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Doctoral Dissertation

**Tacit Knowledge Management Mechanism and
Innovation Performance
- Evidence from Chinese Corporations –**

February 2014

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**College of Business Administration
Seoul National University**

**Tacit Knowledge Management Mechanism and
Innovation Performance**
- Evidence from Chinese Corporations -

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Abstract

Tacit Knowledge Management Mechanism and

Innovation Performance

- Evidence from Chinese Corporations –

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As competition in knowledge economy of developing countries intensifies, local corporations not only have to face local competitions but also competitions from extremely aggressive foreign corporations. In order to survive the fierce competition, they must innovate. Innovative performance depends on enterprises' ability to re-integrate massive resources inside and outside to adapt to volatile surroundings (Laursen and Salter, 2006).

In the first part, we take a detailed look on prior researches on corporate innovation. We also study the fundamentals of knowledge management theory and mechanism management as well as creation, sharing and transfer of internal tacit

knowledge. In the process of analyzing prior researches on corporate innovation in developing countries, we find that many researchers did not pay as much attention to the knowledge management mechanism within firms as they did to the cooperating mechanism between firms.

As we study the effects of different factors, such as technology, marketing, organization, strategy, system, culture, etc., on innovation, we find that what matters most is human resource management, network formation and knowledge acquisition. In the past decades, there has been an increasing interest in the tacit dimension of knowledge. However, the tacit knowledge management mechanism, which constitutes of communication, cooperation and knowledge sharing as the key factors, has suffered from lack of research. We intend to fill in some gap through this paper.

The second part is a case study of Haier Group from China. Through in-depth interviews, we explore various factors that affect Haier Group's innovation performance. Haier Group is China's top household electrical appliance corporation and one of the global leaders in white goods market in the last 4 years. Although China is a big producer of manufactured goods, its competitiveness can only be sustained by innovation. Established in 1984, Haier has experienced rapid growth since then. By studying the history of its development and conducting an in-depth analysis, we come to the conclusion that the tacit knowledge management mechanism, together with transformational leadership, decentralized structure, and environmental uncertainty coherently acted as ingredients of Haier's innovative success.

The third part concerns an empirical study on Chinese enterprises. Based on

Study I and Study II, we design a research model to detect the relationships between different factors. We discover that transformational leadership is becoming more prominent than transactional leadership in China's corporate scene. Under the trend, transformational leadership, combined with a forward-looking vision, is likely to substitute traditional corporate leadership in upcoming years as it has definitive advantage in exploiting the mechanism of tacit knowledge management through decentralized power structure. The trend is verified by the data collected from workers at Chinese corporations. The mediating effect of tacit knowledge management on the relationship between transformational leadership, decentralized structure, environmental uncertainty and innovation performance is partially verified. However, the relationships between environmental uncertainty, the tacit knowledge management mechanism, and innovation performance were ambiguous.

Keywords: transformational leadership, decentralized structure, environmental uncertainty, innovation performance, tacit knowledge management mechanism, Chinese enterprises

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Study I

Concepts: Knowledge Mechanism and Innovation

Performance

1. Introduction

The strategic management researchers recognize innovation as a critical role to achieve competitive advantage in the increasingly complex environment (Madhavan and Grover, 1998; Ireland and Webb, 2007). Corporate innovation depends heavily on its employees' knowledge, expertise, and commitment as key factors in the value creation process (Youndt et al., 1996). Therefore, knowledge management is an approach to adding and creating value by exploring and consolidating the experienced know-how and expertise of the individuals (Ruggles, 1998; Scarbrough, 2003).

The two approaches of knowledge management: tacit knowledge and explicit knowledge gained many attentions under the knowledge based view. Harry Collins (1974) argues the tacit knowledge is tied to the human body, in which knowledge is being social, and tacit knowledge is about sharing, transferring, communicating and cooperating. Although the giants from developing countries gradually reaching remarkable innovation performance (Govindarajan, 2011), the analysis from knowledge-based view was put on the agenda.

Accordingly, based on the classification on the framework of SER-M of review studies of existing literature, this part of the study investigated the status of research regarding the innovation performance in developing countries. Analysis is conducted especially on the entrepreneurs, the organizational structure and the tacit knowledge management as an insider mechanism.

2. Theory Background

2.1 Knowledge management

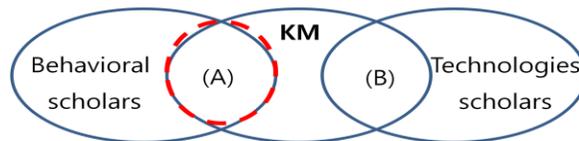
From the RBV perspective, the competitiveness of an enterprise comes from its internal resources, and knowledge is an important resource within an enterprise. A knowledge-based perspective of the firm has emerged in the strategic management literature (Spender 1996; Nonaka and Takeuchi, 1995). This perspective builds upon and extends the resource-based theory of the firm initially promoted by Penrose (1959) and expanded by others (Barney 1991; Conner 1991; Wernerfelt, 1984). The knowledge-based perspective postulates that the services rendered by tangible resources depend on how they are combined and applied, which is in turn a function of the firm's know-how (i.e., knowledge). This knowledge is embedded in and carried through multiple entities, including organizational culture and identity, routines, policies, systems, and documents, as well as individual employees (Grant 1996a, 1996b; Nelson and Winter 1982).

Peter Drucker said “knowledge has become the key economic resource and the dominant and perhaps even the only source of comparative advantage”. Ruggles argued that the acquisition, learning, accumulating, and creating process of knowledge inside enterprise, creating a competitive advantage and higher performance (Ruggles, 1998).

There are two major aspects of studies in knowledge management. One is

more inclined to the behavior studies. Some social sciences pay much attention to the relationships between the organizational structure, culture, organizational learning and the knowledge management (Argyris and Schön, 1999; PE Bierly, et al., 2000; Storey and Barnett, 2000). The other is more inclined to the technological studies. The corporate information systems are built to support creation, transfer, and application of knowledge in an organization. This system is named as knowledge management system, where strategies for developing a knowledge management system infrastructure will help a corporation use the knowledge resources more effectively, and improve competitiveness in the complex environment.

Figure 1. Field of knowledge management



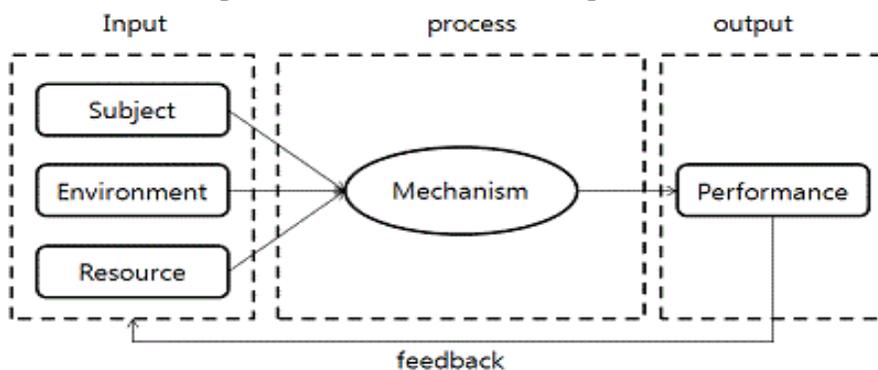
2.2 Mechanism management

From the development stage of strategic management theory, we can find 3 kinds of main perspectives, which are subject-based view (SBV) (Child, 1972; Hambrick and Maison, 1984), environment-based view (EBV) (Hannan and Freeman, 1977; Porter, 1981; Kogut, 1993), and resource-based view (RBV) (Wernerfelt, 1984; Barney, 1986; Conner, 1991). These researchers were explaining the factors of a firm's competitiveness with just one kind of the three independent

elements of subject, environment and resources.

The term 'mechanism' in the field of business and management is not uncommon. But there were no definitions of 'mechanism' itself (Walsh and Seward 1990; John and Rue, 1997) before Cho and Lee suggested the 'SER-M' paradigm, which combine the three kinds of perspectives (Cho and Lee, 1998). Mechanism management is a perspective not only focus on the internal of an organization (mainly RBV studies), but also the external environment of the enterprise (mainly EBV studies). Mechanism management also highlights the main impact of the S (subject), which proves as an important force for integration (Cho, 2006). "S" is the chief engineer of the enterprises, who establishes the strategy and development objectives. By perceiving the external environment, based on his/her previous experience, he/she leads the integration of internal resources (selection, learning, and coordination process) to make the whole organization's survival (Cho, 2006).

Figure 2. The mechanism management



The knowledge management is a kind of mechanism inside the firm. Cavusgil et al. (2003) argue that knowledge management is a mechanism, through which the

existing knowledge and the new knowledge are used to create an innovation process. Cavusgil et al. (2003) consider corporations that have a good knowledge management mechanism, which means use knowledge rapidly and effectively, tend to be able to innovate faster and more successful than others. Pyka (2002) also agrees that the synergistic creation and management of knowledge is the driving force of innovation networks.

Therefore, the integration of the knowledge to an organization, both internally and externally, is a very important mechanism. An organization can achieve value-adding through knowledge selecting, knowledge absorb, knowledge learning, and knowledge sharing by coordination steps, which can promote the enterprise management mechanisms on (W Tsai, 2001).

3. Innovation and the affecting factors

3.1 Innovation in developing countries

Schumpeter identified innovation as the critical dimension of economic change. He distinguished innovation into five different types: new products, new methods of production, new sources of supply, the exploitation of new markets and new ways to organize business (Schumpeter, 1912). The phenomenon of international giants reaching 'reverse innovation' which happened in developing countries, is gaining attention of many researchers (Govindarajan, 2011; Immelt, et

al., 2009).

From late 1980's, many researchers start focusing on the corporate innovation in developing countries (see Table 1).

It is found that in the subject (S) aspect, the researchers focus on the leadership and ownership of the corporations; in the resource (R) aspect, the researchers focus on the R&D investment, human resource development, organizational structures; in the environment (E) aspect, the market dynamics, government support and policies were focused; and in the mechanism (M) aspect, the knowledge accumulation, knowledge creation and sharing, learning, network, coordination, cooperation, culture, trust and team work, strategy alliance were focused. Most of the studies focused on one aspect, few studies came across two areas or more.

Table 1. The factors for innovation in developing countries

| | | |
|-----------------|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S (Subject) | Leadership | Tilman Altenburg , 2008; L Gumusluoglu, A Ilsev, 2009; Tanes Gülsöy, Özlem Özkanlıb, Richard Lynch, 2012; |
| | Ownership, | Yifei Sun, DebinDua, 2010; Gustavo Crespi, Pluvia Zuniga, 2012; |
| R (Resource) | R&D investment, | Nagesh Kumar, Mohammed Saqib, 1996; Xielin Liu , Steven White, 2001; Tilman Altenburg, 2008 |
| | Human resource development | Xielin Liu , Steven White, 2001; Pao-Long Chang , Hsin-Yu Shih, 2004; Michael Hobday,2005; Peilei Fan, 2006; Mary B. Teagarden Joab Meyer Dupre Jones, 2008; Tilman Altenburg, 2008; Shiu-Wan Hung, 2009; |

| | | |
|--------------------|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | Mingfeng Tang , Caroline Hussler, 2011 |
| | Organizational structures | Nagesh Kumar , Mohammed Saqib, 1996; Tanses Gülsoy, Özlem Özkanlıb, Richard Lynch, 2012; Jae-Yong Choung, Hye-Ran Hwang, 2014 |
| E (Envrionment) | Market dynamics, | Dieter Ernst, 2002; Kevin Zheng Zhou, 2006; Shiuwan Hung, 2009; |
| | Government support and policies | Pawan Sikka,1999; Patarapong Intarakumnerd, Punarj Chairatana , Tipawan Tangchitpiboon, 2002; Yongmin Chen, Thitima Puttitanun, 2005; Jean-Eric Aubert, 2005; Kazuyuki Motohashi, Xiao Yun, 2007; Kyung-Nam Kang, HayoungPark, 2012; Jae-Yong Choung, Hye-Ran Hwang, 2014; |
| M (Mechanism) | Knowledge accumulation, | Mike Hobday,1994; Michael Hobday, 2005; Stan Metcalfe , Ronnie Ramlogan, 2008 |
| | Knowledge creation and sharing, | Banji Oyelaran-Oyeyinka, Kaushalesh La, 2006; Daniel Chudnovsky , Mingfeng Tang , Caroline Hussler, 2011; Gustavo Crespi, Pluvia Zuniga, 2012; |
| | Learning, | John L. Enos, et al. , 1988; Andr 'es L ´opez, Germ ´an Pupato, 2006; Andrea Morrison , Pietrobelli & Rabellotti, 2008; Pietrobelli , Rabellotti, 2011; |
| | Network and strategy alliance | Xielin Liu , Steven White, 2001; Pao-Long Chang , Hsin-Yu Shih, 2004; Ingo Liefner, Stefan Hennemann, Lu Xin, 2006; Peilei Fan, 2006; Mei-Chih Hua, John A. Mathews, 2008; Stan Metcalfe , Ronnie Ramlogan, 2008; Aida Idris , Lian Seng Tey, 2011; Kyung-Nam Kang, HayoungPark, 2012; Jae-Yong Choung, Hye-Ran Hwang, 2014; |
| | Trust and team work | Mary B. Teagarden Joab Meyer Dupre Jones, 2008 |

3.2 Innovation and tacit knowledge management

Past experience of some Asian countries illustrates that can be gained and accomplished by tapping into Western knowledge and technology and using these advantages as a source of competitiveness. Japanese enterprises are known for their creative ability. Researchers called it 'N-form' corporation, which has a hierarchy and flexible organizational structure and a charismatic top manager (Hedlund, 1994).

In addition, developing countries have a specific asset which is in a form of indigenous knowledge derive from people's experiences accumulated and transmitted over generations. This knowledge concerns many walks of life and is a very valuable asset as a source of innovation, both technologically and organizationally. In fact, innovation is often brought out from the blending of indigenous knowledge with technological and organizational inputs in the developed world. The key is to facilitate the proper exploitation or integration of such indigenous knowledge and know-how in projects relevant to the countries concerned (Hobday, 1994; Intarakumnerd, et al., 2002; Pietrobelli and Rabellotti, 2008; Kang and Park, 2012) .

Knowledge can be divided into two categories, tacit and explicit knowledge (Nonaka, 1991; Meso and Smith, 2000). And recent studies in business were paying more attention on the tacit knowledge management. It is proved that tacit knowledge is more important than explicit knowledge (Planyi, 1962). And studies also suggested that tacit knowledge is playing more effect on the radical innovation

(Mascitelli, 2000).

Developing countries have much more to lose if they do not engage in the debate to find ways to survive in the new environment of rapid technological and organizational changes. In the process of imitation, the catch-ups in developing countries to learn is through practicing the new changes and apprenticeship. Stiglitz (1999) named these processes of learning 'horizontal methods of knowledge transfer', whereas the formal, codified storable mode is called 'vertical transfer'. In one hand, these largely practical, informal methods take several forms. Despite the increasing propensity to codify technical functions, tacit knowledge remains an important component not only in the context of traditional sectors and small firms, but it is also a necessary cognitive basis for interpreting codified knowledge including digital and mathematical functions. On the other hand, formal learning is characterized by five distinct characteristics, namely: (1) it has a prescribed framework; (2) an organized learning package or events; (3) the presence of a designated teacher or trainer; (4) the award of a qualification or credit; and (5) the external specification of outcomes (Eraut, 2000). However, building institutions for formal knowledge accumulation is not only costly and time consuming, the resources for sustaining the institutions are often not enough in poor countries.

3.3 Innovation and leadership

In developed countries, there are many longevity enterprises, which are in their mature stage. For these leaders, a large part of the entrepreneurs' role is

replaced by corporate mechanisms. But entrepreneurs in developing countries are very young, thus the leader's effect is more important. (Alston, 1989; Dorfman, et al., 1997; Li and Zhang, 2007; Warner, 2003)

In developing countries, the state-owned enterprises, and big family enterprises play an important role in the country's economic development (Dewenter and Malatesta, 2001). The capability of an entrepreneur is very important, since it is closely related with the innovation capability and performance of the organization (Hitt, et al., 2001).

Leadership is normally classified into two kinds: transformational leadership and transactional leadership (Burns, 1978; Bass 1985). And the growing impact of entrepreneurship can be mainly attributed to the changing environment and the complex nature of international business activities (Zahra and George, 2002; Yeung, 2002).

The leadership types and firm performance (include the innovation performance) is a main research area in developed countries (Bryant, 2003; Reuvers, et al., 2008; García-Morales, et al., 2008). In recent years, researchers from developing countries start to focus on this area (Altenburg, 2008; Gumusluoglu and Ilsev, 2009).

3.4 Innovation and organizational structure

The necessary of designing dual structures for innovation (Duncan, 1976),

and organization structures (formal and informal structures) have different responses with respect to the generation of new technology (Teece, 1996).

In developing countries, such as India, China, and Thailand, all incentive systems (like, salary incentive, bonuses, promotion incentive, and so on) are needed to encourage the employees to share knowledge and create innovation ideas (Lin, 2007; Gold, et al., 2001). In 1980's, Western 'Management by Objective' was introduced to China, and in the mid-1990's, many corporations started the KPI system to evaluate the employee performance in China (Hu, 1982; Huang and Yu, 2002). This incentive system always along with the team work performance, and based on the principles of division of labor, the need for supervision and a single center of authority and control.

4. Conclusion and discussion

In order to be more thorough, a research on the dynamic capability inside a company in developing countries is needed, however, such area is still lack of analysis. For example, research about the mediating role of tacit knowledge management.

Dynamic mechanisms of the Korean corporations have been analyzed by the mechanism management theory, which includes selecting, coordinating and learning mechanism (Cho and Lee, 1998; Cho, 2006). The US professional 'networks of practice' (NoP) and the Japanese organizational 'communities of practice' (CoP)

approaches to transnational learning unfold in practice (Lam, 2008).

In conclusion, it is essential for companies to adopt transformation entrepreneurs, the operative organization structure and the economy incentive mechanism in order to improve the innovation performance in developing countries. Though, enterprise's internal learning mechanism, organizational culture, coordinated teamwork, and so on are required further study in developing countries.

Study II

Haier Group: Key Factors for Innovation

1. Introduction

Chinese enterprises grow up fast in intense international market competition. Most Chinese enterprises are still concentrated in traditional manufacturing industry (markets mature) and have to compete with foreign stronger rivals. But the radical innovations of Chinese enterprises are still limited, and most of the innovations are sustaining innovation (Yam, et al., 2004).

Without leading technology, how do Chinese corporations achieve the success? Empirical study in this field finds that the factors of government support in financial and policy are significant (Chang and Shih, 2004). But some researchers found that Chinese enterprises' innovation ability and achievement is mainly derived from the change in organizational culture, human resources and organizational structure (Lau and Ngo, 2004; Yam, et al., 2004).

How does this innovative capability happening within the organization? As to Chinese corporate, a think in terms of knowledge management and learning organization is needed.

Haier group who has a powerful innovation capability and performance in traditional manufacturing industries was chosen for this case analysis.

2. Design of the case study

As discussed in Study I, the inside mechanism of the tacit knowledge

management of corporations requires in-depth examination. So Chinese Corporation--Haier, was chosen as the representative for this case study. Key findings in the qualitative study (Study II) are intended to be used in the empirical testing (Study III).

After literature paper research, and internal record information collection, we conducted several in-depth interviews in December, 2012, August and September 2013. A total of 43 employees were interviewed, of which 30 works in planning, R&D, and marketing department; 11 works in innovative management, financial, legal department; and the remaining 3 are the senior corporate leaders. The interview time is from 1 hour to 4 hours, with an average of 1.3 hours, and selected records.

The research questions are as follows: What are the main factors for Haier's success? How to achieve it? How to do innovation? How about oversea management?

3. Details of Haier Group

3.1 Introduction of Haier Group

Haier's predecessor was the Qingdao Refrigerator Plant, officially renamed as the Haier Group in December, 1992. Zhang Ruimin was appointed as the plant director in 1984, the fourth director in that year. The plant then made a loss of RMB

1.47 million (equivalent to US\$525, 000). The main products of Haier Group are refrigerators, washing machines, air conditioners, microwave ovens, and televisions etc.

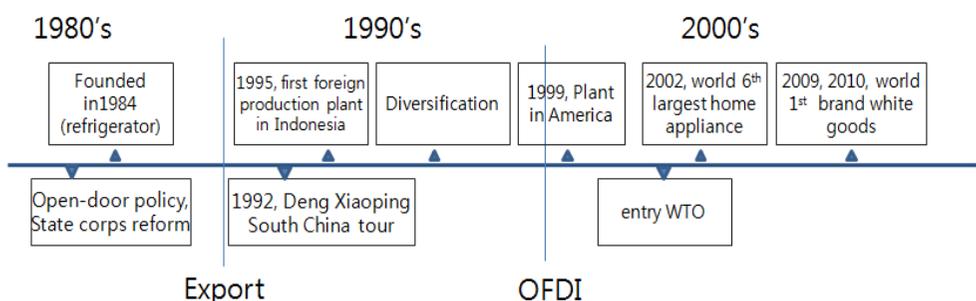
According to statistics from Euromonitor, Haier has been honored as the world’s largest Major Appliance brand for four consecutive years. In accordance with BCG’s Report, Haier is in the eighth position of the World’s Most Innovative Companies in 2012 and Haier is the only Chinese company which entered the top ten rankings.

Table 2. Overview of Haier Group

| | |
|--------------------------------|---------------------------------------------------------------------|
| Established Time | Dec. 26th, 1984 |
| Number of employee (worldwide) | More than 70,000 |
| Major Business | White Goods, Black Goods, |
| Annual income and Net profit | Annual income: 180.3 billion RMB Net profit: 10.8 billion RMB |
| Industry ranking | China Top1; No. 1 Global Major Appliances Brand (Euromonitor) |

Data Source: Corporate Culture Center of Haier Group, update in Jan. 2014.

Figure 3. The development timeline of Haier



3.2 Stages of development (1984-2012)

①1984-1991: Always aiming at the top position

Mr. Zhang Ruimin was appointed as Haier's plant director in 1984, the fourth one in that year. Before coming to this plant, Zhang was vice general manager of the household appliance division of Qingdao's municipal government. The plant loses RMB 1.47 million (equivalent to US\$525, 000) before Zhang joining Haier.

After the policy of "reform and open" started in 1978, the Chinese economy developed rapidly. In 1984, there were about 300 refrigerator manufacturers in China, most of which produced poor quality products. Zhang believed that Chinese consumers would be willing to pay more for higher quality products and reliable service. Inspired by the workmanship of German products that he saw during a trip to Germany in 1984, Zhang remarked "Our people aren't more stupid than Germans. Why can't we do the same as them?" and promptly entered into a technology licensing agreement with German refrigerator manufacturer, Liebherr¹. Liebherr had 70 years of experience in producing high quality refrigerators. Its refrigerators were generally regarded as the leading ones in the world. Haier followed up the licensing of Liebherr' four-star technology with an active learning and R&D strategy. Haier established a sophisticated R&D department, and sent more than 40 of its top engineers and managers to Liebherr for training. Liebherr proved to be a

¹ Zhang Ruimin quoted in Pamela Yatsko, To Serve and Profit: A Chinese Fridge Maker Wows Customers with Service, Far Eastern Economic Review, October 17, 1996, available

very successful training institute for Haier's top R&D talents. In 1985, a year after it licensed Liebherr's technology, Haier was able to introduce its first four-star refrigerator on the Chinese market. This product instantly established Haier as the leading refrigerator producer in China.

One of Zhang's biggest hurdles was getting workers to understand that Haier's commitment to quality was unlikely to be seen at other Chinese companies. To get his message across, Zhang once pulled 76 refrigerators off the line, some for minor flaws such as scratches, and ordered staff to smash them to bits. "That got their attention," laughed Zhang. "They finally understood that I wasn't going to sell just anything, like my competitors would. It had to be the best." Haier promoted personal accountability by having workers with poor performance stand on a pair of yellow painted feet in the factory at the end of the workday to explain their failings to their assemble colleagues.

Haier made a profit of RMB 1 million by its second year after licensing technology from Liebherr, in which its refrigerators sold in three major cities in China. Despite the overwhelming market demand and soaring prices for refrigerators, Haier resisted mass production, focusing on quality and brand-building instead. In 1988, Haier won a gold medal for quality in a national refrigerator competition. In 1989 China's refrigerator market faced oversupply, but rather than cut prices as its competitors did, Haier raised them. Zhang discovered that the Haier brand commanded a 15% premium, even during a price war (Yi and Ye, 2003).

This stage of Haier can be summarized as follows: with government-led

support, introduction of advanced facilities and technologies from German, and the total quality management (TQM), Haier showed E-S-R mechanism, and become No. 1 in white goods business in China.

②1991-1998: Culture activated “shocked fish”

By 1991, Haier had become China’s leading refrigerator manufacturer. “Now we could let our reputation precede our new products,” said Zhang. “It was time to diversify.” Haier found two candidates: the Qingdao Air Conditioner Factory, and the Qingdao General Freezer Factory, both stumbling due to poor management. Haier took on the debt of each firm and retained most of their employees. Introducing a new air conditioner type at the former and Haier worker discipline at the latter, the new divisions had transformed a deficit of RMB 15 million in profits within one year. Then in 1993, by strategically alliances with advanced foreign partners, i.e. Merlonic Company and Mitsubishi Heavy Industries, Haier enhanced these two main white good products’ technology levels.

The newly expanded refrigerator, freezer, and air conditioner manufacturer were renamed Haier Group in 1992. The same year, Haier acquired 500 acres of Qingdao land for a new industrial park to house the corporate headquarters and the bulk of the firm’s factories and subsidiaries. To finance such a large capital investment, Haier turned to China’s stock market, listing 43.7% of its refrigerator division on the Shanghai Stock Exchange in November 1993.

From 1995 to 1998, Haier acquired 13 firms. The most famous case was the

merger with Qingdao Red-Star Appliance. Haier used its culture to activate 'shock fish' (the enterprise hardware conditions are good, but have poor management). Haier culture, which was shaped approximately in the last 10 years, was copied to these enterprises; in most cases, the acquired firms can come out from the loss status only in several months.

The external environment is turning from the seller's market to the buyer's market. From over 100 refrigerator producers in 1989, China had just 20 major producers remaining by 1996, with the 10 largest accounting for 80% of the market share, up from 50% four years earlier. Three of the Chinese big manufacturers together account for about 60% of the market in 1996, Haier was one of the three big manufacturers, the other two are Meiling and Wanbao. With many weak ones failed, many formidable Chinese competitors have grown. Among Haier's domestic rivals, only Guangdong Kelon, which had once held the top position in China's white goods market, offered a full line of home appliances. Kelon also started out as a refrigerator manufacturer in the early 1980s, and listed stock market in the late 1990. But in the early 2000's, Kelon was merged by Greencool, another Chinese refrigeration firm, because the intense competition and the management problem.

Haier had started to venture into overseas markets as a contract manufacturer for multinational brands in the early 1990s, first exporting to the United Kingdom and Germany, and then to France and Italy. Haier also used Joint Ventures to explore foreign markets. In 1994, Mitsubishi invested \$30 million for a 55% stake in a JV with Haier to set up China's largest air conditioner plant. The Qingdao

factory would produce five of Mitsubishi's latest models for export to Japan². In 1995, Haier became one of the first Chinese companies to engage in foreign direct investment, setting up a refrigerator and air conditioner plant in Indonesia as the majority partner in a JV with a local firm³. In 1997 Haier launched its first manufacturing base in Europe, producing air conditioners in Belgrade through a JV with a Yugoslavian company. In 1997, Germany became the first export market for Haier-branded refrigerators. The same year, Haier formed a JV with a Philippine electronics company LKG to manufacture Haier-branded freezers, air conditioners, and washing machines in the Philippines for sale to local and regional markets (Yi and Ye, 2003).

The OEC (O stands for Overall; E stands for Everyone, Everything, and Everyday; C stands for Control and Clear.) management operation greatly improved the productivity of the corporations. CEO Zhang said, "OEC means that every employee has to accomplish the target work every day. The OEC management control system aims at overall control of everything that every employee finishes on his or her job every day with a 1% increase over what was done the previous day." (Hu, 2003)

In 1990, Haier had set up a service center in Qingdao that used a computerized system to track tens of thousands of customers. In those years customers throughout China accustomed to expect little or no after-sales service,

² "Zhang's Qingdao Masterpiece," Business Weekly, June 19, 1994, available at <http://www.factiva.com>.

³ James Hardin, "China's Future Dragons—Successful Companies are Emerging," Financial Times, August 14, 1997, p. 17

Haier different herself from other competitors.

With the continual expansion, the organization of Haier group became more complex. Learning from its Japanese competitors, Haier applied the divisional structure system. The Product Division operates independently, leading the organization to become more flexible.

This stage of Haier can be summarized as follows: under the intense competition in China, with the advanced facilities and technologies from strategic alliances, the OEC management and innovative marketing, Haier showed E-S-R mechanism, to prepare for the more intense competitive in the future.

③1998-2005: Go abroad and export to create a famous brand

After the fight in the first-line market, the second-line and third-line markets inside China became the next target. The rural population in the counties and townships were the new targets of the Chinese appliance competitors. In 2003, about 23% of rural Chinese households owned a refrigerator. China's entry into the World Trade Organization in December 2001, and the competitors of the famous foreign consumer appliance brands assault on, they are Siemens, Electrolux, Samsung, LG, Matsushita, Sony, GE, and Whirlpool. These competitors make joint ventures with Chinese players, and the multinational brand refrigerator unit sales represented 31% of the Chinese market in 2002, up from 26% the previous year. Foreign brands were especially strong in the automatic washing machine sector where they accounted for 38% of sales in 2002, up from 31% in 2001. But in

the rural area, network is hard to expand without the help of sales and marketing. Haier and some other Chinese manufacturers' technology were nearly as good as these foreign competitors, their prices were lower and their styling and distribution was better suited to Chinese consumers' expectation. All these made Chinese manufacturers more competitive against foreign brands.

While Haier continues to expand overseas, Haier established a separate overseas Promotion Headquarters, which is responsible for all the overseas business of the group. Haier's products are no longer only produced from China, but support with local design, local production, local manufacturing, local sales, which is the "localization of Haier". Haier continues OEM production for foreign multinationals and actively sought new OEM clients, but after 1999, the company was focused on selling Haier-branded products in overseas markets. "The objective of most Chinese enterprises is to export products and earn foreign currency. This is their only purpose," said Zhang. "Our purpose in exporting is to establish a brand reputation overseas."⁴

In pursuing the expansion of its brand to international markets, Haier was emulating the strategies of successful Japanese and Korean firms such as Sony, Samsung, and LG. Haier started to upgrade the low-end Chinese brand. Haier began with niche products to enter developed countries. Haier's move into the U.S. market with cautious at first, it focused upon two niche markets in compact refrigerators and electric wine cellars. Both markets were underdeveloped, but Haier believed

⁴ Zhang Ruimin quoted in Yibing Wu, "China's Refrigerator Magnate," The McKinsey Quarterly No. 3, 2003, available at <http://www.mckinseyquarterly.com>.

that both markets had growth potential and were being largely neglected. The company's sales figures soon proved this belief was correct, allowing Haier to firmly establish itself in the US niche market. In Japan, “small, small child prodigy”, a 1.5kg washing machine, once swept the Japanese market is still top with the capacity of the top paragraph. Haier started to build manufacturing plants in India and Africa after 2000. Soon after, Haier opened plants in Jordan, Algeria, Egypt, Nigeria and South Africa through Joint Venture with local partners.

At the period to go out, go inside, Haier was constantly looking for gaps with the international competitors, and improve itself. After setting up factories in the United States, in order to optimize enterprise management, Haier enhanced its information management systems by introducing the SAP system which connects with all branches through the world. Haier began to implement the market-chain-based business process reengineering system in late 1998.

According to CEO Zhang, a market chain is a series of business process activities to make products or render services to satisfy customers' needs. In a nutshell, a market chain links every employee's work with the market, which can either be an external or internal market. Therefore, every Haier employee's next downstream activity or process is a market, and every employee faces a market with a direct link to a customer. This allows the firm to convert external market competition into a type of internal competition. With employee compensation tied to market performance, every employee provides the best performance to meet his or her customers' needs.

The figure below shows the synchronous flow model of Haier's market

chains. The top row shows the management process of strategic planning, operational reporting, internal audit, and process and IT management. The second row shows the supply chain planning that links with both supplier relationship management (SRM) to obtain the best global supply chain resource and customer relationship management (CRM) aiming to provide excellent service to global customers. There are three major flows: order information, product, and money flow. In the center of the diagram, there are three circles. The left circle shows the primary activities of the logistics division. The middle circle shows the primary activities of the various product divisions. The right circle shows the primary activities of the marketing and sales division. The company pays attention to product lifecycle management (PLM). All service departments support the three circles with total quality management, total production management, total budget management, enterprise culture, and human resources management. The fundamental base of the reengineering system is the IT infrastructure and Haier's OEC management-control system.

Under the market-chain-based business process system in March 1999, Haier began to transform the Group's pyramid structure into a matrix structure focusing on project operations. Under this matrix, the horizontal axis consists of functional departments, and the vertical axis consists of projects. The new structure maintained all the divisions and their R&D, procurement, and sales departments; but now, divisions need to interact with other divisions on certain projects. In 2001, Haier created a unique transaction job-recording system between two activities in the market chain called SST: Claim Compensation (Suo Chou), Claim Payment (Suo

Pei), and Stop (Tiao Zha). This SST system ensured upstream and downstream activity in the market-chain process.

Starting from 2002, Haier's reengineering system began focusing on making every employee a Strategic Business Unit (SBU), which means that each employee is an independent profit center with the responsibility to make a profit. All Haier employees learn that they have to give customers what they want, and, with SBU, employees care about the individual needs of the customers. This philosophy is "The customer is the king for every Haier sales person", which was always been the core of Haier culture, and spread through the world branch. Till the end of 2005, Haier have built 18 oversea branches, 9 oversea R&D center, and people from over 100 countries use Haier products.

This stage of Haier can be summarized as follows: under intensive competition inside China and around the world, with advanced facilities and technologies from strategy alliances and foreign talents, market-chain-based business process reengineering system, SBU management and bond with the customer marketing, Haier showed S-E-R mechanism, start participating in the competition on the world stage.

④2006-2012: Consolidating global resources and creating a global brand

After 20 years of development, Haier has successfully intruded into the global market, however, the process of domestic expansion within china went deeper and slower. Haier realizes the goal is to become the best manufacturer. By

enhancing the competitiveness of the products and business operations, achieving a win-win relationship with sub-suppliers, customers, users, and transforming Haier culture to a diverse culture, Haier will achieve sustainable development, with its brand being localized in each national market.

The policy of “household appliances going to the countryside” (government gives subsidy for the household appliances, the policy period was from 2007 to 2013) encouraged even more companies to enter this field. And because of the appreciation of RMB, the fixed cost of the industry rises. In order to cost reduction, most companies produce more goods and sells goods in low price. All of this triggered price war in the household appliances sector. But Haier didn't join in, Haier plays value war, by differentiating its products to attract customers. Haier's strongest Chinese competitor is Midea. Midea gets a great achievement in air-condition and refrigerator markets, it is a threat to Haier. Simons, Green, Samsung, Hisense are also the competitors of Haier.

In 2009, Haier acquired 20 percent stake in Fisher & Paykel. Haier helped this New Zealand company break into China's high-end white goods market, while Fisher & Paykel help Haier with its expansion projects in Australia and New Zealand, as well as development of a new washing machine motor. With this motor, Haier won the market inside China, a quiet type of Cylinder Washing Machine bonding the customer needs. In 2012, Haier offered Fisher & Paykel's main shareholders a buyout offer, and acquired Fisher & Paykel. Haier also acquired Panasonic Corp.'s Sanyo Electric washing machine and refrigerator units in Japan and Southeast Asia in 2011. From 2007, Haier sourced more strategic

partners, like Cisco, Intel, FramTech, DOW, Honeywell, MXCHIP. These acquisitions and strategy alliances help Haier improve its upstream industry chain. As a result, Haier launched more appealing products, like the Italian-style Three-door Fridge, Innovative Glass Design 3D Fridge Freezer, No-tail TV, and No-tail kitchen appliance. In 2011, Haier's overseas sales accounted for about 26 percent of its total revenues.

Table 3. Mechanism of Haier from 1984-2012

| | Brand building Stage 1984-1991 | Diversification Stage 1991-1998 | Internationalization Stage 1998-2005 | Global Stage 2005-2012 |
|-------------|-------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Subject | Zhang Ruimin, Qingdao government | Zhang Ruimin, top management | Zhang Ruimin, top management | Zhang Ruimin, top management |
| Environment | Chinese reform and opening-up, rise in demands, Government policy, | 1992 inshore city opening policy(Deng Xiaoping), Intense competitions inside China, | 'Go abroad' policy, 2001 China enter WTO, Global competitors attacking domestic, | Intense competitions over the world, Customer demands' diversification, |
| Resource | advanced facilities and technologies from German (Liebherr), total quality management, Haier culture, | Extension of sales, M&A and consolidate with Haier culture, Reorganization of the resources, total quality management, OEC management, excellent service, Strategy | Reorganization, Supply chain process reengineering, SBU, 'Cash on Delivery', 'Just in time', SST, HR management, Global supplier and network, Haier culture going abroad, 9 oversea R&D | Inverse triangle/ network/ platform organization, individual goal combination win-win mechanism, Standard R&D and manufacture, zero-inventory, |

| | | | | |
|-----------|---------------------------------------------------------------------------|---------------------------------------------------------------------------------|----------------------------------------------------------------------------|---------------------------------------------------------------|
| | | alliances for technology, financial resource(IPO), innovative marketing, | center, | M&A oversea, HR management, 5 R&D platform, |
| Mechanism | Building own capabilities in response to external environment, E-S-R type | Use low price (OEM) and niche product to live in the foreign market, E-S-R type | Technology catching up and product expansion in foreign market, S-E-R type | Technology and management innovation in the world, S-E-R type |

Haier Group started to implement the individual goal combination operations model in 2006. Individual goal combination is Haier’s competition model to achieve success in the global market. “Individual” means an independent and innovative SBU; “goal” means a marketable objective of being first among the competition. Individual goal combination is an integration of the individual SBU and company goal, direct selling, and direct delivery of goods and services to generate positive cash flows. Haier developed Model T management approach, which T is based on a budget system in which several rounds of discussions between top management and product-line managers set the competitive market objectives. With Model T, Haier divides the entire process from order creation, to order acquisition, to order execution into 13 nodes and selects T, the planned production day, as the starting point of the two-way process promotion.

Haier carried on the organizational structure management reform, established inverted triangle structure, through the establishment of resource layer down and a transfer mechanism in the corporate management, Haier established user needs as

the starting point of service and customer demand satisfaction as the service endpoint closed-loop management process. Through understanding the needs of users and realization of the management unit are a variety of independent management body (self creation, self drive, since running), this combined strategy and structure empowers staffs who deal directly with customers, by giving them the autonomy to make expedient decisions on behalf of customers. Managers exist only to support and provide resources. Since 2007, Haier reformed the corporation to 6 big operation groups, and each operation groups are organized as an inverted triangle each.

This stage of Haier can be summarized as follows: in the era of demand diversification of the customers, with improved technology innovation capability, the strategy alliances help, the individual goal combination win-win mechanism, bonding with the customer needs, Haier showed S-E-R mechanism, leading the future home appliance industry.

4. Case analysis

4.1 CEO Zhang Ruimin

In 1984, starting the prologue of Haier's entrepreneurship, CEO Zhang studied at the night college for 4years while working in a Hardware Factory as a normal worker after graduating from high school.

CEO Zhang Ruimin, from his coming in the 1980's, is a spiritual leader of the group. He has driving ambition and a worldview transcending personal ambition. From 1984 to 1991, globalization pressure was relatively weak for Chinese corporations. Haier built the brand domestically and internationally, because Zhang said "Chinese businesses will have to develop their own brands to survive in a global economy."

His favorite books are <The Book of Changes>, <The Fifth Discipline>, <The Future of Management>. And his key words in speeches after the year 2000 were innovation, reform, catch opportunity, customer, and market needs (data from analyzing Zhang's speeches after 2000 on the Haier website).

Zhang's philosophy has always been "Only play chess with the masters." He said, "To compete with major international players, I believe Haier needs to focus on building its own brands rather than settling for manufacturing things to be marketed under a Western company's brand'. To achieve that end, Haier's strategy is an ambitious one: "Fight in the toughest markets first." By entering the advanced markets first can help Haier to establish its brand and make inroads into developing markets easier. That is why, in 1990, Haier exported its first batch of refrigerators to Germany. It is also why Haier established a refrigerator factory in South Carolina in 1999. Under the leading of Zhang, Haier continues to learn and grow by studying the competition.

".....the strategies posed by CEO Zhang is ahead of normal Chinese competitors, different voice raised from the society, like when we first set plant in

USA, many disapprove voices raised, but the reality turns out that we won in this bargain and the following several brave steps..... following CEO Zhang is right.....”

—Innovation modeling JYT(创新经营体), Manager P

4.2 Culture of Haier

‘Haier is the Sea’, with a generosity of mind.

Innovation is “the Way of Haier”, which means create value for customers on the basis of world-class systems and platforms, so as to establish a win-win culture. Meanwhile, Haier committed to long term success, which depends to a large extent on the values of Haier.

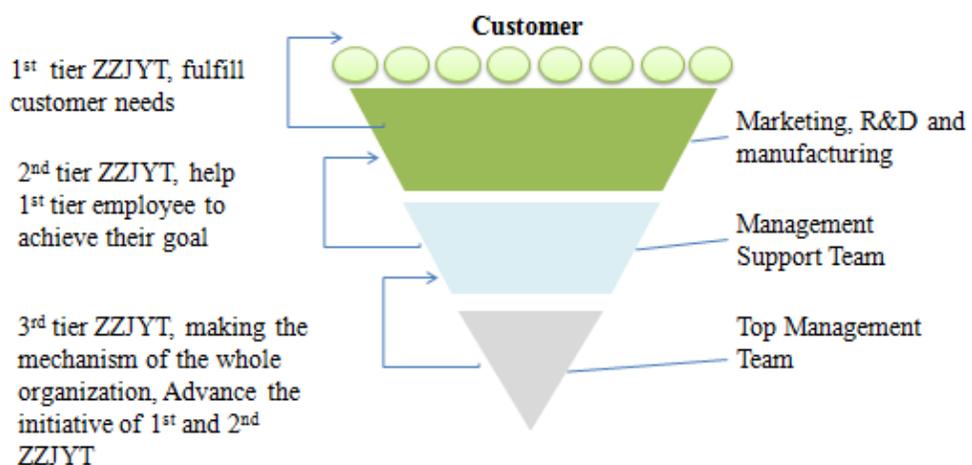
Thinking what consumer thinks means not only to meet, but also to create consumer needs. Haier constantly challenge itself to make break-through in the ever-changing world. Haier’s philosophy is not the only guidance on individual development, but also restricts on employee values. “Think What Consumers Think” requires everyone to be enterprising and innovative. The essence of innovation lies with value creation, which is in turn derived from customer creation. Haier is all about stakeholders –employees, customers and shareholders. Only the win-win culture can guarantee the sustainable growth of Haier. The enterprising and innovative employees will then commit to value creation for customers in different independent operations, while realize the values by themselves at the same time.

Haier's value on rights and wrongs is “users are always right while we need to constantly improve ourselves”, value on development is “entrepreneurship and innovation spirits”, value on interests is “Win-win Mode of Individual-Goal Combination”.

4.3 Inverted triangle organization

Evolution from SBU to ZZJYT to fast reaction from the market (1999 marketing chain, 2001 SBU, 2005 ZZJYT) . Each employee creates value for users in different ZZJYT to fulfill their own values. Each employee establishes a goal with users by joining ZZJYT and signing a contract with the users. Small company (ZZJYT) and intrapreneurship (create ventures in-house) are encouraged to release humanity to the largest extent.

Figure 4. Inverted triangle organization of Haier



Source: Haier documents.

4.4 Individual goal combination win-win mode

Haier concerns the interests of all stakeholders, including employees, users, and stockholders. “Individual” refers to the employees with two spirits of entrepreneurship and innovation; “Goal” is users’ value. Each employee creates value for users in different ZZJYT to fulfill their own values. As a result, the value of the enterprise and stockholders are naturally fulfilled (see Figure 5).

Figure 5. ZEUS Model

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p style="text-align: center;">I. Strategy:</p> <ul style="list-style-type: none"> • Know your strategy positioning and goals • Zero-distance to Customer | <p style="text-align: center;">II. People:</p> <ul style="list-style-type: none"> • Match the right people to execute the strategy • Entrepreneurial employee |
| <p style="text-align: center;">III. Execution:</p> <ul style="list-style-type: none"> • Detail execution plans • Unified commitment & process | <p style="text-align: center;">IV. Pay:</p> <ul style="list-style-type: none"> • Individual compensation should be in line with goal achievement • Sharing value with customer and employee |

Source: Haier documents.

4.5 Knowledge management of Haier

Haier manages its explicit knowledge by using the Information system (patent management, R&D process, problem solving method sharing), and using social technology network (‘Wechat’ of Tencent, Group chatting). Haier learns technologies from its strategic alliance partners, or conduct R&D activities together.

As for tacit knowledge learning, there are many different approaches. Haier

collage was built in 1999 for the purpose of managing the group's staff training, where older employees share their experience, and experts sharing professional knowledge. Every university graduates will have a 'tutorial' to learn their field work when first come to work in Haier. The organization encourages employees and ZZJYT to upgrade themselves through self-learning, self-criticism, and self-examination, to find a new routine for solving problems more efficiency. Sharing with a group (ZZJYT) members, other groups, and partners is automatically implemented.

The communication and cooperation happened inside the corporation and between Haier and its partners. From the beginning of the 1980s, Haier started developing strategic alliances with many advanced overseas companies to. Haier has good relationships with the suppliers, which are selected strictly by the technology and quality. Many of the strategic alliances or supplier partners send some staffs just working inside Haier, and this makes close relationships between the employees from two companies.

Table 4. Strategy alliance of Haier Group

| Year | Partner | Country | Cooperative Target |
|-------------|--------------------------------|----------------|---------------------------------------------------|
| 1993 | Merlonic Company | Italy | Produces automatic roll-washers |
| 1993 | Mitsubishi Heavy Industry, LTD | Japan | Produced air-conditioners |
| 1994 | GK Design Company | Japan | Engaged in the cooperative design of new products |
| 1997 | Philips | NL | Produced color TV-set |
| | Metz | Germany | |
| 1998 | Beihang University | China | Software development |

| | | | |
|------|----------------------------------------------|-------------|------------------------------------------------------------------------------------------------|
| | C-Mold | USA | |
| 1999 | Toshiba | Japan | Produced MRV inverter series of commercial air-conditioners |
| | NETSCREEN | USA | System network development and service |
| 2002 | Sanyo | Japan | R&D |
| | SAMPO | Taiwan | |
| 2007 | Cisco | USA | Chip in intelligence appliance |
| | Intel | USA | Chip in intelligence appliance |
| 2008 | VDE Testing and Certification Institute | Germany | R&D, product to EU |
| | GE | USA | Washing machine(energy saving, noise reducing), solar energy |
| | BMW | Germany | Washing machine R&D |
| | P&G | USA | Washing machine |
| 2009 | UNICOM | China | WCDMA, network, IT |
| 2010 | HP | USA | Marketing network exchange |
| | FramTech | Norway | Low-carbon green technology |
| | LIXIL | Japan | architectural ornament and design |
| 2011 | The Carlyle Group | USA | R&D |
| | DOW | USA | Energy saving technology and new material, green appliance |
| | BEST | EU | |
| | Fisher & Paykel | New Zealand | |
| | Honeywell | USA | heat preservation and insulation problem |
| 2012 | MXCHIP | China | Home application Wi-Fi technology |
| | Ali cloud | China | Smart phone |
| | Underwriters Laboratories | USA | Energy saving and environment protection freezer appliance in standard, product R&D and safety |
| | China Astronaut Research and Training Center | China | Astronaut refrigerator R&D |
| 2013 | DOW | USA | Water purification technology |

Source: Haier website. (Final data by 2013.05)

4.6 Innovation in Haier

①Technology innovation

The technology innovation of Haier seemed to be very different with other Chinese corporations. Haier do more radical innovation. For instance, Three door refrigerator, Appliances Without ‘tail’, Mini washing machine, vegetable washing machine, Mini refrigerator, Transparent refrigerator, which were all a break though product at the time. Now, Haier has a leading Energy-saving technologies, which makes Haier expands the European market easier.

Haier has established several overseas design and R&D centers. These design centers (totaling 15 to date) are in charge of developing a broad variety of household appliances that satisfy consumer needs in a number of countries worldwide. For example, the compact refrigerator for college students and wine cooler in the living room for middle class in America, small washing machine for single in Japan, big washing machine for washing the long women clothes in Middle-east, 2 meters high refrigerator in Russia all achieved success in each local market.

“Haier’s niche market strategy is always giving satisfaction to the local customers. Nothing special, we just find unfulfilled consumers' needs and satisfy them.Once you are the first maker in this area, you are the King in this area. Because this market is so small, if the competitors want to share this part, they should pay much more caution. Even they squashed in the finals, they can just share

a little, you know, it's not a big cake initially. ”

—Japan marketing, WGG oversea department, manager Z

“Every year Haier push the new product in the local market, the speed is quicker than the competitors, and the customers like the new appearance. Now we carry on modular design and modular manufacturing, and resulting with high speed in production and low cost..... We just combine parts from different suppliers..... The R&D centers are connecting with each others, the new design from the Americans R&D center may also have the contribution of the Chinese engineering.....”

—American modular product research center, manager T

“Spreading the research and design development network all over the world, drawing exterior resources through the opening structure, fostering the suppliers in the value chain to participate in the research and development, Haier improved its capability to capture the technology opportunities.

For example, when designing the new electric water heater for quick service in the summer, our engineers in research and development center just think about adding heating tube, but when we open the research and development platform, one of our supplier introduced its new material and products, which could easily fulfill the customer's need of having a shower that does not need to wait more than 10 minutes.”

“..... at the last stage, we have 9 R&D centers oversea, but they were just

restricted labs. Now we have 5 big R&D Platform in 5 continents, which have no boundary. Because they are open, in each platform, we can draw more resources quickly..... the capability to acquire new technology improved greatly.”

—Innovation modeling JYT(创新经营体), Manager P

Meeting international quality standards allowed Haier to introduce its products into the markets of developed countries and developing ones. After starting the manufacture abroad, Haier transplant the quality assurance capabilities, for example, Haier incorporated the 6-S quality concept in American plants. This time the local culture and Chinese culture might be conflicts, Haier had to find the balance point, and respect the local culture first.

“.....the Japanese customers are the most critical, the refrigerator they bring home should not have any dust and strange smell. The products to other countries only wipe once before packing, but for the products export to Japan on the production processes, the workers wipe the refrigerator several times, and before the product leaves the door, our workers checked again. They are not only cautioning on the product itself, but also the packing box, our workers are very careful to avoid any wrinkle on the box..... This character is influenced by the Japanese culture.....”

—Customer service, (Asian) overseas department, manager L

②Organizational innovation

The leaders of Haier insist on paying attention on the market, from the CEO speeches, we found that the market changing and the needs of the customer were frequently mentioned. For a more flexible response to market demand, Haier made many management innovations. For instance, OEC (overall every day clear), ZZJYT with the same goal (vision), Marketing, R&D, manufactory department combining together. After implementing the SBU organization, Haier implements now autonomous management, the small group's organizational structure could change flexibly according to different product category, because when the organizational structure is flat, loose, it may combine (for example a new project group) to support new technical development as necessary. Under the inverted triangle organizational structure, the manager of particular model product has his own power of decision-making, he can ask for the coordination from other groups independently. He does not need ask for the superiors anymore. This release-authority mechanism causes the decision-making process to be more flexible and faster.

“.....so leader cannot substitute staffs to make decisions, and leader does not necessary need to be on the project site, because the leader might have grasped less information than the employees, the decision he made may not be as suitable as the decision made by the employees, meanwhile, the level of efficiency may decrease. Now, we give 3 kinds of “rights” to the staffs, the independent right to select team

members, the independent right to allocation, and the right to make decisions on the project site. The whole company is divided into more than 2000 teams, and each team is like a small company, greatly enhance efficiency.....”

—Innovation modeling JYT(创新经营体), Manager P

③Operational Innovation

Haier first grow to the refrigerator giant Quality guarantee, 6S, SST, and “A hundred times, a thousand times no error manipulation is innovation” by Zhang, - Diversity service, customize, network in village,

The Total Quality Management (TQM) helped Haier build its brand in China in the 1980s’ and early 1990s’. Towards becoming a global leading enterprise, the company sets the goal of elevating its product quality to be amongst the best in the world. It thus launched a drive to improve quality, service, design, and technological capability.

“Haier has manufacturing sites in countries with widely different living standards, and when we have to manufacture some products for particular market for export, we will first study the standard there, and all the products will be made in accordance with the special standards. The quality control standards also differ depending on the order country.”

— Quality control engineer, washing machine department, manager L

After value chain recreation in the beginning of 21st century, Haier created two big modern for managing the networks, one is the ERP system inside the corporation, the other is the CRM system to connect with the customers. By connecting with the market, CRM allows the marketing workers to continuously communicate with the customers, and converses the customer needs to the internal organization, such as breaking the walls between the customers and the corporation. ERP system improves the connection inside the corporation more effective, like breaking the walls between the departments inside the corporation. Then, the customer needs can be quickly transferred to the supply system, delivery system, financial system and custom service system, achieve synergy operation, and content at the end.

“...a cooperation platform inside the corporation. R&D, manufacture, marketing, financial, planning, law, and HR departments, they all combined together with the core to satisfy customer needs. As such, we created a small team, which we called “ZZJYT(自主经营体)”, because of the same goal, they create values for the customer together. In contrast, some years ago, if the marketing worker take an contract, the R&D department would say the product is impossible and the manufacture department would say the time is not enough..... now it is totally different everyone is finding his right way to help the team to achieve the goal without excuse..... ”

—Innovation modeling JYT(创新经营体), Manager P

4.7 Key factors for the success in innovation

① Transformational leadership of Zhang and TMT group

Learn from stronger rivals. Zhang's philosophy has always been "Only play chess with the masters". He thinks the company needs to get as close as possible to your competitors. Haier's strategy is an ambitious one: "Fight in the toughest markets first". 1990 export to Germany, and 1999 FDI in America.

Zhang, 'Create market' with differentiated product (2000), 'employee is the company's innovation resource' (2002), 'Innovation is the biggest weights of survival' (2010). 'The risk of not innovation is higher than do innovation.' (2012)

".....the strategies posed by CEO Zhang is ahead of normal Chinese competitors, different voice raised from the society, like when we first set plant in USA, many disapprove voices raised, but the reality turns out that we won in this bargain and the following several brave steps..... following CEO Zhang is right....."

—Innovation modeling JYT(创新经营体), Manager P

When asking about the main reason for the oversea management, "the right leader" was the most favorable answers. The failure in Italy and South Korea in the early times is contributed to choosing the wrong local leaders.

As the oversea director, Li Pan said, "Every country is a complete new

environment, you cannot just use our means in Chinese market”. So the managers of oversea branch are actually managing a new venture with accumulative experience. And the oversea CEO plays as a communicator and a creator. There is a local manager to manage the branch in their home country, who work together with a Chinese deputy from Headquarter Qingdao. When Haier culture depressed overseas, it changes and adapts through a Localization process, different with the western corporations ‘globalization or globalization’ strategy. (Cho and Chang, 2007). The branches all over the world pursuit of shared values and common ground.

②Decentralized organization

Haier has a rapid market response because of the two big modern managing networks (IT system), ERP system & CRM system. Also, the structure of ZZZYT creates great powers conferred upon Product Manager, as well as more simplify approval procedures.

Effective internal communication promotes each individual to share experience inside the corporation, and team members cooperate together for the same goal.

Free choose team leaders and members. ZZZYT leader has the right and the means to choose the members, employees also have the right to choose which ZZZYT they want to work with. An opening market for talent is under operation.

③Incentive by staff-goal-reward

According to the individual's key Performance Indicator data from Company's financial and human system, everyone's wages is determined by his contribution to the whole performance. As for ZZJYT, when the whole team achieved higher profits, then the exceed profits will be shared within the team. The distribution ratio is decided by the members.

Promoting members strive for the common goal. Management is by objectives with the auxiliary system and mechanism. Individual not only exercise their working ability, but also apply the ability of the self planning, the budget, the understanding of the industry trends, and problem analysis capabilities. Meanwhile, this will promote employee to analyze the reasons for his failure independently and uses new experience to create new knowledge. Haier promotes the organization by setting and reaching higher new goals, as well as improving innovative capabilities, including exploring new markets while ensuring the old markets, create new marketing tools, new products research and development, and self-renewal the managing processes the next project in the era of innovation.

④Fair competitive environment inside company

Standard individual's KPI and evaluation system make it possible to check one's performance and everyone is responsible for their own goals. So, in Haier, someone who does not work or does not share but get the high-wage, and hard-working people with low wages phenomenon do not exist.

No unfair relationships. Differ from many other state-owned enterprises in

China, where the ones have a good relationship with the leadership then obtain higher wages, Haier requires its workers to willingly share with others and willing to do more work and participate within the team work. This fair climate enhanced mutual trust among team members.

⑤Powerful sharing and same vision

The whole group around the world has a common goal - to become the world's leading white goods enterprise. The mutual cooperation and sharing of knowledge behavior exist within the group. Like many Chinese corporations, Haier learns from the Japanese company's 'teamwork' and 'team innovation ability', and from the Western company's 'individual innovation ability'.

Actually, the team (ZZJYT) becomes more cohesive with economic incentives to every member. And it enhances the ability of the organization to connection with the external environment; a network with customer, supplier, and rival is constituted.

⑥Coordination of cross-functional, cross- organization and even cross-country

ZZJYT makes coordination of various departments within the company easier. Leader of ZZJYT and project leader have power in open system. By connecting with their own network, the leaders of ZZJYT gain more resources to bring into the business.

For example, water heater R & D ZZJYT leader looking for ‘Rapid heating module’ from their supplier in 2011. Nidec Motor Corporation research and developed a new kind of aluminums winding electric machine especially for Haier Washing machine in 2009. Haier telecom oversea ZZJYT leader use part of their own excess-profit hiring local marketing specialists who are not full-time employees of Haier Group.

⑦Trust

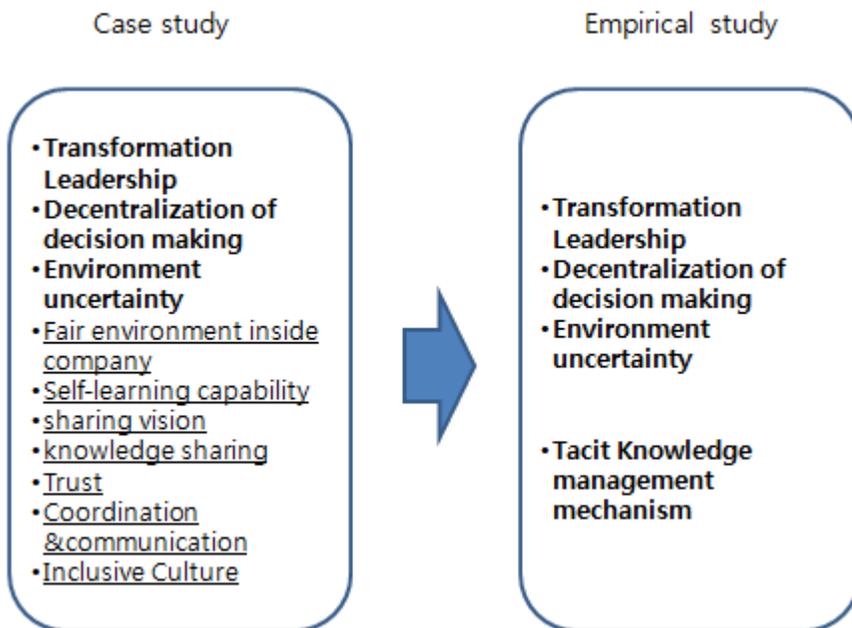
Trust between members. Trust among ZZJYT group members improve learning efficiently, productively, and innovatively. Haier encourages small inventions and small creation on the production line, and name it with the worker’s named, which was started in the mid 90’s. (ex. 1995, ‘Yun Yan mirror’) By sharing the small techs, raising qualified rate, and trusting the last production processes by partners, Haier has greatly improved the staff’s activity and implemented innovation performance.

Trust between partners can carry out smoothly due to mutual trust of the co-operation ZZJYTs. Outside strategic partners trust each other; thus, researches are exchanged, patents are shared, and market information is exchanged.

5. Conclusions

Compare with most other Chinese corporations, we find that Haier is relatively different because of its transformational leadership, decentralized

organizational structure, and the tacit knowledge management mechanism, which is contributed by the sharing, teamwork, coordination and trust culture within the corporation. A small number of Chinese firms since the late 1980s, like Huawei and Levovo, the culture value plays an important role (C Hawes, E Chew, 2011; ZZC Zhao, 2007). In the next part, we will detect the role of these variables through empirical analysis.



Study III

The Mediating Effect of Tacit Knowledge Management Mechanism and Innovation Performance

1. Introduction

In the Study II, we studied a case study of Chinese corporate Haier by examining the factors for innovation, especially the transformational leadership, organizational structure, environment uncertainty and the knowledge management inside the company.

The purpose of Study III is to examine the relationships between the factors through an empirical study. Our intention was to conduct an in-depth empirical study on the mediator effect of the tacit knowledge management mechanism by establishing a model based on the knowledge management theory. Then Study III will be concluded by thorough analysis of the case study.

In detail, the three factors that we found that influence the innovation of the Chinese corporations using the framework of the Mechanism-based view (Cho, 2006) were subject (s), resource (r), and environment (e). On the other hand, another three factors (transformational leadership, decentralized structure, environment uncertainty) were found to influence the tacit knowledge management mechanism.

We analyzed the factors of innovation performance in developing countries in Study I and Study II. We have also taken a look at key variables that received attention in prior researches. This study proposes and tests a synthesis model that explicitly articulates the role of various key variables together, especially focusing on the mediating effect of the tacit knowledge on mechanism.

2. Literature review

2.1 Transformational leadership

Originated in the West in the 1970s, the transactional and transformational theories of leadership have been recently considered by numerous authors (Burns 1978; Bass, 1985; Tichy and Devanna, 1986).

Transactional leaders and those who follow their leads are always engaged in continuous exchange in "tacit contract". They complete their assignments under the constraints and may feel corresponding satisfaction. Transformational leaders share vision with their organizations, creating atmospheres of reformation in the organizations. The process of efficiently completing an organization's adaptive change helps it to achieve its objectives (Bass and Steidlmeier, 1999).

Empirical studies in three developing countries prove transformational leadership has a positive impact on organizational learning ability and business performance (Wang et al., 2005; Walumbwa, et al., 2011). Some unique entrepreneur characteristics that are more prevalent in Chinese corporate environments, such as Paternalistic leadership (PL), have also been studied (Cheng, et al., 2004). The corporate environments developing countries create give rise to stronger emphasis in creativity and transformation ability (Bass, et al., 1999; Waldman, et al. 2001).

2.2 Organization theory

Child proposed a formulaic management structure, called centralization organizational structure, which consists of different positions and varies by the number of levels (Child, 1972). The degree of centralization or decentralized is determined by distribution of power.

Studies are diverse in this area. Some studies show that monopoly power (centralized organization) has a positive influence on business performance and organizational innovation, and some others prove that decentralized organization is more beneficial (Ginzberg, 1980; Prud'Homme, 1995; Mills, 1994; Cao, et al., 2010). One of the case studies on decentralized organization showed that organizational power, politics, culture is affected by the organization structure (Malmi, 1997).

2.3 Tacit knowledge management mechanism

As we mentioned before, tacit knowledge management is a mechanism, which has a key role in the acquiring and absorbing the knowledge both inside and outside of corporations (W Tsai, 2001; Pyka, 2002; Cavusgil et al., 2003). The term “tacit knowledge” is tricky: tacit knowledge is subjective and hard to be formalized (Nonaka, 1991). J Howells(1996) emphasized the need to view tacit knowledge in a dynamic setting, where tacit knowledge can be acquired and transferred between or

within varying levels of entities: individuals, groups, firms or even groups of firms.

In a firm, members constantly communicate each other, exchanging and spreading tacit knowledge on both individual and group-level. In our study, we consider both levels. Sharing between individuals or sharing and reusing of knowledge in a network is necessary for sustained competing capability (Kim and Lee, 2006). The emotional capital (feelings, faith, values, etc.) of employees helps to accumulate knowledge capital for their entire organization (Thomson, 1998). Supporting and collaborating with each other promotes creation of new products and services (Chwe, 2000).

Figure 6. The tacit and explicit knowledge

| | TACIT | EXPLICIT |
|---------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| INDIVIDUAL DEPENDENT | <ul style="list-style-type: none"> - Personal Tacit - Self-Motivated Creativity | <ul style="list-style-type: none"> - Know-How - Know-What - Know-Why |
| INDIVIDUAL INDEPENDENT (organization or group based) | <ul style="list-style-type: none"> - Cultural Tacit - Organizational Tacit (e.g. Causal Ambiguity) | <ul style="list-style-type: none"> - Regulatory Assets (Copyrights, Patents, Trademarks) |

Source: Peter Meso, Robert Smith, 2000

An organization’s external environment, the organizational-level cooperation forces innovation within the related corporation's network (Pyka, 2002; Sabherwal, Fernandez, 2003). Thus, relationships between partners promote integration of tacit knowledge acquired from activities with other organizations. Coordinating activities

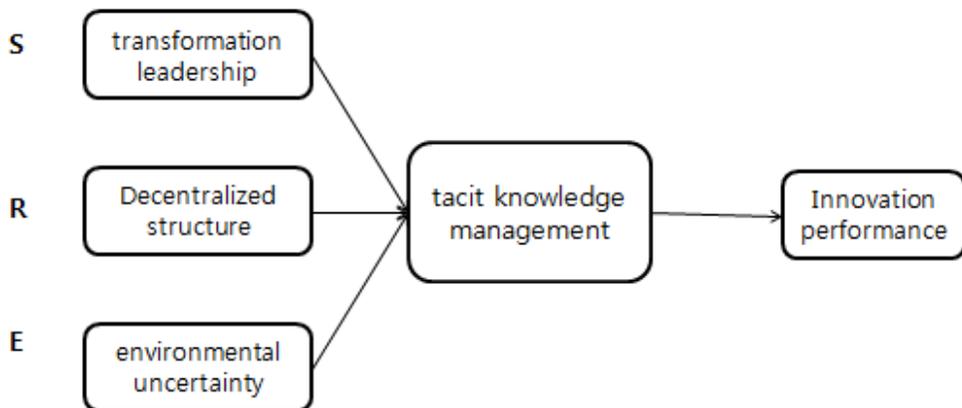
can even achieve value-adding through selection, learning, and sharing of knowledge.

3. Research model and hypothesis

3.1 Research model design

So far, we have examined the knowledge management theory in relation to innovation performance. Our research model is based on MBV. The model concerns transformational leadership (Subject), decentralized structure (Resource), and environmental uncertainty (Environment). The relationship between the three factors and the tacit knowledge management mechanism, and the mediating effect of the tacit knowledge management mechanism to innovation performance is included in this study. The framework of the empirical study is shown in Figure 7.

Figure 7. Framework of Empirical study



3.2 Transformational leadership and TKMM

Some researchers argue that leaders play an important role in the process of managing knowledge effectively. And transformational leadership may be more effective at creating and sharing knowledge in the organization under the collaborative culture (Bryant, 2003; Yang, 2007).

As knowledge acquires importance in organizations, employees must manage it as a source of value- adding and creation (Winter, 1987). As technology advances, companies may hire more knowledge workers in order to acquire more knowledge capital. Transformational leaders may be able to exploit these workers to discover market opportunities and develop unprecedented ideas.

Transformational leaders create a common vision, which increases teamwork efficiency. As transformational leaders expose opportunities, employees are encouraged to more thoroughly communicate with each other, stimulating further exchange in tacit knowledge within the company (Bass, 1999). Leaders have good understanding of each team member's knowledge capacity, allowing them to have more control in productivity of their organizations (Senge et al., 1994). When transformational leaders find their own tacit knowledge capital lacking, they often search for partners or a strategic alliance (Krishnan. 2004).

According to studies of Chinese enterprises, there is strong evidence to suggest the positive relationship between abundant knowledge-exchanging activities and corporate performance and individual productivity (Wang et al., 2005).

Therefore, the following hypotheses can be established.

H1. Transformational leadership is positively related to tacit knowledge management of Chinese corporations.

3.3 Decentralized and TKMM

In centralized organizations, leaders' decisions and actions have a significant impact on organizations. In decentralized organizations, there is higher flux of knowledge exchange, allowing more flexibility in organizations' actions (Fiol, 1985). Information and knowledge sharing in decentralized organizations make organizational learning more active and push them to innovate (Radner, 1993; Slater and Narver, 1995).

Out of all cases where there was a significant difficulty in knowledge transfer within an organization, 29% was due to inadequacy of the current organizational structure (Ruggles, 1998). An empirical study showed that organizational structure has a significant impact on internal knowledge exchange in many industries. In the real world, many organizations have shown to exhibit characteristics of both centralized and decentralized structures (Sah and Stiglitz, 1987; Csaszar, 2012). According to a comparative study on organizational structure, different structure requires different degrees of abilities to share knowledge. Centralization negatively affects exploratory innovation, whereas formalization positively influences

exploitative innovation (Jansen, et al. 2006).

An empirical study on empowering leadership proved that knowledge sharing is more active if the leader's power is more decentralized (Srivastava and Bartol, 2006). By case analysis, Chen found that firms with horizontal organizational structure and market-oriented have higher learning ability, and a strong ability to adapt to the environment, thus efficiency tacit knowledge exchanging is improve the creating ability (Chen, 2007). Therefore, the following hypotheses can be set up.

H2. Decentralized structure is positively related to tacit knowledge management of Chinese corporations.

3.4 Environment uncertainty and TKMM

Environment uncertainty has close relationship with the firm performance. The environment uncertainty affects decision-making process and organization structures (Duncan, 1973; Downey, et al., 1975; Ensley, et al., 2006; Ireland, 2011).

A research showed that different environments could affect firms' routine and non-routine decisions (Duncan, 1973). Environment uncertainty causes firms to increase their competitiveness through experience-based trust and a network-based mechanism – in other words, developing the ability to effectively share and manage knowledge should be their top priority (Glückler and Armbrüster, 2003).

Under an unstable market environment, innovation and competition forcing

firms to establish their long-term strategies. Strategically speaking, the most important resource of a firm is knowledge. Hence, integration of individuals' and partners' specialized knowledge using effective knowledge management takes a crucial role in improving firms' innovative and competitive endeavor (Grant, 1996). Market uncertainty, when its influence is met with firms' internal knowledge during market turbulence, stirs up firms to improve their technology and evolve further. As industrial innovation is becoming more open, we increasingly value the external sources of knowledge that is becoming more prominent (Chesbrough, 2004).

Recently, many researchers have paid attention to the impact of environmental uncertainty as an independent or intermediate variables on strategy and marketing (Hafeez and Ajmal, 2013; Ogunsiji, et al., 2013) .

We can set up a hypothesis concerning the relationship between environment uncertainty and tacit knowledge management as follows.

H3. Environment uncertainty is positively related to tacit knowledge management of Chinese corporations.

3.5 TKMM and innovation performance

Tatum (1986) proposed an internal hidden mechanisms affecting innovation. They are project organization capability, experience of key personnel, process emphasis, project demands, individual initiative, construction input to design, and

transfer from other industries and so on. People are the main innovation subject. In recent years, many studies began to focus on the relationship between the innovation and human resources management (Dewar, 1986, 2001; Brentani, 2001; Laursen and Foss, 2003).

Firms that create and use knowledge rapidly and effectively are able to innovate faster and successfully (Lynn et al., 1999). Teece (1998) reminded people that creating successful new products lies at the firm's fundamental core – firm's intangible assets or knowledge. Tacit knowledge or embedded knowledge is important for firm knowledge creation and product innovation (Madhavan and Grover, 1998; Cavusgil and Calantone, 2003).

Innovation was viewed to be happened by a process of knowledge transfer in the study of Scarbrough (2003). According to Barnett, innovation could be considered as a change in thoughts (Barnett, 1953).

In business management field, researchers who study knowledge creation and learning generation tend to take classification of the tacit/explicit dimension and the individual/social dimension. Tacit knowledge develops through four main combinations of knowledge direction between tacit and explicit knowledge: socialization, externalization, combination and internalization (Nonaka and Takeuchi, 1995). Actually, it is the process of knowledge sharing and learning that strengthens innovation, not knowledge itself. Tacit knowledge is an abstract concept, as it cannot be formalized using concrete concepts. Although tacit and explicit knowledge are positively related to organizational learning and innovation performance, tacit knowledge is of greater interest (Alwis and Hartmann, 2008).

Thus, Hypothesis 4 can be set up between tacit knowledge management mechanism and innovation performance as specified below.

H4. Tacit knowledge management mechanism is positively related to the innovation performance of Chinese corporations

3.6 Mediating effect of the tacit knowledge management mechanism

Empirical study showed that there is a positive relationship between transformational leadership and R&D employees' creativity, thus transformational leadership is positively associated with innovation of an organization (Gumusluoglu, 2009). Transformational leadership significantly promotes the formation of innovation-supporting organization, as pointed out an empirical study of Taiwanese corporations (Jung, et al., 2003).

Using a structural equation modeling, researchers have found that decentralized organizational support for intrapreneurship and organizational ambidexterity exerted positive effects on innovative performance (Raisch, et al., 2009; Alpkan, et al., 2010). Tacit knowledge may be transferred via body language or skillful physical demonstrations (Leonhard and Sensiper, 1998). So the motivation by the sender and receiver is important. In decentralized organizations, members proactively share their experience and knowledge, engaging in more knowledge-exchanging activities. Hence, decentralized organizations tend to have

richer tacit knowledge capital, allowing them to be more innovative (Lehner and Lehmann, 2004)

Robert M. Grant (1996) analyzed the mechanism of knowledge integration within firms, which create the corporate capabilities in a dynamic market environment. He concluded that it is difficult to create the “dynamic” and “flexible-response capabilities”, which is deemed critical to success in hypercompetitive markets. An empirical study on environment uncertainty and knowledge transfer showed that negative relationship exists between them and that knowledge transfer acts as a mediator between environmental uncertainty and competitive advantage.

Thus, the hypothesis 5 can be established as shown below.

H5. The tacit knowledge management mechanism acts as a mediator in the relationship between transformational leadership, environmental uncertainty, decentralized organization, economic incentive and innovation performance.

4. Research methodologies

4.1 Measurement of variation

In this empirical study, we have conducted a survey based on the preceding study on the existing knowledge management. Questionnaires are composed of 40 questions, which respondents answer them with 7-point Likert scales (1=strong

disagree, 4=so-so, 7=strongly agree).

4.2 operational definition and measurement of variables

4.2.1 Independent variables

①Measurement of transformational leadership

In this empirical study, the measurement is composed of 3 items based on the studies of Podsakoff, et al., (1996) and Avolio, et al., (1995). They are:

1. The companies' management is always on the lookout for new opportunities for the unit/department/organization.
2. The organization has leaders who are capable of motivating and guiding their colleagues on the job (masters).
3. The management encourages innovation, and guides staff thinking and solving problem in new ways.

②Measurement of decentralized structure

In this empirical study, the measurement items are composed of 3 items, two of them are based on the studies of Robbins (1990), and Lin (2008). And the third one about internal entrepreneurship is coming from the case study in the Study II. They are:

1. The decision-making power of the current department is shared by most of employees.

2. Even small matters have to be referred to someone higher up for a final answer.

3. Our company encourages internal entrepreneurship, small and micro enterprises.

③ Measurement of Environment uncertainty

The measurement is divided into technological uncertainty, market uncertainty and political uncertainty, which assigned one item each. It is based on the study of Jaworski and Kohli, 1993, De Luca and Gima, 2007. The items are as follows:

1. It is very difficult to forecast technological developments in the industry.

2. Customers' demand and preferences change quite rapidly.

3. The political environment of the industry is unstable.

4.2.2 Mediator variable- tacit knowledge management mechanism

There are comparison measurements and static measurements in the tacit knowledge management mechanism determine. In this study 6 items are contained. They are based on Kim and Lee (2006), Collins and Smith (2006) and De Luca and Gima (2007). The items are:

1. I voluntarily share my know-how, information, and knowledge with other employees.

2. Formal analysis of failing and successful product development projects.

3. I am encouraged to say what I think even if it means disagreeing with people I report to.

4. People communicate with other employees through informal meetings and within the organization.

5. Cross-functional cooperate fully in generating and screening new ideas for new products.

6. I fully cooperate with the suppliers and strategy alliances' partner (domestic or the overseas).

4.2.3 Dependent variable

In this empirical study, the measurement items of innovation performance are composed of 3 items based on the studies of Gloet and Terziovski (2004), Chen and Huang (2009). The items are:

1. We have launched products that are the first of their kind in the world.

2. We often upgrade and transform our products or services.

3. We have management innovation (e.g quality management, process re-engineering)

4.3 Questionnaire Survey process and collection of data

As this empirical study targets the knowledge management in Chinese corporations, various types of Chinese corporations were observed, including state-owned enterprises, private enterprises and joint ventures enterprises. An English version of the questionnaire was developed first. To ensure conceptual equivalence, it was translated into Chinese and proofread by two friends working in Chinese companies.

The data was collected from the Harbin institute of Technology Alumni network. Several major groups from various cities were selected, and they were Beijing, Shanghai, Shenzhen, Qingdao and Harbin. Then surveys were finally sent by email and, additionally, a week after the distribution of the mailed survey, reminder messages were sent to the chatting group online (only part of the mail objects were in the chatting groups), to verify receipt and to promote the return of the surveys.

From 1st Nov to 3rd Dec, 1288 mails had been send, and 346 mails had been sent back with questionnaires filled in, including the questionnaires mailed back from the friends of some alumni who were working in different companies. Lastly, we excluded those whom we deemed inapplicable (i.e. those who were working for foreign invested firms or government) from the sample, resulting in a sample size of 298. The collection ratio was about 23%.

4.4 The Characteristics of the data

The characteristics of respondents and corporations are shown in the table 5, table 6. The geographical distribution of the sample was similar to that of corporations aggregated in 2012 Statistical Yearbook. One interesting fact to note is the major discrepancy (23%) in Shandong province. It could be pure coincidence, or it could be attributed to Shandong people generally having very warm hearts, a well-known fact any Chinese would agreed with.

Table 5. Locations of the corporations

| | Provinces include | 2012 Statistical Yearbook | The sample (292) |
|-----------|--------------------------------------------|---------------------------|------------------|
| Northeast | Beijing, Tianjin, Hebei, Shanxi, Neimenggu | 7% | 8% |
| Beijing | Heilongjiang, Jilin, Liaoning | 13% | 21% |
| Shandong | Shandong | 9% | 23% |
| Shanghai | Shanghai, Jiangsu, Zhejiang, Anhui, Fujian | 33% | 24% |
| Shenzhen | Guangdong, Guangxi, Hainan | 13% | 12% |
| Central | Jiangxi, Henan, Hubei, Hunan | 12% | 8% |
| West | Others in the West | 12% | 3% |

The ratio of male was far higher than female. One main reason is that the number of the male students studying at Harbin institute of Technology is more than 3 times that of the female students. Although the number of small firms is far more than that of big firms, big firms have many subsidiaries, which constitute numerous

employees, so there were little differences between the number of large, medium and small corporations.

Table 6. Characteristics of respondents

| | | | | |
|-----------------|---------------|-------------------|-----------------------|------------------|
| Gender | Male | 202 | Female | 96 |
| Age | 20-30 | 30-40 | 40-50 | 50~ |
| | 109 | 160 | 24 | 5 |
| Position | TMT | mid-level manager | basic-level manager | general employee |
| | 50 | 93 | 87 | 68 |
| Employee number | 0-299 | 300-999 | 1000~ | |
| | 39% | 21% | 39% | |
| Industry | Manufacturing | IT industry | Construction industry | Others |
| | 40% | 18% | 11% | 31% |

5. Results of empirical study

5.1 Reliability Test

In the following sections, we will discuss the overall reliability and the validity of our research. The level of reliability was obtained from the analysis on factors. Only variables with a factor loading greater than 0.5 were chosen (Hair et

al., 1998). Then items with a factor loading less than 0.5 had been omitted, and the result is shown in the table 7.

Reliability was analyzed by measuring the Cronbach- α , and the result is shown in table 8. Theoretical variables used in the analysis show that Cronbach- α value is 0.6 or higher, which shows that measuring items are measured at a reliable level (Nunnally, 1967). Only Cronbach- α values of decentralized structure and environmental uncertainty are lower than 0.6, but values higher than 0.5 are still acceptable. The total Alpha value is good, so no further step was carried out.

Table 7. Results of analysis on exploratory Factors

| Concept composition | Items | Component | | | | |
|--------------------------------------|-------|-----------|----------|----------|----------|----------|
| | | Factor 1 | Factor 2 | Factor 3 | Factor 4 | Factor 5 |
| Transformational leadership | TL1 | 0.775 | 0.147 | 0.211 | 0.079 | 0.039 |
| | TL2 | 0.816 | 0.104 | 0.159 | 0.168 | 0.017 |
| | TL3 | 0.725 | 0.179 | 0.233 | 0.184 | 0.194 |
| Decentralized structure | DS1 | 0.126 | 0.316 | 0.036 | 0.703 | 0.185 |
| | DS3 | 0.095 | 0.079 | 0.180 | 0.807 | 0.058 |
| Environmental uncertainty | E1 | 0.075 | 0.013 | 0.328 | 0.152 | 0.732 |
| | E2 | 0.064 | 0.068 | 0.201 | 0.057 | 0.801 |
| Tacit knowledge management mechanism | TKM1 | 0.441 | 0.585 | 0.203 | 0.188 | 0.181 |
| | TKM3 | 0.393 | 0.528 | 0.199 | 0.364 | 0.022 |

| | | | | | | |
|------------------------|------|-------|-------|-------|-------|-------|
| | TKM4 | 0.119 | 0.778 | 0.062 | 0.067 | 0.101 |
| | TKM5 | 0.126 | 0.669 | 0.403 | 0.072 | 0.078 |
| | TKM6 | 0.090 | 0.575 | 0.482 | 0.159 | 0.018 |
| Innovation Performance | INP2 | 0.319 | 0.146 | 0.754 | 0.149 | 0.031 |
| | INP3 | 0.372 | 0.128 | 0.656 | 0.158 | 0.015 |
| Eigenvalue | | 3.132 | 2.855 | 2.310 | 1.959 | 1.429 |
| Variance Explained (%) | | 22.37 | 20.39 | 16.50 | 14.00 | 10.20 |

Note: Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 6 iterations.

Table 8. The Reliability Statistics

| | Cronbach's Alpha | Survey Items |
|--------------------------------------|------------------|--------------|
| Transformational leadership | 0.789 | 3 |
| Decentralized structure | 0.571 | 2 |
| Environmental uncertainty | 0.507 | 2 |
| Innovation Performance | 0.746 | 2 |
| Tacit knowledge management mechanism | 0.762 | 5 |
| Total | 0.8206 | 14 |

5.2 Validity Test

To test the dimensional confirmation of the concept, Stata12.1 was utilized for confirmatory factor analysis. The result was as follows: Overall fitness is $\chi^2(67)=137.894(p=.000)$, Root mean squared error of approximation(RMSEA)=0.060,

Comparative fit index(CFI)= 0.937, Tucker-Lewis index(TLI)=0.914, Standardized root mean squared residual(SRMR)=0.050. The model is considered good.

Convergent validity can be judged by examining the significance of the factor loadings and the composite reliability (>0.6). All multi-item constructs met this criterion.

Table 9. Correlation among variables

| | TL1 | TL2 | TL3 | DS1 | DS3 | E1 | E2 | TKM1 | TKM3 | TKM4 | TKM5 | TKM6 | INP2 | INP3 |
|------|--------|--------|--------|--------|--------|--------|-------|--------|--------|--------|--------|--------|--------|------|
| TL1 | 1 | | | | | | | | | | | | | |
| TL2 | .530** | 1 | | | | | | | | | | | | |
| TL3 | .500** | .639** | 1 | | | | | | | | | | | |
| DS1 | .167** | .273** | .313** | 1 | | | | | | | | | | |
| DS3 | .098 | .252** | .278** | .312** | 1 | | | | | | | | | |
| E1 | -.002 | -.029 | .097 | .193** | .071 | 1 | | | | | | | | |
| E2 | .111 | .150** | .204** | .200** | .1617* | .233* | 1 | | | | | | | |
| TKM1 | .272** | .333** | .326** | .291** | .065 | -.035 | .054 | 1 | | | | | | |
| TKM3 | .409** | .392** | .427** | .417** | .255** | .049 | .154* | .450** | 1 | | | | | |
| TKM4 | .223** | .265** | .324** | .186* | .073 | .023 | .074 | .319** | .374** | 1 | | | | |
| TKM5 | .277** | .282** | .361** | .285** | .147* | -.079 | .174* | .359** | .436** | .431** | 1 | | | |
| TKM6 | .289** | .307** | .346** | .308** | .176** | -.137* | .118* | .258** | .407** | .405** | .475** | 1 | | |
| INP2 | .386** | .379** | .377** | .275** | .195** | -.123 | .127* | .228** | .411** | .191** | .403** | .417** | 1 | |
| INP3 | .302** | .394** | .469** | .231** | .202** | -.011 | .095 | .263** | .420** | .220** | .363** | .319** | .595** | 1 |

Notes: **: p<0.01, * : p<0.05

Table 10. λ value and CR analysis

| | Items | λ | CR |
|--------------------------------------|-------|-----------|-------|
| Transformational leadership | TL1 | 0.692 | 0.799 |
| | TL2 | 0.785 | |
| | TL3 | 0.786 | |
| Decentralized structure | DS1 | 0.793 | 0.666 |
| | DS3 | 0.615 | |
| Environmental uncertainty | E1 | 0.791 | 0.616 |
| | E2 | 0.532 | |
| Tacit knowledge management mechanism | TKM1 | 0.525 | 0.747 |
| | TKM2 | 0.726 | |
| | TKM3 | 0.508 | |
| | TKM4 | 0.646 | |
| | TKM5 | 0.631 | |
| Innovation Performance | INP2 | 0.787 | 0.742 |
| | INP3 | 0.748 | |

Notes: λ value: standardized structural coefficient; CR: Composite Reliability.

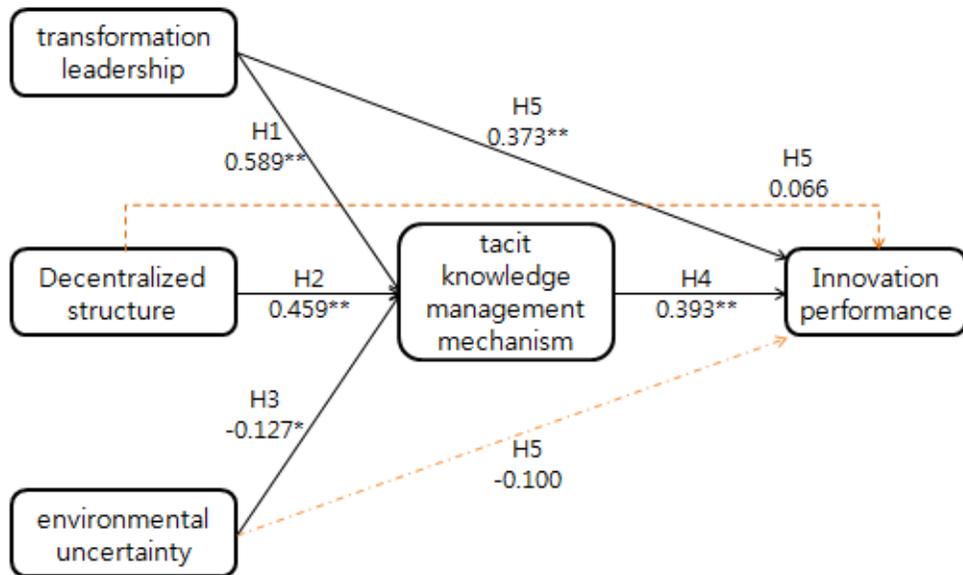
5.3 verification of Hypothesis

We developed and analyzed the result to verify our hypotheses using the structural equation modeling (SEM) approach. Figure8 presents the results for the structural model.

Over all fitness of the model is $\chi^2(67)=137.894(p=.000)$, Root mean squared error of approximation(RMSEA)=0.060, Comparative fit index(CFI)=

0.937, Tucker-Lewis index(TLI)=0.914, Standardized root mean squared residual(SRMR)=0.050. The model is considered good. It was found out that the path coefficient of hypothesis 1, 2, 3, 4 are deemed significant.

Figure 8. Result of analysis on SEM



Notes: Number of observations= 291; Estimation method= maximum-likelihood estimation;
 *p<0.05, **p<0.01

Hypothesis 1: *transformational leadership(TL) is positively related to the tacit knowledge management mechanism(TKMM) of Chinese corporations.* The path coefficient was 0.589, and p<0.01, therefore the coefficient value was significant. The findings showed that the transformational leadership style affected the organization members’s ability to exploit the tacit knowledge.

Hypothesis 2: *decentralized structure(DS) is positively related to tacit knowledge management mechanism (TKMM) of Chinese corporations.* The path coefficient was 0.459, and $p < 0.01$, therefore the coefficient value was significant. The findings showed that decentralized organizational structure positively affected the tacit knowledge learning and spreading process.

Hypothesis 3: *environmental uncertainty(E) is positively related to the tacit knowledge management mechanism (TKMM) of Chinese corporations.* The path coefficient was -0.128, and $p < 0.05$. The results of the structural equation model showed that the relationship between environmental uncertainty and tacit knowledge management mechanism is insignificant and the coefficient is negative. The findings showed that environmental uncertainty, especially market change, was a vital factor in triggering tacit knowledge management mechanism. The more uncertain the environment was, the less tacit knowledge accumulated and transferred.

Hypothesis 4: *tacit knowledge management mechanism (TKMM) is positively related to innovation performance(INP) of Chinese corporations.* The path coefficient was 0.393, and $p < 0.01$, therefore the coefficient value was significant. The findings showed that, in the ‘black box’, an appropriate tacit knowledge management mechanism would drive the corporate to be more innovative not only in the technological development or new product creation, but also in the area of corporate management.

As to Hypothesis 5, we carefully judged the mediating variable (RM Baron, DA Kenny, 1986). The path coefficient of TL to TKMM and INP are 0.589 and 0.373, both are significant, and the path coefficient of TKMM to INP is 0.393. Because $0.589 \times 0.393 = 0.232 < 0.373$, the mediating effect of tacit knowledge management mechanism on the relationship between the transformational leadership and innovation performance was partially verified. The mediating effect of tacit knowledge management mechanism on the relationship between the decentralized structure, environmental uncertainty and innovation performance was verified. Therefore, Hypothesis 5 was partially verified.

Table 11 Results of verification of hypothesis

| | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|
| H1. Transformational leadership is positively related to tacit knowledge management of Chinese corporations. | Support |
| H2. The decentralized organizational structure is positively related to tacit knowledge management of Chinese corporations. | Support |
| H3. Environmental uncertainty is positively related to tacit knowledge management of Chinese corporations. | Reject |
| H4. Tacit knowledge management is positively related to innovation performance of Chinese corporations. | Support |
| H5. The mediating effect of tacit knowledge management on the relationship between the transformational leadership, decentralized organizational structure, environmental uncertainty and innovation performance of Chinese corporations. | Partial support |

6. Discussion and conclusion

By implementing a structural equation modeling approach, this study integrates five constructs, transformational leadership, decentralized structure, environmental uncertainty, tacit knowledge management mechanism and innovation performance. This study proposes and tests a synthetically model that explicitly articulates the role of various key variables that in past research received only partial attention.

Firstly, the results of the structural equation model indicate that the tacit knowledge management mechanism has a significant positive effect on innovation performance. This finding is consistent with the research by Ronald Mascitelli (2000), which indicated that tacit technical skills and tacit cognitive skills will have a positive impact on innovation performance. Also, empirical study proved that not only the firm's tacit knowledge stock but also its tacit knowledge flows that are crucial for sustaining innovative performance (Jantunen, 2005).

Secondly, it was figured that the innovation performance of Chinese corporations is positively influenced by the transformational leadership. This point also confirmed by Howell and Avolio (1993) and Jung et al. (2003), because they found that transformational leadership has significant and positive relations with both empowerment and an innovation-supporting organizational climate. In this paper we found that the leader has the potential to strongly influence the extent of communication and knowledge sharing, which stimulate and encourage the tacit

knowledge management mechanism. Therefore, the findings support that top managers' transformational leadership styles directly and indirectly affect their companies' innovation.

Thirdly, although there is no evidence to support a direct relationship between decentralized structure, environmental uncertainty and the innovation performance, the indirect effect proved significantly by the mediator of tacit knowledge management mechanism. Therefore, the decentralized structures positively influence the innovation performance. This point also confirmed by Chen and Huang (2007), because they found that when the organizational structure is more decentralized, social interaction is more favorable, and tacit knowledge management will be positively stimulated. This kind of organizational climate will affect interpersonal and inter-organizational learning, and promote the people to be more active, improving the corporate innovation ability.

Finally, the evidence showed that environmental uncertainty negatively influences the tacit knowledge management mechanism and influences the innovation performance by the mediating affection. This last result concurs with Cui et al. (2005), which proved that environment uncertainty or market dynamism influence knowledge management capabilities significantly. Although environmental uncertainty negatively affects firm performance (Ensley et al., 2006), it is found that pursuing exploratory innovation is more effective in dynamic and competitive environments (Jansen et al., 2006).

This study has some inherent limitations. One of the limitation is that it is not possible to use better statistical sampling methods (for example, random sampling)

to select the samples. Because the data I needed cannot be obtained from All-China Federation of Industry and Commerce (ACFIC), which has collected vast data from corporations around China, the data had to be collected by the survey. And due to the HIT alumni workplace distribution and approachability, only some big cities or groups of the alumni network were selected. Therefore, only the convenience sampling method was used to select the investigation targets of this research, and errors from actual situation to the sampling results may be unavoidable. Also, the results from the research did not reveal the different influence of the firm's characteristics, such as firm size, industry, and shareholding structure.

The study proposes several future works. We have concluded that transformational leadership was proved to have a positive influence on the corporation innovation performance; however, we are not covered the contrasting leadership-- transaction leadership. Further study could include the two kinds of leadership to test their possible effects on the innovation performance, especially whether any mediator affect of tacit knowledge management mechanism. Additionally, more subjects from different department could be considered in a future study in order to reduce the limitations of research samples and enlarge the scope of knowledge management activities of firms. Futhermore, more control variables could be investigated different results on this issue in the future. For example, the firm size, age (Thornhill, 2006), industry (Tsai, 2001), and firm location (Minbaeva, et al., 2003).

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국문초록

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경영학과 경영학 전공

지식 경제 시대에서 개발도상국 기업들은 현지 기업들과 경쟁해야 할 뿐만 아니라 외국 기업들과 맞서야 하는 상황에 놓였다. 기업들이 생존하기 위해서는 혁신을 통해 발전해야만 한다. 실제 혁신성은 기업이 방대한 내부 자원을 어떻게 적절하게 활용하여 변화하는 외부 환경에 얼마나 민감하게 대응하는지에 의해 좌우된다.

첫 부분에서는 기업의 혁신성에 관한 과거 연구들을 탐구하고, 지식관리론, 지식관리메커니즘의 기초가 되는 내용과 암묵지식의 생성, 공유와 교환에 관한 내용들을 살펴볼 것이다. 개발도상국 기업의 혁신성에 관한 과거 논문에 대한 연구를 통해 알 수 있듯이 대부분의 학자들은 기업 내부의 지식관리메커니즘보다는 기업 간 협력메커니즘을 중시하고 있다.

여러 가지 요소들이 혁신에 어떠한 영향을 미치는지 살펴볼 것이고, 그 중 인사 관리, 네트워크 형성 및 지식 확보에 중점을 둔다. 지난 수십 년간, 지식의 암묵성에 관한 연구가 활발이 이루어졌지만, 소통, 협력 그리고 지식 공유가 핵심 요소인 암묵적 지식관리메커니즘에 관한 연구가 여전히 많이 부족한 상황이다. 이 분야에 대한 연구가 더욱 활발해 지기를 도모하며 본 논문을 작성하게 되었다.

두 번째 부분에서는 중국의 하이얼 그룹에 관한 사례 연구를 다룬다. 심층 인터뷰를 통해 하이얼 그룹이 이례적인 혁신 성과를 이룰 수 있도록 작용한 요소들을 살펴본다. 하이얼 그룹은 중국에서 가장 큰 가전제품 기업으로서 지난 4년 동안 세계 최고의 대형가전 생산 기업으로 자리 잡을 만큼 성장하였다. 비록 중국은 세계 제조업 1위 대국이지만, 혁신 없이는 경쟁력을 유지하기 어려운 실정이다. 1984년에 설립된 이래, 빠르게 성장한 하이얼의 성공 비결에 대해 충분히 연구할 만한 가치를 가지고 있다. 하이얼이 다른 기업들과 다르게 혁신적인 성공을 이루어낼 수 있었던 이유로는 암묵적 지식관리메커니즘, 변혁적 리더쉽, 분권화된 구조와 환경 불확실성 등이 있다.

세 번째 부분에서는 중국 기업들에 대한 실험적 연구에 대해 다룬다.

첫 번째와 두 번째 부분에 의하여 여러 요소들 간 관계를 파악할 수 있는 연구 모델을 작성할 것이다. 중국 기업들이 거래적 리더십보다 변혁적 리더십을 더 선호하는 것으로 조사되었다. 이러한 추세가 지속된다면, 기존의 방식을 고집하던 중국 기업들도 모두 미래를 내다보는 비전을 겸비한 변혁적 리더십을 추구하게 될 가능성이 높으며, 분권화된 구조로 인해 암묵적 지식관리메커니즘을 더욱 활용하게 될 것이라는 전망이 도출되었다. 이러한 전망은 중국 기업의 종사자들로부터 수집된 자료를 바탕으로 수립되었다. 변혁적 리더십, 분권화된 구조, 환경 불확실성 그리고 혁신성과 간의 관계에 대한 암묵적 지식관리의 매개 효과는 부분적으로 확인되었다. 하지만, 환경 불확실성, 암묵적 지식관리메커니즘 및 혁신성과 간의 직접적인 관계는 확인되지 않았다.

주요어: 변혁적 리더십, 분권화 조직구조, 환경 불확실성, 혁신성과, 암묵적 지식관리메커니즘, 중국 기업

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