

A STUDY ON THE EFFECTS OF KNOWLEDGE MANAGEMENT ON INNOVATION STRATEGIES AND COMPETITIVE ADVANTAGES

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The 21st century is a knowledge economic era when a person who could master knowledge and technologies could master the competitive future. The knowledge and technology competition and the emergence of information technology and the Internet in the future have innovation strategies enter a new era. Knowledge management and share as well as innovation strategies of a business present the importance on the enhancement of competitive advantages. Effective knowledge management and innovation strategies become the key in the success.

Aiming at Kunshan German Industrial Park, the executives and employees in 6 of top 500 businesses are distributed 300 copies of questionnaires, among which 218 valid copies are retrieved, with the retrieval rate 73%. The research results show the significant correlations between 1. innovation strategies and competitive advantages, 2. knowledge management and innovative strategies, and 3. knowledge management and competitive advantages. It is expected to assist businesses in constructing knowledge management.

Keywords: innovation strategies, knowledge management, competitive advantages

1. RESEARCH BACKGROUND

From agricultural time to modern hi-tech era, the labor-intensive advantage in China could no longer compete with other backward countries. Excellent competitiveness, which could be kept by “knowledge”, requires a business constantly changing the innovative capabilities. To maintain competitive advantages, the organizational learning speed should be faster than others, for which management is required. Following the arrival of knowledge economic era, knowledge has gradually been regarded as a strategic asset and the major source of innovation

strategies. When the meanings of products and services and the production process become more complex and professional, business competition is changing from physical assets to knowledge resources. A business takes innovation strategies and knowledge management as the tactic of operation. The business operation in the knowledge economic era presents on knowledge replacing traditional tangible products and assets that knowledge management would become the core of business management. Under the globalized competitive environments, being able to effectively accumulate the existing knowledge and constantly creating new knowledge are the key success factors for Chinese businesses. Knowledge management has become an essential element for a business entering an international market. It becomes the globally competitive focus for a business presenting globalized knowledge management and effectively delivering knowledge internationally. When creating value and pursuing excellent quality for customers are emphasized, the meanings of innovation strategies and knowledge management cannot be ignored. Among the knowledge-based economic issues, the promotion of knowledge management, innovation strategies, and productivity undoubtedly reveals great benefits on the maintenance of competitive advantages. Accordingly, the effects of innovation strategies on knowledge management and competitive advantages are investigated in this study, expecting to establish the relationship among knowledge management, innovation strategies, and competitive advantages for a business constructing knowledge management in the future.

2. LITERATURE AND ASSUMPTION

2.1. Knowledge management

Knowledge management refers to the process of timely offering correct knowledge for necessary members taking correct actions to enhance the sustainability of organizational performance (Aboelmaged 2012). Such a process covers the creation, confirmation, collection, classification & storage, share & access, use & improvement, and elimination of knowledge (Camelo-Ordaz et al. 2011). Knowledge management is regarded as the organizational and technological infrastructure of a business to enhance the sharing and reuse of knowledge and the integration ability of a business to identify, manage, and share all organizational information assets (Feleagă et al. 2013). Information assets contain database, documents, organizational policies & procedure, and the tacit skills and experiences of a worker who has not yet acquired knowledge. Different from general management, knowledge management focuses on the viewpoint of knowledge, and the ultimate objective is to systematically and organizationally apply knowledge and

further create knowledge (George and Bock 2011). Lai and Lin (2012) regarded the major objective of knowledge management as to stimulate the creation, sharing, and reuse of knowledge so as to achieve the organizational learning and continue the life of an organization.

Referring to McIntyre (2011), three dimensions for knowledge management are utilized for this study.

(1) Organizational learning: The process of a company acquiring information or knowledge.

(2) Knowledge production: The process to transform and integrate untreated information into knowledge for a business solving business problems.

(3) Knowledge distribution: The process allows organizational members acquiring and using the group knowledge.

2.2. Innovation strategies

Aboelmaged (2012) mentioned that the idea of innovation strategies was first proposed by Schumpeter, who regarded innovation as a business utilizing resources for satisfying the market demands with new production, and the motivation of economic growth. He further pointed out two innovative factors in the flexibility of economic growth, including technical change and organizational change, and proposed the opinions about innovation as 1. the promotion of new products or new product quality, 2. the possibility of new production being from scientific findings or product commercialization, 3. the development of new markets, 4. the use of new materials, and 5. new industrial structure, such as monopoly or getting rid of monopoly. Camps and Torres (2011) argued that the objective of innovation strategies was to enhance the return on investment of a business and the employees' profitability. Hsiao and Chang (2011) considered innovation strategies as the "process" transforming knowledge into useful goods, in which people, affairs, and objects as well as the interaction and information feedback among relative departments were emphasized; besides, innovation was the major source to create knowledge and expand technological knowledge. Innovation strategies therefore were the primary tactic for a nation or a business promoting the competitiveness. Loke et al. (2012) regarded innovation strategies as a new approach to generate or produce new products in a company, including the increase of product patterns, production management systems, organizational structure, and strategic development. Mirkamali et al. (2011) defined innovation strategies as the route for a business developing and using technologies. When drafting innovation strategies, a business had to consider the industrial conditions, the company competence, and the basic competitive strategies. Since technical changes would affect industrial

structure and competitive advantages, innovation strategies became the essential element in the entire competitive strategies of a business. Based on competitiveness and innovative opportunities, Nguyen and Mohamed (2011) developed three types of innovation strategies, namely total leader, follower, and runner.

Referring to Wang and Ellinger (2011), innovation strategies are divided into Proactive, better support for innovative techniques than for other businesses, and Responsive, applying learning and following strategies to innovation, where some businesses were able to learn the invention abilities of other businesses to become followers, rather leaders. Proactive innovation strategies are based on invention abilities, while responsive ones need to pay attention to the market trend.

2.3. Competitive advantages

Al-Adaileh and Al-Atawi (2011) regarded competitive advantages as the variables for some managers making decisions; such variables usually appeared differently in various industries. Chong et al. (2012) proposed several characteristics of competitive advantages. 1. Competitive advantages were the events or conditions requiring special attention. 2. The effects of competitive advantages on a business could be positive or negative. 3. Competitive advantages would deeply affect a business achieving the target, which revealed great relationship with the sustainable management. 4. A business should be aware of or particularly stress on competitive advantages to avoid unpredictable conditions or miss possible development opportunities. 5. Competitive advantages could be confirmed by evaluating the strategies, environment, resources, and operation of a business. Hung et al. (2011) argued that competitive advantages were particularly emphasized when a business or a manager intended to acquire better performance or success. Such emphases not only affected the business operation but also played the same role in the future. López-Nicolás and Meroño-Cerdán (2011) indicated that competitive advantages of a business were generated by the different competence from other competitors, and the business competence was based on the intangible assets. Such competence differences were divided into four dimensions.

- (1) Distinctive technological competence, showing that a business presented the competitive advantages with technical differentiation and expert competitive field. Such a business focused on the accumulation and innovative development of specific R&D technologies, revealed the ability to transfer and apply such technologies to distinct industries, and participated in the formulation of industrial technical specifications and standards.

- (2) Low-cost operating competence, presenting a business owning the cost-based competitive advantages but concentrating the product on narrow competition, focusing on industrial manufacturing and the satisfaction with production efficiency, and regarding cost reduction as the operation point.
- (3) Market orientation operation, revealing a business focusing on satisfying the ultimate customer demands and market expansion as well as the establishment of brand and image and the diversification of products. A business with diversified products and mastering the time to a market was the market developer and the pioneer.
- (4) Diversification, presenting a business with cost-based competitive advantages and broader competition. Such a business owns the products and techniques in the industry as well as plural technologies of other relative industries. The business shows enormous capitals and the highly hybrid organization.

2.4. Relationship between innovation strategies and competitive advantages

Analoui et al. (2012) indicated that a successful innovator could have innovation become an important strategy in a business. Innovation strategies revealed the abilities to develop and commercialize products, services, and organizational systems, including new production techniques or new product and service distribution. Innovation strategies presented three characteristics. 1. They stressed on customer value, rather than technical development. 2. They preceded innovative activities through the internal system of a business and the cooperation with suppliers and distributors. 3. They could have higher output as they do more, faster, and more frequently. Such three characteristics also had a business with innovation strategies present the unique competitive advantages. De Vries et al. (2011) regarded innovation strategies as a new approach for a business producing or manufacturing products internally. Four elements were proposed to enhance competitive advantages, namely efficiency, quality, innovation, and customer services. Randall et al. (2011) pointed out innovation strategies as the primary basis to establish competitive advantages. For the permanence, the establishment of competitive advantages could be regarded as process driven by innovation strategies. For this reason, it is assumed in this study that

H1: Innovation strategies present significant correlation with competitive advantages.

2.5. Relationship between knowledge management and innovative strategies

In face of the changeable business environments, Becan et al. (2012) considered innovative strategies as the best strategy, which allowed a business growing in the constant innovative activities. In such innovative strategies, knowledge was a key, i.e. to support a business continuing the innovative strategies with knowledge management. In the past history of industrial competition, the emergence of revolutionary innovation would change, or even vanish, the status of the leader in the original industry. In this case, a business, in order to maintain the competitive advantages, had to well apply knowledge management to combine with innovative strategies and further predict the opportunities to keep the advantages and even surpass the competitors. DuBrin (2012) argued that an organization should link the existing knowledge with innovative strategies, look for knowledge which could achieve innovative strategies, and compare with real knowledge to present the difference between innovative strategies and knowledge; a business, on the other hand, should practice knowledge management aiming at reducing such a difference to actually maintain the organizational innovative strategies. Robbins (2013) mentioned that an organization possessing or acquiring unique, valuable, and non-imitable knowledge revealed larger potential competitive advantages. Accordingly, integrating innovative strategies and knowledge management is a key factor in a business remaining survival and competitive advantages. As a result, it is assumed that.

H2: Knowledge management reveals remarkable correlations with innovative strategies.

2.6. Relationship between knowledge management and competitive advantages

Bolívar-Ramos et al. (2012) indicated that Resource-based Theory, proposed by Barney in 1991, was greatly discussed in academic circles and became a mainstream in the research on management. Zott et al. (2011) mentioned that an organization in Resource-based Theory was regarded as a place with unique resources and capabilities which were the major source to achieve competitive advantages. In the knowledge economic era, effectively managing the knowledge of a business has become the key in acquiring competitive advantages; one being able to manage high-value, rare, and non-imitable knowledge could master the opportunities (Franke and Felfe 2012). According to Resource-based Theory, globalized

knowledge management could directly result in organizational competitive advantages. Consequently, it is assumed in this study that

H3: Knowledge management shows notable correlations with competitive advantages.

3. SAMPLE AND MEASURING INDEX

3.1. Research sample and subject

Aiming at Kunshan German Industrial Park, the executives and the employees in 6 of top 500 businesses are distributed 300 copies of questionnaire. Total 218 valid copies are retrieved, with the retrieval rate 73%. Kunshan German Industrial Park, established in 2005, specializes in the investment in European and American businesses. Covering 15 square kilometers and located in one of 25 reform points of administrative systems, Zhangpu in Kunshan, the park was cooperatively constructed by the People's Government of Kunshan and German Chamber of Commerce. The park mainly attracts the investment of European and American businesses to develop precise machinery, fine food, and headquarter logistics. There are currently about 70 European and American businesses, including 29 German businesses and 6 of top 500 businesses of General Mills, Wave Group, Kellogg's, Tyco Electronics, Tiantai Group, Yihai Kerry Investment.

3.2. Reliability and validity test

Validity refers to a measuring instrument being able to really measure the questions a researcher requests. Validity is generally divided into content validity, criterion-related validity, and construct validity. The questions in this study are referred to domestic and international research, and a pretest, which is discussed with experts, is preceded before distributing formal questionnaires that the questionnaire presents certain content validity. The causal relationship among knowledge management, innovation strategies, and competitive advantages is verified with Linear Structural Relations Model in this study, and the data input is based on the correlation matrix of above observed variables. The analysis of Linear Structural Relations Model shows the favorable convergent validity and predictive validity as the overall model fit reaches the reasonable range. Referring to Kerlinger's (1986) suggestions, item-to-total correlation coefficients are used for verifying the construct validity of the questionnaire, i.e. reliability analysis, and

the questionnaire content is judged by the item-to-total correlation coefficients. The item-to-total correlation coefficients of the dimensions in this study are larger than 0.6, revealing certain degree of construct validity.

To further understand the reliability and validity of the questionnaire, both reliability and validity analyses are preceded. From the viewpoint of Cuieford (1965), the higher Cronbach's α presented the better reliability, and the Cronbach's α above 0.7 represented the high reliability, while the Cronbach's α lower than 0.35 should be deleted. The value in 0.7~0.98 was treated as high reliability. Furthermore, the item-to-total correlation coefficient had to be higher than 0.6, or it should be deleted. Based on the above standards to develop the formal questionnaire, the measured Cronbach's α reliability appears in 0.71~0.88, conforming to the range.

4. ANALYSIS OF EXPERIMENTAL RESULT

4.1. Assessment criteria for LISREL model

LISREL (linear structural relation) model, combining Factor Analysis and Path Analysis in traditional statistics with simultaneous equations in econometrics, could calculate multi-factor, multi-causal paths. In regard to the assessment of model fit criteria, Bagozzi and Yi (1988) proposed to evaluate the preliminary fit, overall model fit, and fit of internal structural of a model.

The research data are summarized in *Table 1*. The preliminary fit, internal fit, and overall fit of the model are explained as following.

In terms of the preliminary fit, the three dimensions of knowledge management (organizational learning, knowledge production, and knowledge distribution) achieve the significant explanation (the significant standard of $t > 1.96$, $p < 0.05$); the two dimensions of innovation strategies (proactive and responsive) reach the significant explanation (the significant standard of $t > 1.96$, $p < 0.05$); and the four dimensions of competitive advantages (distinctive technological competence, low-cost operating competence, market orientation operation, and diversification) achieve the significant explanation (the significant standard of $t > 1.96$, $p < 0.05$). Apparently, the overall model reveals favorable preliminary fit.

Regarding the internal fit, knowledge management shows remarkably positive correlations with innovation strategies (0.846), innovation strategies reveal notably positive correlations with competitive advantages (0.835), and knowledge management presents significantly positive correlations with competitive advantages (0.807), revealing H1, H2, and H3 are supported.

The overall fit standard χ^2/Df 2.167 is below the overall model fit standard 3, showing the proper results of χ^2/DF and RMR. Besides, the chi-square value is sensitive to the sample size that it is not suitable for directly judging the fit. Nevertheless, the overall model fits GFI = 0.957 and AGFI = 0.934 are above the standard 0.9 (the closer GFI and AGFI to 1, the better model fit) that the model presents favorable fits.

Table 1. Analysis of overall LISREL model

Item	Parameter/evaluation criteria		Result	t
Preliminary fit	Knowledge management	Organizational learning	0.746	5.76*
		Knowledge production	0.781	7.21*
		Knowledge distribution	0.796	8.55*
	Innovation strategies	Proactive	0.833	11.27**
		Responsive	0.817	13.42**
	Competitive advantages	Distinctive technological competence	0.853	16.42**
		Low-cost operating competence	0.772	13.25**
		Market orientation operation	0.824	14.38**
		Diversification	0.840	10.21**
Internal fit	Knowledge management→innovation strategies		0.846	22.73**
	Innovation strategies→competitive advantages		0.835	26.85**
	Knowledge management→competitive advantages		0.807	27.12**
Overall fit	χ^2/Df		2.167	
	GFI		0.957	
	AGFI		0.934	
	RMR		0.011	

Note: * stands for $p < 0.05$, ** for $p < 0.01$

4.2. Hypothesis verification of the overall LISREL model

Figure 1 displays the path diagram of this study, where the estimates of the relationship between dimensions and variables are significant. The verification results of research hypotheses are shown in Table 2.

Table 2. Hypothesis verification

Hypothesis	Correlation	Experimental result	P	Result
H1	+	0.846	0.00	supported
H2	+	0.835	0.00	supported
H3	+	0.807	0.00	supported

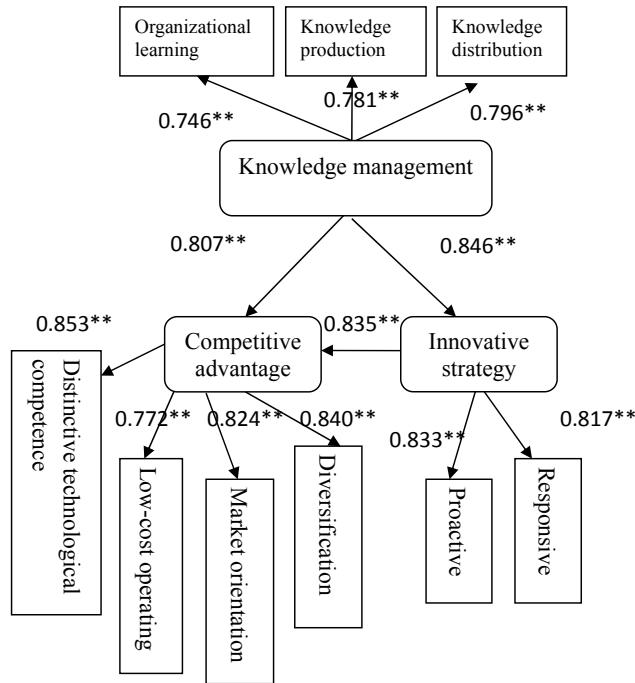


Figure 1. Path diagram

Note: ** stands for $p < 0.01$

5. CONCLUSION

The research results reveal the remarkably positive effects of knowledge management on innovation strategies and competitive advantages, presenting that a business covering knowledge creation, knowledge application, and knowledge transformation in the knowledge management and applying them to innovation strategies when practicing knowledge management could enhance the source of innovative inspiration and the correctness of innovation direction to further promote the organizational competitive advantages. Apparently, knowledge management shows the importance and influence on an organization. As a consequence, constantly enhancing competitiveness is necessary for the sustainable operation in the knowledge economic era, and it is inevitable to practice knowledge management and develop innovative capabilities to promote the competitiveness. Applying knowledge management to innovation strategies would be a good way to enhance the competitiveness. A business would expect to promote the competitive advantages when drafting strategies. Generally speaking, disruptive product

innovation is considered as the optimal choice. Moreover, it is also feasible to choose the process innovation. When a business intends to enhance the competitive advantage of market orientation operation capabilities, the product innovation could rapidly respond to the customer demands and meet the market demands. For this reason, product innovation obviously outperforms other innovation, in regard to the promotion of market orientation operation capabilities. When a business intends to enhance the competitive advantage of diversification capabilities, disruptive product innovation is the best choice.

6. SUGGESTION

According to the research results and findings, several practical suggestions are proposed in this study.

1. To understand the knowledge management in the globalized environments. A lot of businesses are not clear of the knowledge management advantages; in other words, they do not know their strengths. For an international business, a globalized knowledge vision needs to be established between the mother and branch companies in the constant knowledge creation and accumulation process so that the business presents consistent direction on the knowledge development. The establishment of such a knowledge vision could have the companies realize the environments to create and accumulate knowledge. Providing such knowledge vision for a branch company could have it definitely understand the development direction in the knowledge creation process. Besides, encouraging the branch company to dig out the knowledge in overseas markets is a critical source of globalized knowledge management for an international business.
2. A business should devote to constructing, integrating, and reallocating business knowledge. A business continuously updates the objectives of the core competence through the knowledge accumulation and delivery process to finally lead the market. Knowledge needs to be constantly exchanged, shared, and updated, which requires a business applying the dynamic capabilities to constantly improve the existing knowledge and allow it being shared, exchanged, innovated, and created.
3. An effective knowledge management should be established. The knowledge generated by a business could be changed to professional knowledge with the established process. In addition to constructing the knowledge, which could be transformed into competitive advantages, in the database a business would follow the market information and reallocate the resources to cope with the business demands so as to provide the necessary support for constantly expanding the size.

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