

THE IMPACT OF KNOWLEDGE SOURCES ON KNOWLEDGE CREATION: A STUDY IN THAI INNOVATIVE COMPANIES

Khalid Abdul Wahid
Universiti Teknologi Mara (UiTM), Malaysia
karndedkul.m@gmail.com

Haruthai Numprasertchai
Kasetsart University, Bangkok, Thailand
haruthai.p@ku.ac.th

Yuraporn Sudharatna
Kasetsart University, Bangkok, Thailand
fbusyps@ku.ac.th

Tipparat Laohavichien
Kasetsart University, Bangkok, Thailand
fbustrl@ku.ac.th

Somchai Numprasertchai
Kasetsart University, Thailand

Abstract:

In today fast changing business world, innovation has become the mainstay of every organization. Organizations have to ensure that their business strategies are innovative to build and sustain competitive advantage. Innovation is a result of knowledge acquisition, sharing and assimilation through knowledge creation. However, innovation is extremely dependent on the availability of knowledge and therefore the complexity created by the explosion of richness and reach of knowledge has to be identified and managed to ensure successful innovation. In the context of Thai innovative companies, there are not many studies conducted to investigate the impact of internal and external sources of knowledge on knowledge creation. The main purpose of this study is to identify the sources of knowledge which includes organizational knowledge and market orientation as well as to investigate their impacts on knowledge creation. The dimensions of organizational knowledge consisted of social interaction, organizational routines and information system. Meanwhile, the dimensions of market orientation consisted of customer orientation, competitor orientation and supplier orientation. Structural equation modeling (SEM) was used to analyze the influence of both sources of knowledge on knowledge creation. The study on 209 Thai innovative companies showed that all factors of organizational knowledge significantly impacted knowledge creation. Social interaction became the most influential factor. The result also showed that all factors of market orientation had significant influence on knowledge creation. Customer orientation contributed the most impact on knowledge creation.

Keywords: organizational knowledge, market orientation, knowledge creation, SEM

1. INTRODUCTION

In today fast changing business world, innovation has become the mainstay of every organization. The nature of global economic growth has been changed by the speed of innovation, which has been made possible by rapidly evolving technology, shorter product lifecycles and a higher rate of new product development. Organizations have to ensure that their business strategies are innovative to build and sustain competitive advantage. Innovation is a capacity to move beyond current ways of doing things and current ways of operating companies to move beyond the best practice to shape best practice. Innovation can strengthen the sustainable growth and productivity of a country and increase national productivity as well in the global market through creation of new ideas and opportunities (Virameteekul, 2011).

Innovation is as an instrument for seeking interest and opportunity from various changes to create different business and services from competitors (Drucker, 1985). It is an outcome of integrating knowledge and creative ideas for the purpose of economic and social benefits. Innovation is a result of knowledge acquisition, sharing and assimilation through knowledge creation. It is extremely dependent on the availability of knowledge and its complexity created by the explosion of richness and reach of knowledge has to be identified and managed to ensure successful innovation (Adams and Lamont, 2003; Cardinal and Alessandri, 2001). Therefore, knowledge becomes a key for the successful innovative output. According to Saarenketo, Puumalainen, Kuivalainen and Kylaheiko (2009), organizational knowledge and market orientation become sources of knowledge creation for organization's growth.

Knowledge-based view (KBV), one of the existing theories of the firm which is an outgrowth of resource based view (RBV), views an organization as a knowledge-integrating institution of internal and external knowledge (Grant, 1996). Dorri and Talebnejod (2008) stated that the necessity of knowledge creation can be accessed from the internal and external dimension. Nonaka and Toyama (2003) viewed a knowledge creation is dialectic process both within organization and market operating environment. They proposed a model of knowledge creation so called dialectic model (Takeuchi and Nonaka, 2004). This model assumes that knowledge creation is a synthesizing process or an integration between organizational knowledge which include social integration, organizational routines as well as information system and market orientation which includes customer orientation, competitor orientation and supplier orientation (Day, 1994; Kohli and Jaworski, 1990; Narver and Slater, 1990; Ayuso, Rodriguez, Garcia-Castro and Arino, 2011).

A study conducted by Hasgall and Shoham (2008) found that an organization needs a capability to update its organizational knowledge from its external turbulent environmental renewal of organizational asset stock enables an organization to deliver a constant stream of new and innovative products and services to customers. Market orientation has become the major asset of modern businesses and the key to retain their competitiveness. Thus, the main objective of this study is to examine the relationship of both organizational knowledge and market orientation on knowledge creation and second to investigate the impact of organizational knowledge's dimensions and market orientation's dimensions on knowledge creation in Thai innovative companies.

2. KNOWLEDGE CREATION AS A SYNTHESIZING PROCESS

Knowledge theories identified two major types of knowledge: tacit and explicit (Polanyi, 1967). Knowledge creation is a synthesizing process through which an organization interacts with individuals and the environment. This interaction makes the knowledge process to occur as dynamic and inter-linked interaction from an individual-to-societal level (Nonaka and Toyama, 2003). The synthesizing process of knowledge creation has been described in Nonaka's SECI model of knowledge conversion and the spiralling process of knowledge creation (Nonaka and Takeuchi, 1995).

According to the knowledge-based view of the firm, tacit knowledge that the organization develops inside the organization generates long lasting advantages because that knowledge is difficult to imitate (McEvily and Chakravarthy, 2002). The firm absorbs organizational knowledge and the environment, combines them with pre-acquired knowledge, and creates new one (Cohen and Levinthal, 1990). Therefore, we argue that knowledge is orientation created through a synthesizing process between organizational knowledge and market orientation.

H1. Organizational knowledge is positively correlated with market orientation.

3. ORGANIZATIONAL KNOWLEDGE

Organizational knowledge becomes an important factor for knowledge creation (Bhagat, Kedia, Harveston, and Triandis, 2002; Park, Ribiere, and Schulte Jr, 2004) and becomes the most valuable strategic resource for the organization (Prahalad and Hamel, 1990; Takeuchi and Nonaka, 2004; Nonaka, Toyama and Byosiere, 2001). Organizational knowledge creation has become a new trend of knowledge management study (Hansen, 1999). It is defined as how to use appropriate conversion mechanisms to convert personal capabilities or knowledge which could be embedded into organizational knowledge (Fang, Liu, Chiu, & Tsai, 2013). The internal created knowledge can develop new skills, ideas and uniqueness, and difficult for competitors to imitate (Nonaka, von Krogh and Voelpel, 2006). Nonaka (1994) pointed out that if organization can arrange the process of knowledge creation effectively through sharing knowledge which dispersed and embedded in individuals, equipment and routines, it would be a set of successful knowledge management activities to achieve knowledge creation. Hedlund and Nonaka (1993) highlight that creating and exploiting knowledge within an organization revolves around the integration of tacit and explicit knowledge and the transfer and transformation of knowledge between organizational knowledge and market orientation. Thus, the creation of new knowledge is essential for the success of the organization competing in dynamic environments (Kogut and Zander, 1992). According to the previous studies by several researchers, organizational knowledge can be created through social interaction within an organization (Madhavan and Grover, 1998; Schein, 2004; Davenport and Prusak, 1997; Nonaka I., 1994; Polanyi, 1967; Tsoukas and Vladimirou, 2001), organizational routines (Takeuchi and Nonaka, 2004; Nonaka and Toyama, 2003) and information technology (Nahapiet and Ghoshal, 1998; Tsoukas, 1996; Nonaka, Toyama and Konno, 2000).

3.1 Social interaction

Knowledge is embedded within and utilized by interactions among individuals and their networks of interrelationships (Hansen, 1999). Social relations and ties constitute information channels that reduce the amount of time and investment required to gather information (Nahapiet and Ghoshal, 1998; Chua, 2002). The role of network of social relationships has been recognized as a critical mechanism for knowledge combination and exchange to further achieve favorable innovation (Ibarra, 1993; Nahapiet and Ghoshal, 1998; Tsai and Ghoshal, 1998). There are three dimensions related to social interaction among organization members which include structural, relational and cognitive dimensions (Nahapiet and Ghoshal, 1998).

Structural dimension concerns the properties of social system (Granovetter, 1992) and it refers to impersonal configuration of linkages between people of units. Structural dimension helps organization members to access desired strategic resources and increase their social interaction through physical means or through electronic means (Chua, 2002) to involve in knowledge creation activities (Ibarra, 1993; Tsai; 2001, Bell; 2005). Relational dimension is the kind of personal relationships. Organization members developed social interaction through care (Von Krogh, 1998), the norms of cooperation (Putnam, 1995) and the sense of identification (Kramer, Brewer and Hanna, 1996). Care gives rise to mutual trust, active empathy, access to help and lenient judgment (Von Krogh, 1998). Norms of cooperation can establish a strong foundation for creation of knowledge. This is because norms influence social processes by opening up access to individuals for the exchange of knowledge (Putnam, 1993). Other norms that contributed to knowledge creation are acceptance of diversity, openness to criticism and a tolerance of failure (Leonard-Barton, 1995). Lastly, cognitive dimension refers to those resources providing shared representations, interpretations and system of meaning (Cicourel, 1973). In cognitive dimension, organization members discuss and exchange information, asking questions and provide opinion (Nahapiet and Ghoshal, 1998). Cognitive dimension also influences a perception (Pondy and Mitroff, 1979). It also provides a frame of reference for observing and interpreting the environment. Therefore, it facilitates the combination of diversified knowledge mostly in the form of tacit knowledge.

3.2 Organizational routines

Organizational routines serve as a frame of reference for “appropriate behaviour” for the members of an organization (Hoeve and Nieuwenhuis, 2006). Organizational routines refer to explicit structures while there are implicit actions as well. Galunic and Rodan (1998) call them tacitly-held and explicitly-held routines to address the fact that routines can be in tacit form and also explicit form. An

organization needs those routines to be a guideline for effective work and good quality output. Employees will refer to the organizational routines in completing their tasks and jobs. A study conducted by Tsoukas and Vladimirou(2001) on customer operators in Patafon shows that routines in the form of written procedures and manuals provide information for the operators on going issues and current network problems. This makes operators doing their tasks efficiently and effectively. Correspondingly, routines can be seen as part of a learning process leading to continuously improving capabilities (Andreu and Ciborra, 1996). Therefore, routines can be both operational working procedures (explicitly-held-routines) and organizational practices (tacitly-held routines).

3.3 Information system

The development of sophisticated corporate information system makes an organization to retrieve needed information very quickly and on time. Information system becomes one of the critical success factors in implementing knowledge management (Hasnali, 2002). The study shows that information system has a significant positive influence on the process of knowledge creation (Lopez-Nicolas and Soto-Acosta, 2010). The study in small innovative hi-tech companies shows that the use of information technology (IT) assists in creating new knowledge (Spraggon and Bodolica, 2008). IT represents a valuable tool where individual, group and organizational knowledge are continuously codified, stored, diffused and renewed. It also represents a significant source of organizational learning and knowledge creation.

The study of Yang, Chen and Wang (2012) on the impacts of information technology on knowledge management practice in construction industry shows that levels of IT application are positively associated with projects' levels of knowledge management. Additionally, project outcomes can be achieved with higher levels of knowledge management. The findings also indicate IT application affects project performance in terms of schedule and cost success as well as quality and safety performance. The preceding arguments suggest that social interaction, organizational routines and information system can have an impact on knowledge creation within an organization. Accordingly, the following hypothesis is proposed.

H2. Social interaction, organizational routines and information system positively influence knowledge creation.

4. MARKET ORIENTATION

Market orientation is not explicit but rather than difficult to codify and communicate (Nonaka,1995).The prior research shows that the acquisition of market orientation leads to short-term improvements in sales and profitability growth, market share, new product success, customer satisfaction and return on assets (Jaworski and Kohli, 1993; Slater and Narver, 1994).Jaworski and Kohli (1996, p. 131) define market orientation as "...organization-wide generation of market intelligence pertaining to customers, competitors, and forces affecting them, internal dissemination of the intelligence, and reactive as well as proactive responsiveness to the intelligence". According to knowledge based view of the firm, external knowledge acquisition from market environment becomes one of the critical means for knowledge creation in order to achieve competitive advantage (Nonaka and Teakeuchi, 1996; Lavie, 2006).Organizations can acquire information and knowledge from their interactions with a variety of external stakeholders (Ayuso et al, 2011).

According to the stakeholder theory (Freeman, 1984), stakeholders refer to groups and individuals who can affect or are affected by the organization's purpose which include customers, competitors, suppliers, government, NGOs and communities (Kaler, 2006; Holmes and Smart, 2009). Stakeholders become important players in market orientation. They are divided into primary and secondary stakeholders. The primary stakeholders are those who are directly involved in a market relationship such as customers, competitors and suppliers. Meanwhile secondary stakeholders, government, NGOs, communities and etc., refer to those who are not directly involved in a market relationship (Ayuso et al., 2011). The scope of this study only covers the influence of primary stakeholders.

4.1 Customer orientation

The voice of the customers is deployed throughout the product planning and design stages (Hauser and Clausing, 1988). It will become an input in the product design and development. Customers

should be the driving force behind product development. A firm which commits itself to superior customer service and integrates customer preferences and needs into its product development strategy has the best guarantee for long-term success (Gatignon and Xuereb, 1997). Any changes in customers' demands may negatively affect the value of current marketing capabilities.

The literature suggests that the primary objective of an organization is to deliver superior customer value, which is based on knowledge gathered from customer analyses and disseminated throughout the organization (Narver and Slater, 1990). The understanding of customer needs, preferences and market trends enables the organization to identify and develop capabilities for long term performance (Day, 1994) because the organization has information on customers' implicit needs to fulfill customers' satisfaction.

4.2 Competitor orientation

Competitors are defined as organizations or firms offering products or services that are close substitutes, in the sense that they serve the same customer need (Porter, 1980; Kotler, 2000). Competitors' knowledge would provide a solid basis of information pertaining present and potential competitors for executive actions. It also can enhance a firm's competitive advantage by allowing it to benchmark with, learn from, imitate, and improve on the products of successful competitors (Drew, 1997). A considerable body of marketing thought suggests that competitor orientation should improve an organization's performance by enabling the organization to position its strengths against rivals' weaknesses (Slater and Narver, 1994).

Competitors' knowledge can be accessed from many sources and it is available in many forms. The more traditional forms of competitors' knowledge is based on assessment of competitors' goal, financial results and successes and failures, as well as competitors' assumption about a market (Porter, 1980). Besides the traditional forms, an organization can access and analyze competitors' knowledge through internal employees, sale personnel. They can be a medium of supplying competitors' movement and activities in a market because they are involved directly with substitute products or services. Thus, sufficient information on competitors will guide an organization to take appropriate actions in encountering any strategies or actions implemented by any rivals which could threaten its business operation (Sørensen, 2009).

4.3 Supplier orientation

Supplier orientation refers to the supplier has a clear understanding of the manufacturer's needs and expectations (Gwinner, Bitner, Brown and Kumar, 2005). To remain competitive in their mainstream markets, an organization must establish a cooperative relationship with suppliers in order to reduce transaction costs associated with "buy" decision (Verbeke and Tung, 2013 and Sudharatna, 2010). The cost of materials and services become an affecting factor for an organization's cost. If an organization can reduce the cost of inputs, it will have a competitive advantage over its competitors in terms of cost leadership. Besides the cost of materials and services, the quality of materials supplied also should be taken into consideration for producing quality products (Sudharatna, 2010).

Environmental dynamism may cause obsolescence in organization's current knowledge base, eroding its competitive advantage (O'Reilly and Tushman, 2008). To avoid this damage, organizations need to carry out an explorative learning that enables them to reconfigure their capabilities base (Lavie, 2006). Thus, market orientation acquisition by an organization may be considered as a key element for explorative learning development (Lavie, 2006). Consequently, the following hypothesis is proposed.

H3. Customer orientation, competitor orientation and supplier orientation positively affect knowledge creation.

5. KNOWLEDGE CREATION

An organization can develop value and potential to sustain competitive advantage by creating knowledge (Bryant, 2005; Spender, 1996). Spender (1996) emphasizes the importance of knowledge creation in KBV by holding that there are two predominant goals of organization which are the generation and application of knowledge. Tsoukas and Mylonopoulos (2004) noted that an

organization that has the ability to create knowledge develops a capability that is dynamic and unique and that potentially underpins continuous organizational learning.

There are not many literatures discussing about the dimensions of knowledge creation. Most of the literatures discussed knowledge creation in the form its tacitness and explicitness. Many authors have emphasized different dimensions of knowledge creation. Schumpeter (1934) suggested five dimensions in which knowledge creation is translated namely new products and services, new method of production, new markets, new sources of supply and new organizational forms. Miller and Friesen (1983) focused on four dimensions: new products and services, new method of production, risk taking by key executives and seeking solution. While Capon, Farley, Hulbert, and Lehmann (1992) suggested three dimensions: market, strategic tendency to pioneer and technological advancement.

Wang and Ahmed (2004) suggested five dimensions of knowledge creation; products and services, market, process, behaviour and strategy. However, this study will use Wang and Ahmad approach (2004) with the exclusion of strategy dimension because majority of empirical research do not consider strategy outcome as a component factor of organizational innovativeness (Wang and Ahmed, 2004).

5.1 Product and service outcome

Knowledge creation is crucial to new product and service outcome (Yang, 2007). Innovative products and services present an opportunity for business expansion and success (Henard and Szymanski, 2001). Knowledge creation in products and services allow companies to establish dominant position in the competitive marketplace, and afford new entrants an opportunity to gain a foothold in the market (Danneels and Kleinschmidt, 2001).

Product developed from knowledge creation is most often referred to as perceived newness, novelty, originality or uniqueness of products (Henard and Szymanski, 2001). New product development is dependent on the organization's ability to apply knowledge and information towards the discovery of new products and services (Tannenbaum and Nash, 2002). The new product development and knowledge management process are of utmost importance, since products that do not adapt to changes in the external environment cease to exist (Goldenberg, Lehmann, and Mazursky, 2001). Madhavan and Grover (1998) stated that the central theme for the new product and service development process is the creation of new knowledge.

5.2 Market outcome

Market outcome refers to the discovery of new market segment which is related to market research, advertising and promotion (Andrews and Smith, 1996). The main reasons for a company to enter a new market segment or focus on a particular group of customers are to identifying new market opportunities and to fulfill a market gap by monitoring market trends (Dalgic, 1998). For some companies, this means that they can enter a market or identify a new market segment and launch products with cutting-edge technological content.

Companies in the market focus offered fewer products than those in market leader group at a lower cost (Porter, 1980). They outperformed their competitors in terms of innovation efficiency, quality and rapid response to the market needs (Hsu, 2011). In other words, it can be described as appealing to the unique preferences and needs of a narrow, well defined group of buyers better than potential rivals (Thompson, Strickland and Gamble, 2010). Entering new market segment will increase company's competitiveness through growth possibilities, value creation and perceived value, profits, increased sales, prices and market shares, better protection from competition, customer retention/loyalty and higher purchase frequency (Toften and Hammervoll, 2013).

5.3 Process outcome

The discovery of new knowledge can lead to process innovativeness which captures the introduction of new production methods, new management approaches and new technology that can be used to improve production and management process (Wang and Ahmed, 2004). Process innovativeness work is mainly driven by the needs of production and can be said to be primarily efficiency-driven (Bergfors and Larsson, 2009). As a result, an organization can exploit their resources and recombine its resources for optimizing the competitive advantage in production. Besides the implementation of

new approach, process innovativeness also can lead to the reduction of production costs, higher production yields, improvement of production volumes and product recoveries and environment-friendly production (Larger, 2002).

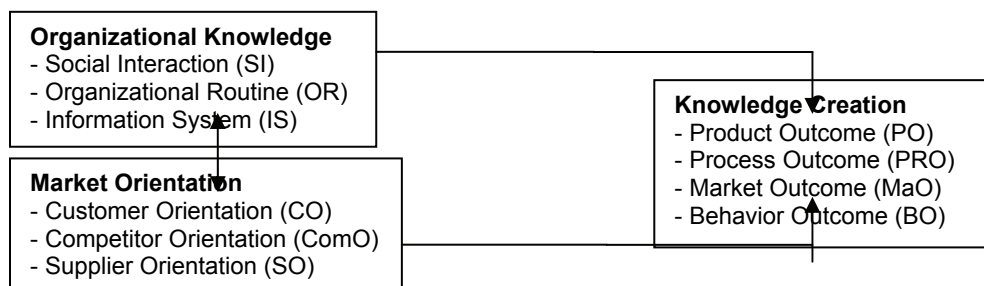
5.4 Behavior outcome

Behavior outcome can be seen at different levels: individuals, team and management. It becomes as an outcome from a response to the environment as suggested by Jaworski and Kohli (1993, 56) “a market orientation essentially involves doing something new or different in response to market conditions, it may be viewed as a form of innovative behavior.” The behavior outcome should reflect the sustained behavioral change of the organization towards innovation.

Individual level can be considered as a willingness to change (Hurt, Joseph and Cook, 1977). The employees in the organization are free to act and work according to their own ways (Wang and Ahmed, 2004). They will react accordance with the organizational expectation for behavior and potential outcomes of behavior by regulating their own behavior in order to realize positive self-evaluative consequences (Bandura and Dickson, 1983). Team outcome is the team’s adaptability to change (Lovelace, Shapiro and Weingart, 2001). Behavior outcome at a team level is initiated by the willingness of every member in the organization to adopt the change (Zaltman, Duncan and Holbek, 1973). The members of the team share the expertise, more open and frequent communication and a tendency to focus on result. Hence, it can reduce fear and encourage new ideas and risk taking (Scott and Bruce, 1994).

Managerial innovativeness demonstrates management’s willingness to change and commitment to encourage new ways of doing things as well as to encourage new ideas (Rainey, 1999). Management level will emphasize for learning, participative for decision making, support and collaboration and power sharing (Hurley and Hult, 1998). The management will implement low formalization in promoting openness and flexibility in roles (Zaltman, Duncan and Holbek, 1973).

Figure 1: The study model



6. METHODOLOGY

6.1 Sample

The study was conducted on 464 Thai innovative companies supported by National Innovation Agency (NIA) of Thailand from 2004-2013. Those companies were divided into three categories 119 companies were eco-industry, 236 companies were design and solution and 109 companies were bio-business.

The data collection was conducted on 10th July 2014 to 25th September 2014. In order to collect data, the measures were distributed to the respective companies by free online survey. Companies which had R&D department, a survey questionnaire was given to R&D manager. For those companies which did not have R&D department, a survey questionnaire was distributed to a company’s owner.

Only 80 sets of online questionnaires were returned at the beginning. A researcher followed up with the companies by making a call and asked their cooperation. The questionnaires were sent for a second time by post for those companies who did not reply online yet. 137 sets of posted questionnaires were returned. A total of 217 responses were collected, representing a 51.7%

response rate. The study required data either from a company owner or research and development manager/head. The study also required no missing data on any instrument. These two constraints reduced the number of acceptable participants to 211 (50.2%). However there were 2 out of 211 data points detected as outliers. Those data points were removed from the data set. Consequently, the n of the study becomes 209 which represents 49.7% response rate.

6.2 Measures

All multi-item variables were measured on a five-point scale to ensure a uniform scale width. Some items were adapted and re-worded to fit the present context. The measures in this study were drawn from several sources. The measures of social interaction were adapted from Chan (2002), organizational routine was adapted from Tsukas and Vladimirov (2001) and information system was measured by five point Likert scale adapted from Teerajatul and Charoenngam (2006). The measures of customer orientation and competitor orientation were adapted from Sørensen (2009). Meanwhile, supplier orientation was adapted from Verbeke and Tung (2013). The dependent variable of knowledge creation was measured by four dimensions which were product outcome, process outcome, market outcome and behavior outcome. The measures of those four dimensions were adapted from Wang and Ahmad (2004).

All theoretical constructs had a Cronbach above 0.70 indicating a good evaluation of reliability of these constructs. The results of the factor analysis also show that all the measurement items loaded on the expected factors had loadings above 0.50.

6.3 Analysis and results

In order to answer the proposed research questions, first of all, basic descriptive, scale reliability, correlation, and regression analyses were employed. In order to answer the research questions of relationship between organizational knowledge and market orientation, basic correlation was conducted. According to this analysis, the existence of statistical inter-relationships among the variables was defined, and depending on the value of correlation coefficient; the magnitude and direction of correlations were assessed (Cohen, 1998; Urdan, 2005). An item-correlation coefficient level between .10 and .30 is a weak positive relationship; between .31-.70 is a moderate range and above .70 shows a high positive relationship (McMillan and Schumacher, 2000).

Organizational knowledge is positively correlated with market orientation at the level of $p < 0.01$ ($r = .66$). The relationship of both is moderate and in positive direction. All three factors of organizational knowledge were significantly correlated with three factors of market orientation. Table 1 showed that among all three dimensions, organizational routines had a strongest correlation with customer orientation ($r = .381$) and supplier orientation ($r = .381$) of market orientation. Meanwhile, information system of organizational knowledge had a strongest correlation with competitor orientation ($r = .290$). By looking at sig. value = .000 ($p \leq 0.05$) we can conclude that organizational knowledge and market knowledge are positively correlated. Consequently, hypothesis H1 was accepted.

Table 1: Correlation table between the factors of organizational knowledge and the factors of market orientation

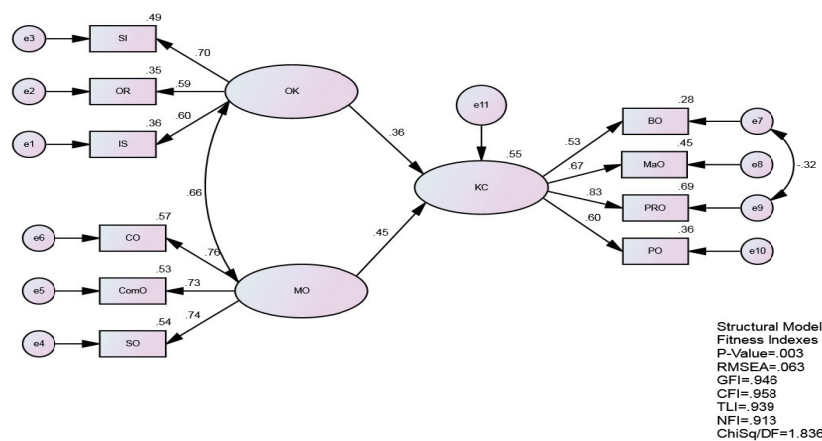
Factors	1	2	3	4	5	6
1. Social Interaction	1					
2. Organizational Routines	.410**	1				
3. Information System	.445**	.331**	1			
4. Customer Orientation	.312**	.381**	.295**	1		
5. Competitor Orientation	.242**	.279**	.290**	.554**	1	
6. Supplier Orientation	.335**	.381**	.306**	.542**	.544**	1

** Correlation is significant at the 0.01 level (2-tailed).

Confirmatory factor analysis (CFA) was conducted to estimate the quality of the structural reliabilities and designated factor loading by testing the model fit between the proposed measurement model and the collected data. Prior to the testing of the overall proposed model, CFAs were conducted for each model construct: the organizational knowledge's factors, the market orientation's factors and the knowledge creation's factors.

The results of CFA for all three constructs, organizational knowledge (GFI= .943, CFI= .972, NFI= .922, RMSEA= .050, SRMR= .027), market orientation (GFI= .908, CFI= .954, NFI= .900, RMSEA= .060, SRMR= .035), knowledge creation (GFI= .941, CFI= .951, NFI= .896, RMSEA= .061), showed that the construct validity was acceptable. The CFA for all hypothesized measurements demonstrated an acceptable model fit with collected data in the Thai innovative companies. All of the model fit indices provide satisfactory results (GFI= .946, CFI= .958, NFI= .913, RMSEA= .063) presenting acceptable model fit.

Figure 2: Structural Equation Modeling of the Proposed Hypothesized Model



In this structural diagram, indicators (ten dimensions) of the latent factors (organizational knowledge, market orientation and knowledge creation) are represented by rectangles, and the single-headed arrows show the associations between observed items and latent factors. These relations represent the factor loadings of the indicators, which indicate the adequacy of the measurement model with the collected data. The results revealed that all four dimensions had significant and homogeneous factor loadings on the latent factor of the organizational knowledge (factor loadings ranged from .59 to .70), the market orientation (factor loading ranged from .53 to .57) that four dimensions of the knowledge creation had statistically significant loadings (from .53 to .83).

In Figure 2, the numbers near each arrow, which are represented by the ellipses and which link the three latent factors, denote the statistical standardized path coefficient (SPC). This statistic could be interpreted in the same way as the standardized regression coefficient. The results indicate that organizational knowledge (SPC = .36, $p < .01$) and market orientation (SPC = .45, $p < .01$) had statistically positive and significant contributions to knowledge creation. Finally, the squared multiple correlations (SMCs) for the variables of organizational knowledge showed that all variables (social interaction (SI), organizational routines (OR) and information system (IS)) positively influence knowledge creation. Social interaction (0.49) had more influence in knowledge creation followed by information system (0.36) and organizational routines (0.35), meaning that 49% of the variance of the knowledge creation factor could be explained by social interaction. As a result, the hypothesis 2 was accepted. The analysis also showed SMCs for the variables of market orientation positively affected knowledge creation. Customer orientation (0.57) was the most influential factor on knowledge creation followed by supplier orientation (0.54) and competitor orientation (0.53), meaning that more than 55% of the variance of the factor could be explained by the customer orientation based on the given data. Consequently, the hypothesis 3 was also accepted.

7. DISCUSSION AND CONCLUSION

The finding from the study showed that social interaction, information system and organizational routines positively influenced knowledge creation. This finding was consistent with the previous studies (Lee and Choi, 2007; Al-Gharibeh, 2011). Several companies manage their social interaction among employees through Community of Practice (CoP) to facilitate knowledge sharing among colleagues. CoP members develop their practice by interacting around problems and possible

solutions, thus building a common pool of knowledge. The main purpose is to establish an environment that might facilitate the sharing and diffusion of knowledge and improve the innovative potential and the problem-solving capability of employees.

Information system supports knowledge sharing by enabling the communication, collaboration provision of knowledge storing the accumulated knowledge and retrieve knowledge. Information system serves as a cost effective and fast medium to acquire, store, share and transfer knowledge but it needs human's motive and willingness to engage in managing knowledge. The use of information system is considered important especially in large companies. However, a not well-designed technological infrastructure could even hamper the functioning of knowledge creation. Raven found that organizational routines both explicit and implicit routines did affect speed and quality of knowledge creation. However, he noticed that explicit routines are more effective in formal meeting but less effective in informal meeting. On the other hand, implicit routines work well with informal meeting. It indicates that an organization has to be carefully in choosing which routines are more appropriate in what situation.

The finding also showed that all factors of market orientation positively affected knowledge creation. This finding was in consistence with Tether and Tajar (2008), Nwokah (2009) and Lau (2011). Tether and Tajar (2008) found that customer knowledge contributed to development and innovation value for an organization and had a positive influence on NPD success. Managing customer knowledge becomes an important activity for today competitive business for several reasons. First, competitors can easily copy each other success but customer knowledge can neither easily observed nor copied. It becomes an important contributor to success. Second, customers can easily make a comparison similar products, the ability to target offerings to specific customer requirements becomes more important. Third, an organization can become first mover advantage by offering new or improved products and services that better fulfill customer preferences. Forth, an organization can compete in high price sensitive by focusing on product and service parameters customers' value and eliminating unnecessary features that reduce profit margin. Lastly, inventory requirement and unused manufacturing capacities can be reduced if an organization knows customer demand.

The purpose of a competitor orientation is to provide a solid basis of intelligence pertaining to present and potential competitors for executive actions. Companies with a high competitor orientation have a better understanding for the value of products and services on the market. Based on information on competitors' products, an organization is able to develop successful strategies for product positioning on their markets, which leads to better sales and a positive economic development. Of those companies which realize the importance of knowing about competitors, many fail to collect information in a systematic fashion. The problem which develops is that good relevant information is rarely at hand and takes time to "dig out" from among the plethora of data available. Very often by the time this information is collated the business opportunity is lost. In order to overcome this problem an organization should employ Competitor Information System (CIS).

Chen et al. (2010) combine supplier customer involvement as a factor of external integration that affects new product speed. When supplier and customer relationships are separately examined, they are found to be highly correlated (Law et al., 2009). According to Fleming and Rowlands (2014), it is essential for an organization to be a customer of choice with a direct supplier with competitors and with high exposure and value. But it may be less important for a company to be a customer of choice for an indirect supplier with many competitors and with low value and exposure. This claim should be further investigated in future research.

8. LIMITATION AND FUTURE RESEARCH

This study also has some limitations. First, this study only examines the impact of the factors which have direct relationship in a market. In order to have a holistic view, indirect factors such as government policies, higher institution and NGOs also should be investigated in the future. Second, with regard to population, majority of the population was small and medium innovative companies. They might be unaware of the concept of knowledge creation. Regarding to the knowledge creation process, larger organizations have more structured research and development institutions and strategic customer care functions, which are required for the creative knowledge process based on the continuous creation process and interconnection with inter-organizations.

There are some interesting and important topics left for future research as well. First, the study is limited only within business environment. A further research should expand to non business environment too such as government agencies, learning institutions and non-profit organizations. The investigation might find out some hidden factors which contribute to knowledge creation for effective and efficient work due to its different orientation. Second, the result of the study was based on small and medium innovative companies which might have limited resources and facilities in knowledge creation process. The further study should be conducted in large innovative companies who have resources and facilities for research and development so that the research results will be more comprehensive and more interesting.

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REFERENCE LIST

1. Adams, G. and Lomont, B. (2003). Knowledge management systems and developing sustainable competitive advantage. *Journal of Knowledge Management*, 7(2),142-154.
2. Al-Gharibeh, K.M. (2011). The knowledge enablers of knowledge transfer: an empirical study in telecommunications companies. *IBIMA Business Review*, 2011, 1-13.
3. Andreu, R. and Ciborra, C. (1996). Organisational learning and core capabilities development: the role of IT. *Journal of Strategic Information Systems*, 5, 111-127.
4. Andrews, J. and Smith, D. (1996). In search of marketing imagination: factors affecting the creativity of marketing programs for mature products. *Journal of Marketing Research*, 33, 17-37.
5. Ayuso, S., Rodriguez, M.,Garcia-Castro, R. and Arino, M. (2011). Does stakeholder engagement promote sustainable innovation orientation? *Industrial Management and Data Systems*,11(9),1399-1417.
6. Bandura, A. and Dickson, J. (1983). R&D work climate and innovation in semiconductors. *Academy of Management Journal*, 26, 362-368.
7. Bergfors, M. and Larsson, A. 2009. Product and process innovation in process industry: a new perspective on development. *Journal of Strategy and Management*, 2(3), 261-276.
8. Bhagat, R., Kedia, B., Harveston, P. and Triandis, H. (2002). Cultural variations in the cross-border transfer of organizational knowledge: an integrative framework. *Academy of Management Review*, 27(2), 204-221.
9. Bell, G.G. (2005). Cluster networks and firm innovativeness. *Strategic Management Journal*, 26(3), 287-295.
10. Bryant, S. (2005). The impact of peer mentoring on organizational knowledge creation and sharing: an empirical study in a software firm. *Group and Organization Management*, 30(3), 319-338.
11. Capon, N., Farley, J., Hulbert, J. and Lehmann, D. (1992). Profiles of product innovators among large US manufacturers. *Management Science*, 38 (February), 157-169.
12. Cardinal, L. and Allessandri, T. (2001). Knowledge codifiability, resources and science based innovation. *Journal of Knowledge Management*, 5(2), 195-204.
13. Chen, J., Damanpour, F. and Reilly, R.P. (2010). Understanding antecedents of new product development speed: a meta-analysis. *Journal of Operations Management*, 28, 17-33.
14. Chua, A. (2002). The influence of social interaction on knowledge creation. *Journal of Intellectual Capital*, 3 (40), 375-392.
15. Cohen, W. and Lavinthal, D. (1990). Absortive capacity-a new perspective on learning and innovation. *Administrative Science Quarterly*, 35,128-152.
16. Dalgic, M. (1998). Niche marketing principles: guerrillas versus gorillas. *Journal of Segmentation in Marketing*, 2(1), 5-18.
17. Danneels, E. and Kleinschmidt. E. (2001). Product innovativeness from the firm's persepctive: its dimensions adn their relation with product selection and performance. *The Journal of Product Innovation Management*, 18(6), 357-373.
18. Day, G. (1994). The capabilities of market-driven organizations. *Journal of Marketing*, 58 (October), 37-52.

19. Dorri, B. and Talebnejod, A. (2008). Investigating the situation of the techniques of knowledge creation in the universities related to ministry of education, research and information technology. *Quarterly of Research and Programming in Higher Education*, 49.
20. Drew, S.A.W. (1997). From knowledge to action: the impact of benchmarking on organizational performance. *Long Range Planning*, 30(3), 427-441.
21. Droge, C., Jayaram, J. and Vickery, S.K. (2004). The effects of internal versus external integration practices on time-based performance and overall firm performance. *Journal of Operations Management*, 22(6), 557-73.
22. Drucker, P.F. (1985). *Innovation and Entrepreneurship*. New York: Harper & Row.
23. Fang, S.H., Liu, H.C., Chiu, C.F. and Tsai, C.H. (2013). Construction of organizational knowledge management system in emerging markets: the process of embedding international norms in organizational knowledge. *Management Science*, 13(2), 49-58.
24. Freeman, R. E. (1984). *Strategic Management: A Stakeholder Approach*. Boston: Pitman.
25. Gatignon, H. and Xuereb, J.M. (1997). Strategic Orientation of the Firm and New Product Performance. *Journal of Marketing Research*, 34(1), 77-90.
26. Galunic, D.C. and Rodan, S. (1998). Resource recombinations in the firm: knowledge structures and the potential for schumpeterian innovation. *Strategic Management Journal*, 19(12), 1193-1201.
27. Goldenberg, J., Lehmann, D. and Mazursky, D. (2001). The idea itself and the circumstances of its emergence as predictors of new product success. *Management Science*, 47(1), 69-84.
28. Granovetter, M.S. (1992). Problems of explanation in economic sociology. in Nohria, N. and Eccles, R. (Eds), *Networks and Organizations: Structure, Form and Action*. Harvard Business Press, Boston, MA: 25-56.
29. Grant, R. (1996). Prospering in dynamically-competitive environment: organizational capability as knowledge integration. *Organization Science*, 7, 376-387.
30. Gwinner, K.P., Bitner, M.J., Brown, S.W. and Kumar, A. (2005). Service customization through employee adaptiveness. *Journal of Service Research*, 8(2), 131-148.
31. Hansen, M.T. (1999). The search-transfer problem: the role of weak ties in sharing knowledge across organization subunits. *Administrative Science Quarterly*, 44(1), 82-111.
32. Hedlund, G. and Nonaka, I. (2008). Models of knowledge management in the West and Japan. In Lorange, P. (Eds.). *Implementing Strategic Process: Change, Learning and Cooperation*. Oxford: Basil Blackwell.
33. Haskall, A. and Shoham, S. (2008). Knowledge process: from managing people to managing processes. *Journal of Knowledge Management*, 12(1), 51-62.
34. Hsu, Y. (2011). Design innovation and marketing strategy in successful product competition. *Journal of Business & Industrial Marketing*, 26(4), 223-236.
35. Hasnali, F.(2002). Critical success factors of knowledge management. *APQC*, 1-4.
36. Hauser, J. and Clausing, D. (1988). The house of quality. *Harvard Business Review*, (May-June), 63-73.
37. Hernard, D.H. and Szymanski, D.M. (2001). Why some new products are more successful than others. *Journal of Marketing Research*, 38(3), 362-375.
38. Hoeve, A and Nieuwenhuis, L.F.M. (2006). Learning Routines in Innovation Process. *Journal of Workplace Learning*, 18(3), 171-185.
39. Holmes, S. and Smart, P. (2009). Exploring open innovation practice in firm-nonprofit engagements: a corporate social responsibility perspective. *R&D Management*, 39(4), 394-409.
40. Hurley, R. and Hult, T. (1998). Innovation, market orientation and organizational learning: an integration and empirical examination. *Journal of Marketing*, 62(July), 42-54.
41. Ibarra, H. (1993). Network centrality, power and innovation involvement: determinant of technical and administrative roles. *Academy of Management Journal*, 30(3), 471-501.
42. Jaworski, B.J. and Kohli, A.K. (1993). Market orientation: antecedents and consequences. *Journal of Marketing*, 57 (July), 53-70.
43. Kaler, J. (2006). Evaluating stakeholder theory. *Journal of Business Ethics*, 69, 249-268.
44. Kogut, B. and Zander, U. (1992). Knowledge of the firm, combinative capabilities and the replication of technology. *Organization Science*, 3(3), 383-397.
45. Kohli, A. and Jaworski, B.J. (1990). Market orientation: the construct, research propositions and managerial implications. *Journal of Marketing*, 54(April), 1-18.
46. Kotler, P. (2000). *Marketing Management*. Englewood Cliffs, NJ: Prentice-Hall.

47. Kramer, R.M., Brewer, M.B. and Hanna, B.A. (1996). Collective trust and collective action: the decision to trust as a social decision. In Kramer, R.M. and Tyler, T.R. (Eds). *Trust in Organizations. Frontiers of Theory and Research*. Sage, Thousand Oaks: CA.
48. Larger, T. (2002). A structural analysis of process development in process industry-a new classification system for strategic project selection and portfolio balancing. *Rand Management*, 32(1), 87-95.
49. Lau, A.K.W. (2011). Supplier and customer involvement on new product performance: contextual factors and empirical test from manufacturer perspective. *Industrial Management and Data Systems*, 111(6), 910-942.
50. Lavie, D. (2006). Capability reconfiguration: an analysis of incumbent responses to technological change. *Academy of Management Review*, 31(1), 153-174.
51. Law, K.M.Y., Helo, P., Kanchana, R. and Phusavat, K. (2009). Managing supply chains: lessons learned and future challenges. *Industrial Management and Data Systems*, 109(8), 1137-1152.
52. Lee, H. and Choi, B. (2003). Knowledge management enablers, processes, and organizational performance: an integrative view and empirical examination. *Journal of Management Information System*, 20, 179-228.
53. Leonard-Barton, D. (1995). *Wellsprings of Knowledge*. Harvard Business School Press, Boston: MA.
54. Lopez-Nicolas, C. and Soto-Acosta, P. (2010). Analyzing ICT adoption and use effects on knowledge creation: an empirical investigation in SMEs. *International Journal of Information Management*, 30, 521-528.
55. Lovelace, K., Shapiro, D.L. and Weingart, L.R. (2001). Maximizing cross-functional new product teams' innovativeness and constraint adherence: a conflict communication perspective. *Academy of Management Journal*, 44(4), 779-793.
56. Madhavan, R. and Grover, R. (1998). From embedded knowledge to embodied knowledge: new product development as knowledge management. *Journal of Marketing*, 62(4), 1-12.
57. McEvily, S. and Chakravarthy, B. (2002). The persistence of knowledge-based advantage an empirical test for product performance and technological knowledge. *Strategic Management Journal*, 23(4), 285-305.
58. Miller, D. And Friesen, P. (1983). Strategy-making and environment: the third link. *Strategic Management Journal*, 4(3), 221-235.
59. Nahapiet, J. and Ghoshal, S. (1998). Social capital, intellectual capital and the organizational advantage. *Academy of Management Review*, 23(2), 242-266.
60. Narver, J. and Slater, S. (1990). The effect of a market orientation on business performance. *Journal of Marketing*, 54(October), 20-35.
61. Nonaka, I. (1994). A dynamic theory of organizational knowledge creation. *Organization Science*, 5(1), 14-37.
62. Nonaka, I. And Teakeuchi, H. (1996). A theory of organizational knowledge creation. *International Journal of Technology Management*, 11, 833-846.
63. Nonaka, I. and Toyama, R. (2003). The knowledge-creating theory revisited: knowledge creation as a synthesizing process. *Knowledge Management Research and Practice*, 1, 2-10.
64. Nonaka, I., von Krogh, G. and Voelpel, S. (2006). Organizational knowledge creation theory: evolutionary paths and future advances. *Organization Studies*, 27(8), 1179-1208.
65. Nonaka, I., Toyoma, R. and Konno, N. (2000). SECI, Ba and leadership: a unified model of dynamic knowledge creation. *Long Range Planning*, 33, 5-34.
66. Nonaka, I., Toyama, R. and Byosiere, P. (2001). A theory of organizational knowledge creation: understanding the dynamic process of creating knowledge. In Dierkes, M., Antal-Berthoin, A., Child, J. and Nonaka, I. (Eds). *Handbook of Organizational Learning and Knowledge Creation*. Oxford: Oxford University Press, 491-517.
67. Nwokah, N. G. (2009). Customer focus, competitor focus and marketing performance. *Measuring Business Excellence*, 13(3), 20-28.
68. O'Reilly, C. and Tushman, M. (2008). Ambidexterity as a dynamic capability: resolving innovator's dilemma. *Research in Organizational Behaviour*, 28, 185-206.
69. Park, H., Ribiere, V. and Schulte, W. Jr. (2004). Critical attributes of organizational culture that promote knowledge management technology implementation success. *Journal of Knowledge Management*, 8(3), 106-117.
70. Polanyi, M. (1967). *The Tacit Dimension*. NY: Doubleday.
71. Porter, M.E. (1980). *Competitive Strategy: Techniques for Analysing Industries and Competitors*. New York: The Free Press.

72. Prahalad, C.K. and Hamel, G. (1990). The core competence of the corporation. *Harvard Business Review*, 68(3), 79-91.
73. Putnam, R.D. (1995). Bowling alone: America's declining social capital. *Journal of Democracy*, 6, 65-78.
74. Rainey, H. (1999). Using comparison of public and private organizations to access innovative attitudes among members of organizations. *Public Productivity and Management Review*, 23(2), 130-149.
75. Saarenketo, S., Puumalainen, K., Kuivalainen, O. and Kylaheiko, K. (2009). A knowledge based view of growth in new ventures. *European Business Review*, 21(6), 531-543.
76. Schumpeter, J. (1934). *The Theory of Economic Development*. Cambridge, MA.: Harvard University Press.
77. Scott, S.G. and Bruce, R. (1994). Determinants of innovative behavior: a path model of individual innovation in the workplace. *The Academy of Management Journal*, 37(June), 580-607.
78. Sørensen, H. (2009). Why competitors matter for market orientation. *European Journal of Marketing*, 43(5/6), 735-761.
79. Spender, J. (1996). Making knowledge the basis of dynamic theory of the firm. *Strategic Management Journal*, 17(Winter Special Issue), 45-62.
80. Spraggon, M. and Bodolica, V. (2008). Knowledge creation processes in small innovative hi-tech firms. *Management Research News*, 31(11), 879-894.
81. Sudharatna, Y. (2010). *Learning Organization*. 2nd ed. Bangkok: Chulalongkorn University.
82. Takeuchi, H. and Nonaka, I. (2004). Knowledge creation and dialectics. In Takeuchi, H. and Nonaka, I. *Hitotsubashi on Knowledge Management*. Singapore: John Wiley and Sons, 1-27.
83. Tannenbaum, A. and Nash, E. (2002). Central intelligence-in life sciences as in other industries, sharing integrated business and competitive intelligence is a valuable competitive advantage. *Intelligent Enterprise*, 24.
84. Tether, B.S. and Tajar, A. (2008). Beyond industry-university links: sourcing knowledge for innovation from consultants, private research organizations and the public science-base. *Research Policy*, 37(6), 1079-1095.
85. Thompson, A.A. Jr, Strickland III, A.J. and Gamble, J.E. (2010). *Crafting and Executive Strategy*. New York: McGraw-Hill/Irwin.
86. Toften, K. and Hammervoll, T. (2013). Niche marketing research: status and challenges. *Journal of Marketing Intelligence & Planning*, 3(3), 272-285.
87. Tsoukas, H. (1996). The firm as a distributed knowledge system: a constructionist approach. *Strategic Management Journal*, 17(3), 197-217.
88. _____. and Vladimirov, E. (2001). What is organizational knowledge. *Journal of Management Studies*, 38(7), 973-993.
89. _____. and Mylonopoulos, N. (2004). Introduction: knowledge construction and creation in organizations. *British Journal of Management*, 15(1), 1-8.
90. Verkebe, A. and Tung, V. (2013). The future of stakeholder management theory: a temporal perspective. *Business Ethics*, 112, 529-543.
91. von Krogh, G. (1998). Care in knowledge creation. *California Management Review*, 40 (3), 133-153.
92. Virameteekul, V. (2011). Message from Ministry of Science and Technology. Retrieved From www.thailand-innovativecompanies.com/ttd_bizenterprise/Indprof/TTIC/TTIC_2011_IPO2.pdf.
93. Wang, L. and Ahmed, P. (2004). The development and validation of the organizational innovativeness construct using confirmatory. *European Journal of Innovation Management*, 7(4), 303-313.
94. Yang, J. (2007). The contingency value of knowledge in new product creativity. *International Journal of Technology Management*, 40(Nos 1/2/3), 101-113.
95. Yang, L., Chen, J. and Wang, H. (2012). Assessing impacts of information technology on project success through knowledge management practice. *Automation in Construction*, 22, 182-191.
96. Zaltman, G., Duncan, R. and Holbek, J. (1973). *Innovations and Organizations*. New York: John Wiley and Sons.