The Competitiveness of the Transformer Industry Between Japan and Taiwan by In-depth Interview

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Abstract. Transformer firms in both Japan and Taiwan go to global in order to cost down. From historical and cultural viewpoints, the relationships between the Japanese firms and the Taiwanese firms were closed. Under the circumstances of the economic globalization, firms had to possess some of specific advantage such as differentiation on products and products’ processes, technology, innovation, reputation or other intangible assets. This study attempted to find out the competitiveness and competitive advantages for the Japanese and the Taiwanese transformer industries in order to complete and find out proper and available models for the governments and the companies to review and improve. Through analysis of this study, competitive advantage was from internal to external which means that firms (industry) attempt to get competitive advantage, they had to follow the steps: 1) review their internal management (to see if there is any points had to be revised), 2) find out their core value (to know what and where are their competitiveness), 3) understanding what their customers’ needs and where their markets were, and then 4) the Japanese and the Taiwanese transformer industries collaborated with each other to compete on the global. Because the resources of firms were limited, firms need government’s positive supports to integrate to develop their competitive advantages.

Introduction

The phenomenon of electromagnetic induction was discovered independently by Michael Faraday and Joseph Henry in 1831. And the first type of transformer to see wide uses was the induction coil invented by Rev. Nicholas Callan in 1836. Through about 180 years, the basic principles of transformers had been no changed. Some of firms in Taiwan considered that the technology life cycle of transformers is maturity. Foreign investors transferred producing knowledge to new specific techniques and for systemic knowledge embracing new procedures requiring integrative learning and coordination. With learning effects, more and more domestic competitors were occurred; prices dropped significantly caused many investors exited from transformer market. In both Japan and Taiwan, transformer industries were defined as “the declining sun industry” or “traditional industry”, which meant that transformer industry was no longer an industry with high technology and high growth; however, we could see that many developed countries, like America and Germany, energy conservation had been a serious issue; how to promote energy efficiency in every aspect and private entities are implementing the efficient use of energy to industries; how to reduce the electric power loss and how to make a proper long distance transmission economically practical were new challenges. Meanwhile, transformer was not only a simple device that transfers electrical energy from one circuit to another through inductively coupled conductors but also played a role in energy efficient and environmental conservation. People realized and started on the issue of how to protect the earth and how to make energy efficiently.

In this study, experts and scholars in the fields of industry academia were interviewed. Questionnaires were issued to the object companies and a comparative case study was conducted to analyze the influencing factors and extent to which differences on the competitive edge and strategies in Japan and Taiwan and those which benefited most or least from governments’ support, internal managements, innovation of the industry and strategic options, etc. in the hope that an effective
reference for improving industrial competitiveness and models of competitiveness could be available for the governments and the companies.

**Literature Review**

**Characteristic of the Japanese and the Taiwanese Manufacturing Industries**

According to Manufacturing Management Research Center in Japan, the figure 1 shows the strategic profiles of positioning with architectures.

![Figure 1. Strategic profiles of positioning with architectures Sources: Manufacturing Management Research Center in Japan (2007).](image)

The Japanese automatic component makers were the pattern of the section on inside and outside integral (customization strategy). Firms with high integral had high competitiveness to compete with other firms in other countries. However, because firms used special materials, mass production (economy of scale) may not bring high profits, it caused the limitations on costs (quotations).

At the section of inside internal and outside modular (products were special but commonly used in the industry), firms could correspond to customers’ needs because they standardize products from upstream to downstream. Firms in this section can make high profit because the mass production (economy of scale) could bring profit for firms. However, the Japanese manufacturers were hardly standardizing products because most of them were inside modular with customizations type which means firms design and produce customizations products with standard materials (the standard means industrial standard in Japan, not special specification). However, some standards in Japan were not universal. “Standard in Japan” or “Standard in Universal”, this kind of answer must depend on firms’ choice. At the meantime, material purchasing networks of firms played important roles. Most of firms would rather to choose the suppliers which firms could easier control: delivery dates, quality and quantities, etc. It meant most of the Japanese manufacturers purchase materials from the other Japanese firms no matter the materials were made in where. Moreover, except sensitive to materials prices fluctuation, the Japanese manufacturers lacked for materials information more than market information. Firms could not get material delivery information, financial information of suppliers, and quality information clearly but spot while they give up purchasing from Japan and changed to purchase from China or the other countries.
Inside and outside modular type (refer figure 1) could be explained on the Taiwanese manufacturers which mean that firms produced standard products and seek for big orders in order to reach economy of scale to cost down: cost strategy. Recently, the Taiwanese manufacturers were not only focus on economy of scale but also notice imitating. They were late movers to observe successful cased in order to avoid risks to reduce the ratio of failure. In initial, most of firms did as ODM/OEM for international firms. By technologies transfer, not only the Taiwanese ODM/OEM firms but also the satellite factories (suppliers) were developed and educated, then, it became a cluster of industry. Through the process of ODM/OEM, it brought a complete supply chain from up to down-stream. Moreover, the competitions for getting customers’ orders were competitive and it caused gross margin reduced. On the other hand, in order to attract customers, firms re-design products to cost down. While firms got the economy of scales and get higher market shares, the power of bargaining with customers were increased. Most of the Taiwanese firms realized that only produce products for customers was not enough, the most important for everlasting management was to sell products with self-brands. They thought firms did not need to do much advertisements, high-quality was one of the brands for a company.

Japan had the ability to integrate and organized the specialty while they develop new (or re-new) product. They were talent on new and special design with high technology and high quality; they tend to “discover” and “produce” products for customers’ needs-they know where the market was. Taiwanese firms did the businesses on producing management, BOM (ERP system control), sales and customer services as well. They could get materials information clearly than market information, just opposite to Japan. That was why we heard the Taiwanese made a new design rarely. The reason was long time jog on ODM/OEM to obstruct to understand what markets really needed; customers would not tell the real trend of their target markets for firms but also enclosed what specifications they needed.

Methodology

Questionnaire surveys of interview questions were sent, and 56 effective of the Japanese firms returns were received and 62 effective of the Taiwanese returns were received. And this research was empirical research and sampling investigation to conjecture the competitive advantages of the Japanese and the Taiwanese transformer industries.

The Summary of the In-depth Review

The Japanese Firms

The author send interview survey to the firms and interviewed four Japanese companies in Osaka Japan from Jan. 30, 2014 to Feb. 02, 2014. All of them were transformer manufacturers and have JIS, JEC, CE, or TUV, etc. certificates. Five companies agreed to do face to face in-depth interview and three of them had planned international expansion and two of them focused on home market. One of them got awards from Ministry of Economy, Trade and Industry in Japan. According to the CEOs, the current and future developments of the transformer industry in Japan were as follows:

1. Base on the current technology, firms focused on upgrade the materials and resource on design effective transformers with smaller size which may help firms to cost down. Firms thought that developing switching, ferrite core, and upgrade current materials were three points in the future. A switching power supply functioned by utilizing switching technology rather than linear. Very simplified, the power supply switched the incoming power on and off, and varies the width of the resultant pulsed to provide the desired voltage after they had been integrated and filtered. This approach was more efficient than that of a linear power supply, which dissipated the power resulting from the voltage drop in its regulator. It was therefore cooler running than a linear power supply with the same output rating, and is smaller because it did not require the bulky (and heavy) power transformer of the equivalent linear supply. However, the switching did result in the output
containing more electrical noise than the linear supply, so when planning to use a switching power supply, it was very important to first verify that the noise would not adversely affect the intended application.

2. In Japan, the transformer industry was very high competitive (competitive rivalry within an industry). In ordered to cost down, going overseas where with attractive lower labor forces was the trend. The population in Japan was getting reduced. The home market was limited. Many firms (especially firms producing transformers under 10KAV) went to establish factories in China because the market was huge and China had lower cost wages than Japan; however, recently, the wages in China were getting higher and higher to press firms search and transfer to the other countries, like Vietnam, India, etc. However, many firms only focused on home market; and they produced special transformers with high-technologies and qualities but lower quantities. It could not bring good profits for firms because without economy scales, the profits are limited. Nevertheless, firms who went overseas had to take the risks by themselves; under the complex circumstance, firms focusing on home market might be another way to survive.

3. In ordered to accompany environmental consciousness, governments and enterprises raise some standards to conserve energy and reduce carbon emission, for instance, RoHS, WEEE and REACH etc. to prevent global warming intensify. People realized and started on the issue of how to protect the earth and how to make energy efficiently. And the Japanese firms focused on the development of new materials. If the new materials could be promoted and accepted by the world customers, developing on materials applications can bring huge profits for firms, especially while the materials get patents.

4. Firms were working on ISO 9001 (quality management system) and ISO 14001 (international environmental standard that specifies a process for controlling and improving a firm’s environmental performance.)

5. The finical crisis had started since August, 2008. And it had affected the orders reduced around 55~70% in 2009. It brought huge risks for firms until 2014 now, and caused many firms breakdown in 2009. Nations focused on infrastructure would reduce unemployment problems and social costs. Moreover, Japanese were proud of automotive industry. The prosperity of this kind of large-sized industry would drive the other smaller industries vigorous.

About the competitive advantages of the transformer industry in Japan, the CEOs’ considerations were sorted as follows:

1. Internal organizations: The communications between employees and firms were concerned. The employees’ loyalties to the firms is high. And also the reliabilities between employees and firms were high. The ratio of employees leaved firms is low; and many employees worked for more than 10 years. On operation, they had enough experiences and know-how; the working speed and working process were effective. On research and development, the engineers had special skill on transformers’ design and materials applications.

2. Technology innovation: The Japanese firms learned from times of mistakes and failures, and the experiences were unique. They could produce unique products with high qualities and innovation. For example, some firms spent around one year on temperature control, and from experiences, they took the data to fuse manufacturers to develop a new type of fuse. This was a kind of technology collaboration.

3. Collaboration and reliability: Firms believed their suppliers and the reliability had been developed for many years; therefore, firms would not approval the other suppliers’ sample easily. Firms had to communicate with upstream and downstream in order to make a suitable design for customers’ circuits and space, etc. Moreover, transformer was a kind of electronic components which with many safety certificates; therefore, while a customer approved one design, it was hard for the customer to change the same product to the other transformer manufacturers, especially while the customer paid the safety fee. Some firms cooperated with the other manufacturers in this industry in order to get economy scales and learn technologies from each other. The kind of technology cooperation may helped firms get new ideas on innovation.
4. Culture: (working attitude) The Japanese firms developed business culture on the world of “WA” which meant firms respect for peace, balance, esteem, and feelings on business activities. Moreover, customer services, technologies and qualities were three DNA of the Japanese transformer manufacturers. The three DNA were unique which global competitors could copy but cannot learn or understanding the really meaning as well.

The Taiwanese Firms

The author send interview survey to the firms and interviewed four Japanese companies in Taiwan from Jan. 20, 2014 to Feb. 10, 2014. All of them had UL and CE certificates and working on ISO 9001 (quality management system). All of the three had planned international expansion and the factories were in China.

About the competitive advantages of the transformer industry in Taiwan, the CEOs’ considerations were sorted as follows:

1. Production and factory management: The Taiwanese manufacturers learnt from the Japanese and American manufacturing ways. When they went global, they could use innovation to re-develop and reform the production processes by themselves to suit the domestic employees’ lifestyle and the level of educations. Because transformer manufacturers needed a large number of employees on production lines to make products, factory management was important. Human assets were the most valuable assets to the company. Moreover, they emphasized production management in order to saves costs for firms. Firms focus on BOM (bill of material) and applied software like ERP systems (enterprise resource planning) to plan, revised and integrated business activities on series of production processes from inbound logistics to customer services.

2. Internal management: The Taiwanese manufacturers emphasized enterprise self-development. Firms focus on e-commerce and e-business application development, the Internet and computer programming could enhance the communications and relationships of organizations closely. Most of the firms were SMEs and their maneuverability was faster than big firms; they were capable of process engineering or organizational restructuring when necessary. And SMEs could do internal cross-organizational cooperation fast. They were bravely to discover new management ways by their innovation. Firms thought that internal factors were much more than externals, because external factors could not be controlled but internal factors could be controlled by the managers of the firms. Firms attached importance to the learning ability of employees and thought it was important to make innovation.

3. Collaboration: Firms knew their suppliers and the other manufacturers’ financial activities as well, because the other manufacturers in the same industry shared information and also firms with capitals more than NTS 500 million, their basic financial information were enclosed on Ministry of Economic Affairs. They knew where to buy materials and the ability on searching new suppliers who could provide new materials were high and this made them advantage on delivery. Moreover, firms would require forecast from customers and provide the forecasts to their suppliers; it caused the delivery date could be predicted and satisfied customers’ urgent formal orders. And because some materials were commonly used firms’ standard products, if the forecasts from customers were not accurate exactly, parts of the prepared materials could be used to the other products.

4. Internationalization: Firms established factories overseas in order to take advantage of low labor wage level, near materials or near their customers. And going global bring profits for firms because Taiwan was too small, the market was limited and without nature material resources.

From in-depth interviews with CEOs, the factors to determine the competitive advantage in the Taiwanese transformer industry were emerged: 1) the internal management, 2) internationalization, 3) relationships with their suppliers and customers and 4) production management. Moreover, the CEOs thought “the capitals”, “employees” and “technologies”, were the three important factors on business and “the capitals” was much more important than the other two. And CEOs realized that they were not familiar on their target market because most of them did the jog as ODM/OEM factories for international companies.
Conclusion

The Japanese transformer manufacturers were advantage on materials applications, technologies development, qualities upgrading, marketing and customer services. Interviews with the five CEOs, three of them thought that cooperate with suppliers, customers, and the other manufacturers in the industry were very important. Because by cooperating, firms could share technologies can bring firms be A+. Moreover, if firms were only focus on their business without collaborating with their customers and suppliers, they would miss information and fall on strategies. On the other hand, the Taiwanese transformer manufacturers were advantage on searching materials to cost down, factories management (overseas), production management (manufacture processes control), and customer services. Firms would like to cooperate with their customers in order to know their market clearly. Moreover, firms collaborated with their suppliers in order to get contract prices and make a long time business with their suppliers.

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References


