TIM based indigenous innovation: experiences from Haier Group

Jin Chen[1], Xin Jin[2] ,Yu-Bing He[2], Wei Yao[2]

[1]Research Center for Innovation & Development
College of Public Administration, Zhejiang University, Hang Zhou, 310027,P.R. China
cjhd@cma.zju.edu.cn

[2] College of Management, Zhejiang University, Hang Zhou, 310058,P.R. China
tomkinxin@163.com

ABSTRACT : **Since the implementing reform and opening-up policy more than two decades ago, though China has experienced dramatic economic leaping development by importing foreign capital and technologies, it as well has suffered such dilemma that most of its enterprises have been restricted by foreign core technologies. Aiming at solving this dilemma, this paper explores the latest researches on indigenous innovation, and analyzes the long time innovation practices from the Haier Group. Through the analysis , this paper finds out that the Total Innovation Management (TIM) is the basis of indigenous innovation, as strategic innovation is essential for directing indigenous innovation and market-oriented innovation sets up its goal, while cultural innovation builds up innovation environment and atmosphere. In the end, the paper concludes that enterprises must carry out indigenous innovation for their sustainable development, and indigenous innovation must be based on the TIM with regular mind change as the soul, last but not least, it must be directed by clear strategic goal and plan.**

Keywords: indigenous innovation
total innovation management
strategic innovation cultural innovation

I. INTRODUCTION

In the past more than two decades of reform and opening-up, despite China's GDP development with an average growth rate of 9.4% annually, its economic achievements mainly come from system reform and investment, instead of S&T progress. However, by the end of 2004, when the GDP per capita in China surpassed 1,000 $US, marking the beginning of the take-off stage of China's industrialization. Facing this urgent challenge, China has made indigenous innovation as its national strategy in its Eleventh Five Year Plan. This has indicated that indigenous innovation has become the key to transform the mode of economic growth from simply relying on natural resources and imitation of foreign technologies to one driven by innovation. In fact, concerning how to explore an indigenous innovation way based on practical situations at home and abroad, a great deal of domestic enterprises in China such as Founer, Haier ,Huawei etc. have already carried out successful indigenous innovation activities. Among those leading enterprises, Haier Group—a Chinese appliance manufacturer based on Qingdao, Shandong province, has made fame itself at home and abroad as "Haier made in China" with Chinese characteristics, amidst the dilemma that most other enterprises have been restricted by foreign core technologies. What are the secrets behind Haier's indigenous innovation? How can Chinese enterprises innovate under fierce competition environment? This paper aims at solving these problems by thorough analysis on Haier Group with depth interviews.

II. LITERATURE REVIEW

Indigenous innovation isn't a new word, as early in 1994, Professor Jin Chen constructed the dynamic learning model for enterprises to import foreign technologies and carry out indigenous innovation [1], and as the best examples of indigenous innovation, Japan, Korea and China's Taiwan province have proved that by way of this learning model, enterprises can accomplish indigenous innovation [2]. As for how to evaluate indigenous innovation, World Economic Forum in 2000 suggested using three indicators such as Indigenous Ability to Innovate, Technology Transfer from Abroad, and Overall Technological Capacity , and it evaluated many countries by ranking their indigenous innovation capability with China being ranked in the middle level with enormous development potential [3]. The empirical analysis on the China's Stone, Legend(now Lenovo),Great Wall and Founder has clarified the essential role of indigenous innovation during China's leaping economic development [4].Base on the previous theories and practices, Chinese central government has made indigenous innovation as national strategy, considering it as the central factor for economic structure modification [5]. Generally indigenous innovation contains three aspects such as original innovation, integration innovation, secondary innovation based on importing and absorbing foreign technologies [6][7],and its definition can be described as: Indigenous innovation is a process to explore potential market with in-house R&D activities and external knowledge acquisition, and the successful indigenous innovation must pay attention to the following six aspects: the dominant role of enterprises, technological strategy, technology center, innovation resources, innovation environment and innovation motivation of entrepreneur [8].As for enterprises to accomplish indigenous innovation, they must base on the total innovation management, which aiming for everyone, everything, anytime and everywhere innovating by way of effective

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innovation management mechanism and tools. The goal of TIM is to cultivate core competence and enhance core competitive capability with strategy as direction and technological innovation as the core, and it combines and harmonizes organizational, cultural, market, strategic, management and institutional innovations [9].

III. THE WAY OF INDIGENOUS INNOVATION

A From importing to indigenous innovation

In 1984, Haier Group was a small collective factory with 1.47 million debts and without its own designed products. By contrast, its turnover exceeds RMB100 billion in 2005 with a series of 96 product types and more than 15,100 portfolios. And it has enjoyed average annual growth rate of 70 percent. In 2005, it has been honored as "the global top 100 brands with most influence" by Global Brand Lab [10]. Haier has explored a different way compared with other domestic enterprises', namely "importing—absorbing—secondary innovation—indigenous innovation" (Figure 1), and has carried out continued management innovation and accumulated own Intellectual Rights and standards, so as to build up factories in foreign countries for local design, production and sale. This way is so effective that it has been considered the general model for enterprises in developing countries, and is one of the best experiences for implementing national indigenous innovation strategy.

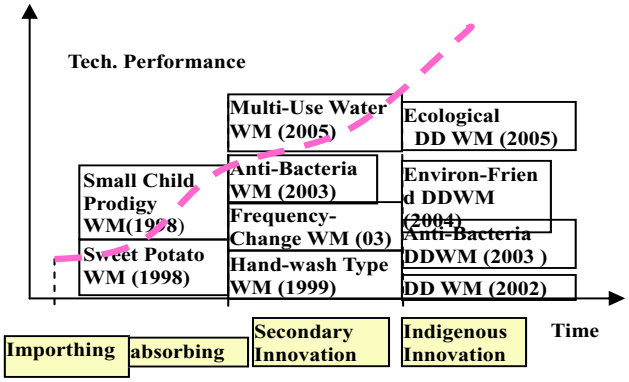

Fig.1 Haier's way of indigenous innovation in Washing Machine

B. Synergy development of indigenous products and technologies

Haier has steadily increased its R&D investment(Figure 2)， and since 1999,its new product ration has kept over 80 percent , with a total of 6,189 patented technology certificates (819 for inventions) and optimized patent structure (Figure 3). By December 2005, Haier has presided over or taken part in modification of about 100 China's technological standards, and its invented technology, incorporated in the Safe Care water heaters and dual-drive washing machines, has been proposed to the IEC Criteria.

C. Total innovation characterized by integrative management innovation and technological innovation

Haier's 20 years of indigenous innovation is centered on two mutual aspects, one is technological innovation and the other is management innovation. Practices have proved that enterprises would fall into "innovation dilemma" if they only rely on technological innovation. By contrast, Haier has carried out total change and innovation, while continuously improving technologies, it innovating management methods by combining management and market-oriented operation, compulsory management and self-management. This not only guarantees products' quality and service, but enhances its market responding ability as well.

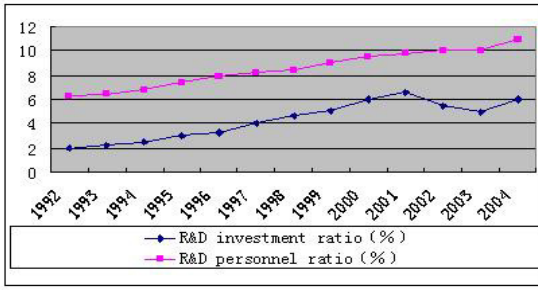

Fig. 2 the ratio of R&D investment and personnel in Haier

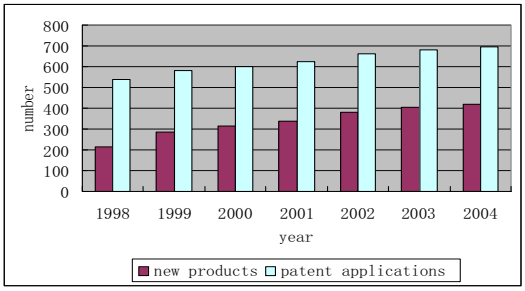

Fig. 3 new products and patent Applications in Haier

IV. STRATEGIC INNOVATION DIRECTING INDIGENOUS INNOVATION

Strategic innovation has contributed to Haier's high-speed development. As early as 1985，Haier's destroying of defective refrigerators symbolized its brand-building resolution, leading to brand strategy and sequent diverse expanding strategy and global strategy. These three strategic innovations play the great role in Haier's indigenous innovation. Under brand strategy, by focusing on product quality, Haier passed ISO9001 and obtained several foreign quality certificates in 1988 as well as China's first golden medal for refrigerator. While shifting to diverse expanding strategy, it advanced from importing and imitation foreign technologies to secondary innovation by setting up technology center in 1994. At present, Haier is embracing global strategy and actively explores international market and

re-engineering its internal process. Under these strategies, Haier not only pays attention to patent application and protection, but plays increasingly role in standards setting. From 1992 to 1998, it has participated in 30 national standards setting; and since 1999, it has participated in 60 international standards setting and presided over 4 international standards setting.

V. MARKET-ORIENTED INNOVATION ESSENTIAL FOR INDIGENOUS INNOVATION

Haier's products development always focuses on the demands of customers. It follows the principle of "off-season mind, no off-season market". It developed the favorable refrigerator for Chinese customers by setting safe above and freezer underside in 1988, and in 2001 it developed Mike freezer within 18 hours responding to customer's idea. Other famous examples are "small child WM", "Haier Washing Bar", "streaming media TV", "Prince frequency change refrigerator", "dual drive WM" etc., and all these products greatly meet the demands of customers and in turn support the further indigenous innovation.

VI. CULTURAL INNOVATION CREATING INNOVATION ENVIRONMENT AND ATMOSPHERE

By combining the excellent enterprises management practices at home and abroad , Haier develops unique management model—— OEC（overall everything clear）, which containing goal system, regulation system and motivation system. Through OEC, Haier detailed the management practices and enhanced process controlling ability, so as to cultivate the high quality employees based on the solid institution. In addition, Haier provides convenient innovation platform for every employee, holding that "everyone is the person with ability". And in the reality, it follows three norms: fair competition and assigning personnel according to their ability, exploring personal potential as much as possible based on their posts, rational post rotation and dynamic management. It implements dynamic post mechanism for excellent, qualified employees. As for managers, Haier evaluates them in terms of their post nature and maintains regular post rotation. As Haier has always followed the enterprise mission of "hard working for nation, seeking excellence", its culture is notable for leading conception innovation, directing strategic innovation, guaranteeing organizational innovation, aiming for market innovation by way of technological innovation. Such culture is engaging all employees' participation, and perfectly combines individual goal with enterprise's goal.

VII. MANAGEMENT INNOVATION LAID FOUNDATION FOR INDIGENOUS INNOVATION

A. basal management is the footstone

During Haier's indigenous innovation journey, basal management has played the leading role in its four stages, so as to form order-oriented, quality-oriented and innovation-oriented culture respectively (table 1). As a result, its products expanded from the household appliance to high-new technology applications. In each stage, the basal management enables employees' quality enhancement and cultivation of innovation culture by way of institution and organization means.

B. organizational structure and process innovations accelerate indigenous innovation

After finding the pyramid organizational structure embraced by most enterprises not suitable for innovation, Haier has gradually constructed a "market chain" mechanism notable for its transverse and networking nature. Under such mechanism, product managers can select suitable personnel from different departments and form product innovation team. Therefore, general managers serve as larger product managers, who leading all management dimensions to process-oriented networking structure favorable for innovation. and in order to **meet** the challenges from knowledge-based economy and China's WTO entry， Haier began implementing process re-engineering based on market chain in 1998. The first five years are focusing on its organizational structure, transforming traditional linear structure into market chain oriented flat one with fluent order information, logistics, capital flowing etc. And the main aim of the second five years is to inspire every employee consciously carrying out self-innovation, namely combining the order and personnel--SBU. This completely demolishes the intangible wall within the enterprise, and put everyone under the market responsibility.

Table 1 basal management in Haier

stage	Basal management
Importing and imitation（1984－1986）	Thirteen regulations
Creative imitation（1987－1991）	TQM,OEC,6S,ISO9001
Improvement and innovation（1992－1998）	Updated OEC，initial own R&D system
Total innovation(1999－)	SBU,internal market,SST,6σ

C. innovation system with R&D at the core integrating global resources

Due to its systemic nature, indigenous innovation needs a supporting technological innovation system. Haier built up technology center at its early stage and in 1998 it formed the central R&D institute, which allies with 28 top technology enterprises from America, Japan and Germany, and builds up 48 R&D teams by taking advantage of global technology and science resources. In 2001, it centralizes the previous distributed R&D resources with vice president as its head by building up R&D center, technology center and engineering center. These centers carry out long

time basic theory research for more than five years, industrial common technology research for three to five years, and commercialized process technology research for less than three years respectively. Through this way, it has trained a great deal of young R&D personnel and obtained advanced technologies.

VIII. CONCLUSION

A. Haier's leaping development lies on indigenous innovation

Indigenous innovation enables Haier growing up as international brand, and continuously creating new market; meanwhile, its core technologies obtained by indigenous innovation increase products' added value. And thirdly, indigenous innovation enhances enterprises' core competence.

B. TIM is the basis of indigenous innovation

TIM plays great role in Haier's indigenous innovation and serves as its basis. For its clear strategic goal and plan with regular conception innovation such as brand strategy, diverse expanding strategy and global strategy all directed it through complicated domestic and international environment. By integrating management innovation and technological innovation, all these TIM practices enable Haier expanding from mere technological innovation to basic theory and technologies. This has proved that any enterprise in developing countries can easily engage in indigenous innovation by incorporating TIM.

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