminant validity.

Table 5: Statistics Of The Reliability And Validity Tests

Measure	Number of items	Reliability (Cronbach α)	Convergent validity [a]	Discriminant validity [b]
HTKMC	4	.88	.65	.68
			.79	.83
			.82	.92
			.74	.81
HSKMC	3	.81	.62	.66
			.70	.73
			.65	.70
KMWILL	3	.90	.80	.86
			.64	.69
			.83	.88
KMFOC	3	.88	.84	.95
			.83	.93
			.65	.70
PKME	5	.93	.80	.84
			.82	.86
			.81	.85
			.86	.90
			.79	.83

[a.] Convergent validity: correlation of item with total score-item.; [b.] Discriminant validity: factor loading on single factors.

5.2. Common Method Variance

Common method variance (CMV) can be a problem when predictor and criterion variables are collected from a single informant or context. To reduce the number of potential problems resulting from CMV, we took two precautions. First, we used Harman's one-factor procedure to statistically test for the presence of CMV among our variables (Podsakoff and Organ, 1986). The results indicate that more than one factor was extracted, with a total variance extracted of 77.7%. The first factor only accounted for 23.9% of the variance, suggesting that CMV was not a problem in this study. Second, following Podsakoff et al. (2003) and Liang et al. (2007), we included the 19 items, the five constructs, and a common method construct that was linked to all the items in the PLS model. The results show that the average substantively explained variance of the items is .55, while the average method-based variance is .017. The ratio of substantive variance to method variance is about 32:1. Moreover, most method factor loadings are insignificant, further indicating that CMV was not a serious problem in this study.

5.3. Hypotheses Test

A multiple regression procedure to determine the effects of independent variables on dependent variables was analyzed by six separate models. The results of the regression analysis are summarized in Table 6. In the first model, only control variables are used. The result for Model 1 indicates that an employee's age has a significant effect on perceived KM effectiveness. Older employees derive more satisfaction than their

younger colleagues by participating in KM. Other control variables are insignificant in terms of KM effectiveness.

Model 2 considers the effects of the control and independent variables on a dependent variable. The increment to R^2 was statistically significant in terms of KM effectiveness (ΔR^2 =.557, F=21.47, p<.001) in this model. The results of the second model show that KM participatory willingness and KM focus are associated with high levels of perceived KM effectiveness, providing strong support for Hypotheses 1 and 2. HSKMC was found to be a relatively significant predictor of KM effectiveness; therefore, Hypothesis 4 is supported. This finding verifies that an organization can derive strategic benefits of KM from effective interpersonal relationships. However, the hypothesized relationship between HTKMC and KM effectiveness (Hypothesis 3) is not supported; hence, technical-based KM capability does not improve knowledge satisfaction.

Table 6: Summary Of Estimated Regression Results

Variables	Model 1	Model 2
Control variables		
Gender	-0.139 (-1.660)	-0.060 (-0.987)
Age	0.358*** (4.157)	0.159* (2.449)
Education	-0.006 (-0.072)	-0.016 (-0.268)
Independent variables		
HTKMC (X_1)		0.012 (0.186)
HSKMC (X_2)		0.280** (3.274)
KMWILL (X_3)		0.294** (3.245)
KMFOC (X_4)		0.198* (2.237)
R^2	0.163	0.584
Adjusted R^2	0.137	0.557
F value	6.153***	21.417***

Dependent Variable: KM Effectiveness. (*p<.05, **p<.01, ***p<.001); *t* statistics in parentheses.

6. Discussion

Most organizations that implement KM projects concentrate excessively on developing effective information-based KM systems and operating them efficiently (HTKMC). Consequently, they do not always motivate employees to contribute their know-how and experience to a project (willingness), and the employees do not realize why KM is needed (focus). More specifically, the need (HSKMC) to promote interpersonal communication for knowledge sharing is not considered by many organizations. By providing empirical evidence for an effectiveness-based KM model, this study stresses the importance of investing in the development of a strong social-based KM capability, KM focus, and KM participatory willingness, as well as in technical-based KM capability.

As mentioned earlier, focus and motivation to participate impact on KM outcomes. Summarizing the significant findings for the industries studied, managers who perceived that their firms emphasized KM focus and willingness also reported better KM effectiveness. Firms that have recognized the importance of KM participatory willingness have devised a variety of schemes to motivate their employees to contribute their knowledge voluntarily. Since willingness involves an employee's attitudes, beliefs, and emotions, managers need to understand the factors that motivate an individual to participate in KM. Bock et al. (2005) define these factors as self-interest, reciprocal behavior, and organizational commitment. The intrinsic needs of knowledge workers, such as the enjoyment derived from helping others and knowledge self-efficacy, must be satisfied by building individual confidence and organizational trust. Moreover, by helping knowledge workers strengthen their reputations in their fields of expertise, organizations can promote individual participation in KM projects (Wasko and Faraj, 2005). Hence, it is essential that companies establish motivational aids to encourage individuals to share and apply their knowledge. It is also important that managers and knowledge workers have a shared vision that identifies the nature of the KM mission. The true value of KM may not be realized because managers do not have a strategic vision of KM to guide workers. In other words, they need to translate strategic imperatives into a knowledge-centric vision of the organization. Such a vision provides a frame of reference for KM that is meaningful to workers, and forms the basis for implementing effective KM initiatives. In short, managers have to clearly understand the strategic focus of KM and establish a KM vision to ensure that all employees realize the importance of knowledge activities to the organization.

Many KM initiatives may fail to deliver the expected outcomes because employees lack the capability to leverage their knowledge resources effectively. Strategies for implementing KM projects are usually regarded as technology-based knowledge systems that are used to acquire, transmit, and create task-related knowledge in firms. It is assumed that a firm's techno-centric capability has a primary effect on KM activities. However, the findings of our empirical study show that individual HTKMC has no impact on KM effectiveness. This indicates that technical solutions are ineffective in terms of successful implementation of KM projects, even though most firms view such solutions as instruments for achieving KM success. In other words, HTKMC might be a necessary skill to support knowledge activities, but it is not sufficient to ensure a project's success.

Two factors may explain this unexpected result. First, we measure the construct of technical-based capability with cognitive items based on respondents who rate their ability to operate ICT effectively. The results may not reflect the real situation. To obtain an objective rating for measuring technical-based capability, a future study might adopt quantification indicators, including the number of KMS functions that operate effectively, the score for executing a technological examination, or the number of training hours allocated to teach staff about using KMS. Second, we only consider technical-based capability on a single dimension, i.e., technical skill. However, Bharadwaj (2000) notes that IT capability includes tangible resources (e.g., the physical system), human IT resources (e.g., IT skills), and intangible IT-enabled resources (e.g., knowledge assets). Further research might synthesize a variety of IT-

based factors as an accumulative, multi-dimensional variable to fully examine the construct's validity.

The ability of people to act (skill, education, experience, value, and social skills) is essential in various situations (Martin, 2000). The results show that stronger HSKMC improves KM effectiveness. Successful KM implementation is highly dependent on the collaborative nature of organizational and social factors – a fact ignored in typical KM initiatives. By providing empirical evidence that HSKMC affects KM positively, this study suggests that managers may need to devote additional organizational resources to assess the level of KM satisfaction. The experience of the Nucor Corporation, a Connecticut-based steel manufacturer, illustrates how a social system can achieve critical knowledge tasks (Gupta and Govindarajan, 2000). The firm has developed a variety of transmission channels, such as face-to-face communication and a community network, to facilitate the transfer and sharing of tacit knowledge held by individuals. Face-to-face communication requires an environment that encourages personnel to discuss task-related issues in an open manner. Meanwhile, a community network promotes interpersonal interaction, which enables employees to share their know-how effectively.

Most researchers agree that the biggest challenges in KM are not technological, but human-based or behavioral issues. As Bhatt (2000) notes "technological systems are important in developing organizational capabilities, but technologies do not determine capabilities." It has been suggested that social-based KM capability is more important than technical-based KM capability in a successful KM project. In conclusion, managers have to increase their efforts to improve individual investment (the motivation to participate in KM, the development of interpersonal relationships among employees, and focus of KM mission/vision) in KM programs. This study suggests that KM benefits will only be realized by firms that make long-term investments to align their people-centric resources for use in KM.

7. Limitations And Future Research

Before discussing the contributions of this research, we should acknowledge the limitations of this study. First, although the study obtained some significant results to support the hypotheses by investigating a sample of 131 respondents, a larger sample would have allowed us to conduct more complicated analysis. To increase the generalizability of the results, we will use a larger sample in future research. Second, the sample was comprised of EMBA/MBA students. Although the so-called convenience sample is acceptable and it has been used in a number of studies (Bontis, 1998), the framework cannot be used to formally evaluate enterprises or industries.

Future works should focus on three tasks. First, an extended framework should be constructed to explore the factors that would strengthen KM participatory willingness, a mechanism to build KM focus, and methods to improve KM capabilities. Next, a similar framework, targeting cross-organization units and their differences, should be developed to examine the main and interacting effects of antecedents on KM performance. Finally, a few new and unknown factors that facilitate KM effectiveness

might be explored based on interviews with experts or the discussions of a focus group.

8. Conclusion

The primary contribution of this study is that it evaluates an effectiveness-based model, similar to that of Smith and McLaughlin, for understanding the determinants of KM effectiveness at the individual level. In addition, the study employs a socio-technical conceptual framework to construct diverse knowledge capabilities and examine their impacts on KM. Our objective is to provide empirical evidence to support our hypotheses about the relationships between KM antecedents and KM outcomes. The results generally support the proposed framework, with three of the four hypotheses confirmed. We demonstrate that KM participatory willingness, focus, and social-based KM capability are associated with high levels of perceived KM effectiveness. Interestingly, the hypothesized effect of technical-based KM capability on knowledge effectiveness is insignificant.

The findings could help managers and academics understand the importance of socio-centric capability-based knowledge management. Moreover, the proposed framework can serve as the basis for evaluating KM effectiveness and provide managers with more specific criteria for interpreting the relationship between KM antecedents and outcomes at the individual level.

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