Knowledge Management Strategy of Thai Manufacturing Firms

Saweeya Prathanadi, Ph.D.
Graduate School, Nakhon Ratchasima Rajabhat University

Abstract

Knowledge management (KM) is important for enhancing innovation and competitive advantage in a fast-changing environment. In Thailand, most executives still lack successful models that could be used as guides. It is important for them to make the explicit connection between their organizational innovation and how they use the KM strategy to support it. A quantitative research design was employed by collecting data from manufacturing firms in the knowledge-intensive and non-knowledge-intensive firms. The research results indicate that both codification and personalization KM strategies can positively and significantly affect organizational innovation. This research provides business executives new insights about making surefooted decisions as to which KM strategy to focus and their investments in it. Therefore, this will maximize the benefit of KM implementation and innovation performance of the Manufacturing firms.

Keywords: Knowledge management strategy / Organizational innovation / Knowledge – intensive manufacturing firms / Codification / Personalization

Introduction

Today, manufacturing firms have to deal with dynamic, complex, and rapidly changing business environments in order to survive in the competitive global economy. Grant (1996) stated that the sources of competitive advantage are not all the firm's internal resources, but just the knowledge-related assets of the organization and its competence to integrate knowledge. Therefore, organizations recognize knowledge as the only meaningful resource (Drucker, 1996), fundamental basis of competition (Zack, 1999), and a key to business success.

Many managers still do not know what to do to manage an organization's knowledge. It is important for them to have enough guidance to develop KM and make the explicit connection between their organizational innovation and how they use knowledge management strategy to support it.

Objectives

This study addresses the following questions: (1) What is the relationship between KM strategy and organizational innovation among Thai manufacturing firms? (2) Does manufacturing types (knowledge-intensive and non knowledge-intensive) moderate the relationship between KM strategy and innovation performance of these Thai firms? And (3) Does organization size moderate the relationship between KM strategy and innovation performance of these Thai manufacturing firms?

Literature review

Knowledge management strategy

KM strategy is the process of generating, codifying, and transferring explicit and tacit knowledge within an organization, getting the right information, to the right people, in the right place and at the right time (Halawi, McCarthy, and Aronson, 2006).

The two very different KM strategies were identified: The codification and personalization approaches to KM. In some companies, the codification strategy centers on the computer. Knowledge is carefully codified and stored in databases, where it can be accessed and used easily by anyone in the company. In other companies, knowledge is closely tied to the person who developed it and is shared mainly through direct person-to-person contacts. The chief purpose of computers at such companies is to help people communicate knowledge, not to store it. They call this the personalization strategy (Hansen, Nohria, and Tierney,1999).

Hansen et al.'s (1999) distinction of codification and personalization strategies is similar to exploration and exploitation typology proposed by March (1991). Both classifications are corresponding in that codification is related to exploitation, whereas personalization refers to exploration of knowledge. Moreover, both typologies are alike in that firms should not attempt to implement and excel at both strategies. Rather, companies should use one KM strategy primarily and use the second to support the first (Smith, 2004; Kim & Trimi, 2007). Specifically, Hansen et al. (1999) recommend an 80-20 split.

The following details about two KM strategies are described by Wong and Tiainen (2004).

a) The codification approach

The core of the codification approach to KM is to develop an electronic document system that codifies, stores in databases, disseminates, and allows reuse of knowledge. The recurrent practice with similar problems eventually leads to a large scale of knowledge being articulated and reused by more knowledge users without having to contact the original source of knowledge or experts (Wong and Tiainen, 2004).

For the codification strategy to be successful, the processes, which knowledge the company seeks to manage, that are critical to the business are identified with all the internal knowledge tasks identified and articulated. The various tasks related to the identification, elicitation, validation, representation, and verification are formalized, with all the roles required to take up all these tasks created. Technical details such as what knowledge acquisition methods are to be used should also be identified for extracting the knowledge for further codification and storage. Such codified knowledge is then stored in a database or knowledge base for later retrieval by either other persons or an automatic system for its operations. The KM focus is on constructing a model that is a good representative of the knowledge intensive process with all the components formalized to a computational form. Hansen et al. (1999) summarized that knowledge is codified using a people-to-document approach. The strategic focus is to invest heavily on information technology to connect people with reusable codified knowledge (Lee and Hong, 2002).

The codification strategy to KM has found many adopters such as Dell in the computer industry (Wong and Tiainen, 2004).

b) The personalization approach

The core of the personalization approach to KM is to develop an information systems infrastructure or networks of people that facilitates the communication of individuals in a company, so that they can easily exchange ideas and share their knowledge such as tacit knowledge (Lee and Hong, 2002) through socialization and communication. Thus, this approach focuses on dialogue between individuals, not knowledge in a database (Hansen et al., 1999). However, Lee and Hong (2002) proposed that the strategic focus of the information technology is to invest moderately to connect people and their ideas.

The competitive strategy for companies that favor the personalization approach can be characterized as an 'innovative' strategy. An innovative strategy emphasizes, instead of reuse economies, an expert economic. An expert economic model typically features a high fee being charged to the clients for a highly customized solution (Hansen et al., 1999; Lee and Hong, 2002). The client's problem will not be framed with a generic problem template for arriving at a quick generic solution. As such the strategy of investing once and reuse many times is not the target of the innovative strategy. Instead, the company typically uses small teams of human experts with a low ratio of associates to experts (Wong and Tiainen, 2004). The value-adding philosophy of companies adopting an innovative approach of KM is to offer their clients with a high-cost, one-of-a-kind innovative solution to a unique problem (Lee and Hong, 2002). Sufficient return is guaranteed from the premium embedded in the high fees (Wong and Tiainen, 2004).

The personalization approach to KM has found many adopters such as Hewlett-Packard in the computer industry (Wong and Tiainen, 2004).

Table 1, adapted from Ribiere, Arntzen, Worasinchai, (2007), lists the type of technologies and practices likely to be used in each of the different KM strategy type. The level of usage of each KM strategy (Codification vs. Personalization) was calculated to determine the KM strategy that the firm primarily focuses on. However, the one that had about equal usage score for both KM strategies will be considered as having a balanced strategy.

Table 1: Technologies and Practices Used in Each of the Different KM Strategy Type

Codification	Personalization
1. Email & Listserv	1. Expertise locators-Corporate yellow pages -Who's who– Directory of expertise
2. Corporate Intranet – Extranet - Internet	2. Communities of practice : CoP's -Communities of interest : CoI's
3. Database Management System (Oracle, Informix)	3. Brainstorming – peer interaction/conversation
4. Search engines – web portals – intelligent agents – information retrieval systems	4. Groupware (as a collaborative tool not as an Email tool, e.g, Lotus Notes)
5. Data Warehouses - Data Marts	5. Teleconferencing (shared applications, whiteboards)
6. Web-based training – e-learning- online training	6. Lessons learned / Best practices repository
7. Help-desk applications	7. Videoconferencing (using audio and/or video)
8. Multimedia Repositories	8. Mentoring / Tutoring
9. Document Management Systems (EDMS)	9. Story telling/ Success story sharing (SSS)
10. Content Management Systems (CMS)	10. Dialogue
11. Data Mining tools - Knowledge discovery tools	11. After action review (AAR)
12. Decision support systems (Executive Information; Expert Systems)	12. Online chat & Instant Messaging
13. Knowledge mapping tools	13. Weblogs (Blogs)
14. Web forum – Discussion groups - News group	14. Wikis
15. Index system - Category	15. RSS (Rich site summary)
16. Navigation – Metadata	16. SNA (Social network analysis)
17. Business Intelligence (BI)	17. Social bookmarking
18. Taxonomies	18. Folksonomies-Tagging

Organizational innovation

The dependent variable is organizational innovation which is considered to be highly important for a firm's competitiveness. However, the definition of "organizational innovation" is interpreted differently and lack of widely accepted definition. "…referring to Schumpeter and other innovation researchers, innovation can be considered to be a complex phenomenon including technical (e.g., new products, new production methods) and non-technical aspects (e.g., new markets, new forms of organization) as well as product innovations (e.g., new products or services) and process innovations (e.g., new production methods or new forms of organization) (Armbruster, Bikfalvi, Kinkel, Lay, 2008; Anderson, King, 1993; Damanpour, Evan, 1984; Totterdell, Leach, Birdi, Clegg, Wall, 2002).

Govindarajan and Trimble (2007) said that innovation can be viewed in the number of forms. The success of any organization is largely based on its ability to predict the future direction of convergence that can enrich the entire value chain-operational innovation, new products/services, new customer value, and new customer base which are relevant to organizational innovation (Lee & Olson, 2010). Therefore, this study tries to cover all areas of organizational innovation. The measurements of organizational innovation summarized as follows; efficiency of the value chain; new products/ services and quality; speed; customization; and new customer base.

Organizational size

Organizational sizes in this study were categorized by number of employees (Damanpour, 1992). According to terminology of SMEs by the Office of Small and Medium Enterprises Promotion (2007) in Thailand, it is classified by number of employees. First, they classified the small enterprises having the number of employees not over 50 employees. Second, medium enterprises were classified by number of employees in the 51-200 range. Lastly, the large organizations mean the size of having more than 200 employees. Thus, in this study, organizational sizes were categorized in three types.

Industry type

The trend in the 21st century promises to emphasize knowledge-intensive industries (Lee and Olson, 2010). Manufacturing industries comprised the industries of aerospace, computer and office automation equipments, pharmaceutics, communication, semi-conduct, scientific instrument, automobile, electrical machinery, chemical engineering, transport equipment, and so on. In this study, researcher categorized industries based on OECD to two manufacturing types as following.

1) Knowledge intensive - manufacturing sector: KIM (included computer & office automation, pharmaceutics, semi-conduct, automobile, electrical machinery, chemical engineering)

2) Non knowledge intensive manufacturing sector: NKIM (included resources/energy, real estate /construction)

Hypotheses Development

Lorlowhakarn and Ellis (2005) noted that in Thailand "the significance of innovation in creating and enhancing national competitiveness is widely recognized. National innovation systems provide a sustainable development strategy for promoting innovation in R&D institutions and enterprises. Academic and financial support mechanisms along with knowledge management are considered to be crucial driving factors for innovation management".

It is interesting that previous statement mentioned about KM and innovation. KM strategy is the part of KM that deals with the way to manage knowledge to gain higher performance and enhancing competitiveness. The importance of organizational innovation for competitiveness has been proven (Mogollon, Carrión, Navarro, and Millán, 2010). This brings to the first question of this research. "What

is the relationship between KM strategy and organizational innovation among Thai manufacturing firms?" The result of KM strategy is believed to enhance organizational innovation. This study hypothesized that there is a positive relationship between KM strategy and organizational innovation

Hypothesis 1: There is a positive relationship between KM strategy and organizational innovation

Hansen et al. (1999) identified two very different KM strategies: codification and personalization strategy. Thus, it is interesting to study each of KM strategy and its relationship to organizational innovation separately. The result of each KM strategy is believed to enhance organizational innovation. However, organizational innovation described by Lee and Olsen (2010) shown the impact of innovation type of all levels that lead us to believed that organizational innovation is comprised of the following dimensions. First, efficiency of the value chain – this leads to better efficiency through higher productivity, employee skills, cost reduction, profitability figures, decision-making, problem solving, and so on; Second, new products/services and quality - focused on creative ideas to improve products or services or quality; Third, speed – focused on faster response of business issues; Forth, customization; Last, new customer base - focused on the new customer base, e-customers, global customers, customer communities. The sub-hypotheses involve each KM strategy that increases each of organizational innovation as followings:

Hypothesis 1a: A codification strategy of KM increases efficiency of the value chain
Hypothesis 1b: A codification strategy of KM increases new products/services and quality
Hypothesis 1c: A codification strategy of KM increases speed
Hypothesis 1d: A codification strategy of KM increases customization
Hypothesis 1e: A codification strategy of KM increases new customer base

Hypothesis 2a: A personalization strategy of KM increases efficiency of the value chain
Hypothesis 2b: A personalization strategy of KM increases new products/services and quality
Hypothesis 2c: A personalization strategy of KM increases speed
Hypothesis 2d: A personalization strategy of KM increases customization
Hypothesis 2e: A personalization strategy of KM increases new customer base

Many researchers have argued that organizational size facilitates innovation (Damanpour, 1992). Large organizations have more complex and diverse facilities (financial slack, marketing skills, research capabilities, product development experience (Nord and Tucker, 1987), and more professional and skilled workers (Damanpour, 1992) that help the adoption of a large number of innovations. Thus, large company have many chances to manage knowledge from their professional and skilled workers which

most likely to adopt personalization of KM. However, in some large organizations also have potential to invest in the strategy centers on the computer. Knowledge is carefully codified and stored in databases, where it can be accessed and used easily by anyone in the company. Consequently, it is expected that a large organization is more likely to adopt both personalization and codification strategy of KM and gain better performance of organizational innovation in terms of efficiency of value chain, new products/ services, and customization. This study hypothesized as the followings;

Hypothesis 3a: The effect of balance strategy in the efficiency of value chain is greater in large organizations than it is in small-medium organizations.

Hypothesis 3b: The effect of balance strategy in new products/services is greater in large organizations than it is in small-medium organizations.

Hypothesis 3c: The effect of balance strategy in customization is greater in large organizations than it is in small-medium organizations.

On the other hand, some organizational scholars argue that large size does not necessarily result in greater innovativeness (Hage, 1980; Utterback, 1974 cited by Damanpour, 1992). Smaller organizations can be more innovative because of their flexibility and having more ability to adapt. In order to achieve a new customer base, researcher believe that codification strategy of KM can enhance this innovation performance. This study hypothesized as follows.

Hypothesis 3d: The effect of codification strategy in new customer base is greater in small-medium organizations than it is in large organizations.

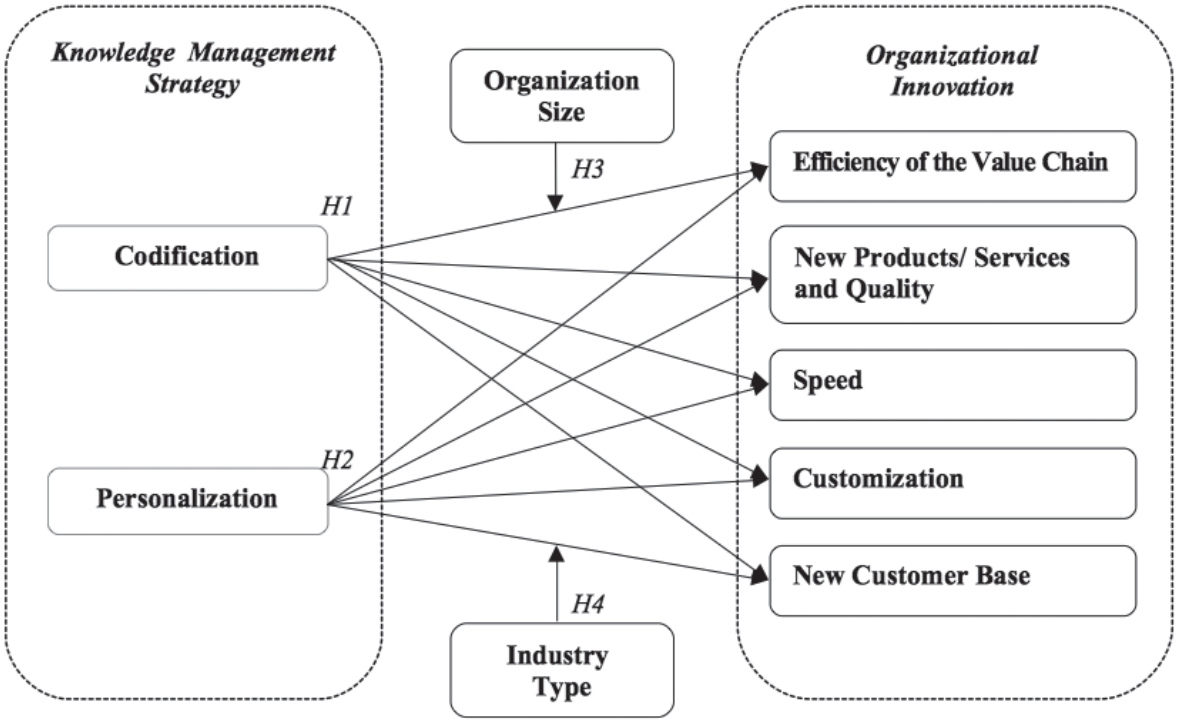
Large organizations have more expertise and experienced skill workers. Therefore, personalization strategy of KM is believed to help the large organizations faster response for any business issues. This study hypothesized as follows.

Hypothesis 3e: The effect of personalization strategy in speed is greater in large organizations than it is in small-medium organizations.

The trend in the 21st century promises to emphasize knowledge-intensive industries. Value and wealth are being created in such knowledge-intensive industries such as biotechnology, ICT, pharmaceuticals, and so on (Lee and Olsen, 2010). The process of KM in knowledge-intensive manufacturing firms is more codification of knowledge than in knowledge-intensive servie firms and still needs experiences from knowledge workers. Hence, a balance strategy is believed to be better in all constructs of organizational innovation in knowledge-intensive manufacturing firms. This study proposes the following hypothesis.

Hypothesis 4a: The effect of balanced strategy in organizational innovation is greater in knowledge-intensive manufacturing firms than non knowledge-intensive manufacturing firms.

Figure 1 Research Model



Research methodology

Data Collection and Instrument

The target populations of this study are chief knowledge officers (CKO), managers and employees involved in KM implementation at any level in an organization. If CKO or the members of KM team are not available in some organizations, chief information officers (CIO) and employees in IT department or involved in human resource development at any level in an organization should be the appropriate persons to be responsible for the task. Thus, a majority of respondents in this study are CKO, CIO, employees in any level of KM team or IT department or department of human resource development while, at the same time, being able to avoid response bias by using a single informer.

A survey-questionnaire was used as the measurement instrument. The questionnaire contains three sections as follows; First, organizational profile and respondent profile; Second, KM strategy assessment tool; Last, organizational innovation assessment tool. The questionnaire items concerning KM strategy were modified from Ribière (2005) and a comprehensive review of previous research. A panel of experts, including senior scholars and professional managers in the respective fields help ascertain the adequacy and appropriateness of wordings in the questionnaire. While, questionnaire items concerning organizational innovation were developed from literature reviews.

Each mailing set asking for participation was mailed to the targeted people involved with KM to 600 companies. Moreover, the online version was available as an internet survey at https://www.surveymonkey.com/s/JL53CDC which researcher informed this web browser in the mailed questionnaires to make more convenient access for respondents. The targeted companies were all located in Thailand. A total of 254 responses (from 185 mailed questionnaires and 69 internet surveys) were received, a response rate of 42.3 percent. The responses became modest due to the fact that the questionnaire took a long time to fill-out (20 minutes - 4 pages - 92 items). Main statistical analysis tools used were SPSS (Statistical Package for Social Science) and Microsoft Excel software.

A pilot study was conducted to determine the clarity and readability of the questionnaire, and the test of internal validity of the measures. The pilot survey questionnaire, developed through a review of the literature as well as through interviews, was mailed via electronic mail linked to the questionnaire web-site to 100 target respondents. The response rate in this pilot project was 50 percent, large enough to have a statistical test. The result showed that questions in each construct had high reliability and were reviewed the scale items in the questionnaire to confirm the validity and readability. We conducted a factor analysis with the Principal Components Method with Varimax Rotation Technique to test the validity of each construct. Overall, Table 2, the levels of validity and reliability of the assessment tool were acceptable.

TABLE 2 Reliability of the Assessment Tools

Factors	Eigen Values	Variance	Cronbach's alpha
Codification strategy	9.360	51.998	.944
Personalization strategy	8.752	48.623	.935
Efficiency of the value chain	11.071	69.191	.964
Speed			.978
New products/services and quality	3.230	80.739	.894
Customization	3.955	79.108	.933
New customer base	3.526	70.513	0.89

Research findings

Sample Characteristics

122 (48 percent) of the respondents who participated in this study were managers and directors, 81 (32 percent) were support staffs, 31 (12 percent) were executives, 12 (5 percent) were technical staffs and 8 (3 percent) felt in other categories. Concerning Job titles of the respondents, researcher found that 40 percent came from department of human resource/ human resource development, 22 percent came from IT/computer/MIS department, 16percent were executives or from administrative department.

8 percent came from knowledge management and system solutions/ learning and development/ business development department. 14 percent of the respondents did not mention the name of their organizations. So, they remain totally anonymous.

More than 86 percent were the majority of targeted respondents. Obviously, a less number of them included the term "knowledge" in the job title. However, researcher asked the respondents "do their organization have a Chief Knowledge Officer (CKO)?" 25 percent of them have CKO, 59.3 percent of them not have CKO, only 3.9 percent of them don't know. 11.4 percent of them have the job description like CKO but they called this position in other job titles such as Knowledge Management Manager, Knowledge Sponsor, Knowledge and Professional Development Partner, Knowledge Management Champion, HR Tools and System Department Manager, Chairman of Learning and Development Council, Learning and Development Leader, Human Resource Manager, Human Resource Development Manager, Training Manager, Media Librarian, Executive Quality Advisor, Quality Control Manager, Quality Manager. This demonstrates that organizations in Thailand now have modest consideration about KM although they implement KM as a subset of IT or HR department.

The organizations that responded to the survey were involved in many industries. The most of the organizations that responded to the survey were 170 respondents or 67 percent involved in knowledge-intensive manufacturing industry (KIM) which was computer & office automation equipments, pharmaceuticals, semi-conduct, automobile, electrical machinery, and chemical engineering. 84 respondents or 33 percent were non knowledge-intensive manufacturing industry (NKIM) which was resources/energy and real estate/construction.

These companies have been implementing KM projects with the average about 6 years. The respondents have worked for KM projects in their companies for 4.7 years in average. 45 percent of the respondents asked to receive research results. This is evidence that these people were interested in the research topic. Only 7 percent of the respondents did not mention the name of their organizations. So, they remain totally anonymous.

The codification KM tools that often used are Email - listserv, corporate intranet - extranet - internet, database management systems, and search engines - web portals - intelligent agents - information retrieval systems.

The personalization KM tools that used sometimes are brainstorming - peer interaction/ conversation, groupware, lessons learned & best practices repository, eentoring - tutoring, storytelling - success story sharing (SSS), after action review (AAR), and online chat & instant messaging (IM).

Test of Hypotheses

The purpose of this paper was to explore the effect of KM strategy (i.e., codification and personalization) on organizational innovation. The research results indicate that both codification and personalization KM strategies positively and significantly affect organizational innovation.

The result of testing Hypothesis 1 was shown in Table 3. There is a significant positive

relationship between codification KM strategy and efficiency of the value chain, speed, new product/ service and quality, customization, and new customer base. Thus, overall, a codification strategy of KM increases organizational innovation.

Table 3 Test of Hypotheses 1a-1e

IV	DV	Pearson Correlation	P-value
Codification	Efficiency of the value chain	.620	.000**
	Speed	.503	.000**
	New product/service and quality	.600	.000**
	Customization	.576	.000**
	New customer base	.589	.000**

**P<.01 n=254

The result of testing Hypothesis 2 was shown in Table 4. There is a significant positive relationship between personalization KM strategy and efficiency of the value chain, speed, new product/ service and quality, customization, and new customer base. Thus, overall, a personalization strategy of KM increases organizational innovation.

Table 4 Test of Hypotheses 2a-2e

IV	DV	Pearson Correlation	P-value
Personalization	Efficiency of the value chain	.525	.000**
	Speed	.407	.000**
	New product/service and quality	.507	.000**
	Customization	.501	.000**
	New customer base	.589	.000**

**P<.01 n=254

The result of testing Hypothesis 3a-3e was shown in Table 5. The effect of balance strategy in the efficiency of value chain, new products/services, and customization are greater in large organizations than they are in small-medium organizations. This is in line with the study about balancing knowledge strategy during product management of J. Ajith Kumar, L.S. Ganesh, (2011). On the other hand, the effect of codification strategy in new customer base is greater in small-medium organizations than it is in large organizations. Moreover, the effect of personalization strategy in speed is greater in large organizations than it is in small-medium organizations.

Table 5 Descriptive statistics and results of hypotheses 3a-3e

Hypo	Mean	SE	Mean	SD	Support/Not Support
	Balanced strategy				
	Large organization		small-medium organizations		
3a	3.433	.200	1.050	.361	Supported
3b	3.190	.228	1.500	.412	Supported
3c	3.590	.234	1.350	.423	Supported
	Codification strategy				
3d	2.398	0.96	3.012	.149	Supported
	Personalization strategy				
3e	3.173	.208	3.033	.212	Supported

The result of testing Hypotheses 4a was shown in Table 6. The effect of balanced strategy in organizational innovation is greater in knowledge-intensive manufacturing organizations than non knowledge-intensive manufacturing organizations.

Table 6 Descriptive statistics and results of hypotheses 4a (balanced strategy)

Hypo	DV	Mean	SE	Mean	SD	Support/Not
		KIM		NKIM		
4a	Efficiency of value chain	3.981	.315	1.883	.295	Supported
	Speed	3.432	.091	3.272	.191	
	New products/services	4.071	.360	1.500	.336	
	Customization	4.171	.369	2.050	.345	
	New customer base	4.114	.363	1.400	.340	
	Overall - Organizational innovation	4.067	.315	1.767	.295	

The results confirm the beliefs of many, and scattered partial support in the literature, and shed a new light on the relationships between KM strategy and organizational innovation. The results also indicate that industry type and organizational size are intermediary factors that influence on the relationship of KM strategy and organizational innovation. The research results were summarized in Table 7.

TABLE 7: Summary of all Hypotheses Tested

Hypo	Description	Results
1a	A codification strategy of KM increases efficiency of the value chain	Supported
1b	A codification strategy of KM increases new products/services and quality	Supported
1c	A codification strategy of KM increases speed	Supported
1d	A codification strategy of KM increases customization	Supported
1e	A codification strategy of KM increases new customer base	Supported
2a	A personalization strategy of KM increases efficiency of the value chain	Supported
2b	A personalization strategy of KM increases new products/services and quality	Supported
2c	A personalization strategy of KM increases speed	Supported
2d	A personalization strategy of KM increases customization	Supported
2e	A personalization strategy of KM increases new customer base	Supported
3a	The effect of balance strategy in the efficiency of value chain is greater in large organizations than it is in small-medium organizations.	Supported
3b	The effect of balance strategy in new products/services is greater in large organizations than it is in small-medium organizations.	Supported
3c	The effect of balance strategy in customization is greater in large organizations than it is in small-medium organizations.	Supported
3d	The effect of codification strategy in new customer base is greater in small-medium organizations than it is in large organizations.	Supported
3e	The effect of personalization strategy in speed is greater in large organizations than it is in small-medium organizations.	Supported
4a	The effect of balanced strategy in organizational innovation is greater in knowledge-intensive manufacturing firms than non knowledge-intensive manufacturing firms.	Supported

Conclusion and recommendations

This research gives the top management a guide to make more surefooted decisions about which KM strategy to focus for organizational innovation. The effective KM strategy will maximize the benefits of KM implementation and innovation performance of the organization.

Table 8 presents the general guidelines for management concerning KM strategy implementation. As the results indicated that industry type and organizational size are intermediary factors in the

relationship of KM strategy and organizational innovation, organizations should pay attention to the selection of the most appropriate KM strategy that best fits with their current organizational characteristics. Codification strategy of KM is the most powerful strategy that can enhance the organizational innovation (such as efficiency of the value chain, speed, customization, new product/service, and new customer base) in any sizes of Thai firms in NKIM industry, and small-medium size both in KIM industries. These firms usually adopt KM tools such as email – listserv, corporate intranet – extranet -internet, database management systems, search engines – web portals – intelligent agents – information retrieval systems for managing their knowledge.

Large firms in KIM have more complex and diverse facilities such as financial slack, marketing skills, research capabilities, product development experience, more professional and skilled workers that help the adoption of a large number of innovations. While, they also have potential to invest in the system that can codified and stored knowledge in databases, where it can be accessed and used easily by anyone in the firms. Thus, large company should manage knowledge by adopt both personalization and codification strategy of KM for gain better performance of organization innovation.

Table 8 Guideline for management for KM strategy implementation

Non knowledge-intensive manufacturing industry (NKIM)			
Value Creation Objective	**Small**	**Medium**	**Large**
Efficiency of the value chain	Codification	Codification	Codification
Speed	Codification	Codification	Codification
Customization	Codification	Codification	Codification
New product	Codification	Codification	Codification
New customer base	Codification	Codification	Codification
Organizational innovation (overall)	Codification	Codification	Codification

Knowledge-intensive manufacturing industry (KIM)			
Value Creation Objective	**Small**	**Medium**	**Large**
Efficiency of the value chain	Codification	Codification	Balance
Speed	Codification	Codification	Balance
Customization	Codification	Codification	Balance
New product	Codification	Codification	Balance
New customer base	Codification	Codification	Balance
Organizational innovation (overall)	Codification	Codification	Balance

Limitation and future research

Like all research, this study has some limitations. The main limitations related to the snapshot data of the study. An important shortcoming of this study is the fact the results are based on the data representing only a snapshot of organizational life. The relationship between knowledge management strategy and effectiveness of organizational innovation is developed incrementally throughout the life of an organization. It could not develop in a short period of time. Although the snapshot data enabled us to conduct the analysis answer the research questions, it limits our ability to a trend over time. Therefore, for a robust analysis of the relationship of knowledge management strategy and effectiveness of organizational innovation, longitudinal research is recommended. Furthermore, this type of study should be conducted in several countries or regions to capture a picture of the relationship in different cultures, countries and economic conditions.

This study attempted a more detailed definition and measurement of organizational innovation by providing a typology and different approaches of measuring organizational innovation. Due to the complexity of organizational innovation, this paper did not attempted to design a universally applicable research approach. Rather, this study aimed to get a better understanding about different types of KM strategy for effective organizational innovation. Thus, more research is needed for theoretical conceptualization of organizational innovation under different sets of cultural, economic, and organizational conditions.

References

Anderson, N., King, N., (1993). **Innovation in organizations.** International Review of Industrial and Organizational Psychology, 8, pp.1–34.

Armbruster, Bikfalvi, Kinkel, Lay., (2008). **Organizational innovation: the challenge of measuring non-technical innovation in large-scale surveys.** Technovation 28, pp.644-657.

Damanpour, F. (1992). **Organizational size and innovation.** Organization Studies, 13(3), pp. 375-402.

Damanpour, F., Evan, W.M., (1984). **Organizational innovation and performance: the problem of ''Organizational Lag''.** Administrative Science Quarterly, 29, pp.392–409.

Drucker, P. (1996). **"The information executives truly need",** Harvard Business Review, January-February, pp.54-62.

Grant, R.M. (1996). **"Prospering in dynamically-competitive environments: organizational capability as knowledge integration",** Organization Science, 7 (4), pp.375-87.

Govindarajan, V., Trimble, C. (2007). **"Strategic innovation",** Leadership Excellence, 24(5), pp.9-10.

Halawi, L.A., McCarthy, R.V., Aronson, J.E. (2006). **"Knowledge management and the competitive strategy of the firm",** The Learning Organization, 13(4), pp. 384-397.

Hansen, M., Nohria, N., Tierney, T. (1999) . **"What's your strategy for managing knowledge?",** Harvard Business Review, 77(2), pp.106-16.

J. Ajith Kumar, L.S. Ganesh, (2011). **"Balancing knowledge strategy: codification and personalization during product development",** Journal of Knowledge Management, Vol. 15 Iss: 1, pp.118 – 135.

Lee, S.M., Olson, D. L. (2010). **Convergenomics: Strategic Innovation in the Convergence.** Era: Gower Publishing Limited.

Lorlowhakarn, S., Ellis, W. (2005). **"Thailand's National Innovation Agency",** CACCI Journal, 1.

Mogollon, R.H., Carrión, G.C., Navarro, J.G.C., Millán, A.L.(2010). **"The role of cultural barriers in the relationship between open‐mindedness and organizational innovation",** Journal of Organizational Change Management, 23(4): pp.361.

Nord, W.R., and Tucker, S. (1987). **Implementing Routine and Radical Innovation.** Lexington, MA: Lexington Books.

Office of Small and Medium Enterprises Promotion (2007). **"SMEs Definition".** http://cms.sme.go.th/cms/web/osmep/sme_define.

Ribiere, V. (2005). **"The critical role of trust in knowledge management ",** Doctoral Dissertation, School of Applied Economy, Paul Cezanne University, Aix-en-Provence, France.

Ribiere, V., Arntzen, A. A. B., Worasinchai L. (2007). **The Influence of Trust on the Success of Codification and Personalization KM Approaches.** from http://phd-it.siam.edu/Conference2007/documents/The%20Influence%20of%20Trust%20on%20the%20Success%20of%20Codification%20and.pdf.

Schienstock, G., Rantanen, E., Tyni P. (2009). **Organizational innovations and new management practices: Their diffusion and influence on firms' performance.** Results from a Finnish firm survey, Retrieved January 8, 2010, from http://www.iareg.org/fileadmin/iareg/media/papers/WP_IAREG_1.2d.pdf

Smith, A.D. (2004). **"Knowledge management strategies: a multi-case study",** Journal of Knowledge Management, 8(3), pp.6-16.

Totterdell, P., Leach, D., Birdi, K., Clegg, C., Wall, T. (2002). **An investigation of the contents and consequences of major organizational innovations.** International Journal of Innovation Management, 6(4), pp.343–368.

Wu, I.L., Lin, H.C. (2009). **A Strategy-Based Process for Implementing Knowledge Management: An Integrative View and Empirical Study.** Journal of the American Society for Information Science and Technology, 60(4), 789-802.

Zack, M.H. (1999). **"Developing a knowledge strategy",** California Management Review, 41(3), pp.125-45.