

How did Singaporean SMEs Internationalize Business Relations?

— The Case of Singaporean Precision Engineering Services Industry —

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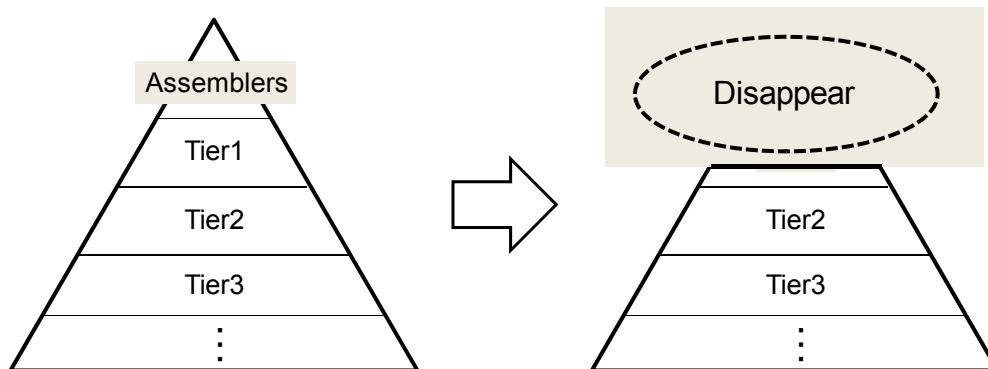
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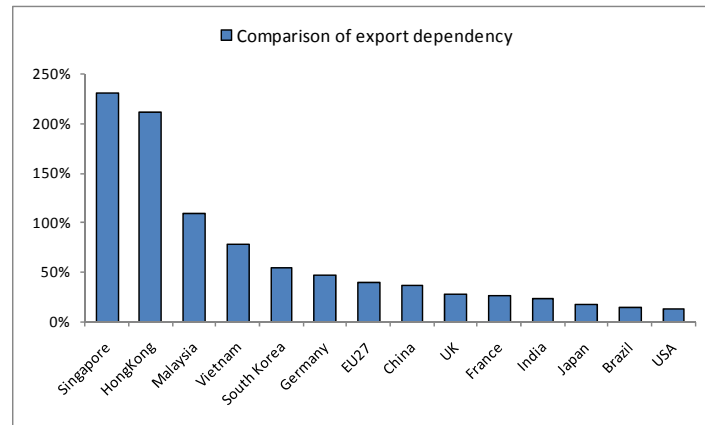
1.Introduction :Why do Japanese need to focus on Singaporean SME manufacturers?

The aim of this paper is to elucidate the process of internationally diversified business relation of Singaporean SME manufacturers and obtain some implication for Japanese SME manufacturers. It is well-known that manufacturing sector is the core of Japanese economy. Especially, machinery industries such as automobiles, aircrafts, household appliances, medical devices have played main roles. Many researchers revealed that based on a great deal of SME manufacturers under strong subcontract relationship with large assemblers, it seems the industrial structure has been formed as the pyramid in Japanese manufacturing sector. In addition, it is also recognized that the pyramidal structure is the source of international competitiveness of Japanese manufacturing sector.

Figure1.The Change of Japanese Industrial Structure



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Graph1.Comparison of export dependency in each country

Source : METI(2010)“Industrial Structure Vision 2010”

Under the pyramidal industrial structure, most of Japanese SME manufacturers that belong to machinery industries could depend on a few domestic customers that brought stable orders. However, from the middle of 1990s, Japanese assemblers started to shift their production base to foreign countries and attempt the global procurement. Additionally, they relatively decrease their international competitiveness due to the global competition with other Asian countries' companies. As Yamamoto(2010-a) mentioned, due to above reasons, the recent image of Japanese industrial structure from the viewpoints of SME manufacturers changed as figure1. Through this change, Japanese SME manufacturers started to be required to diversify their business relation internationally. In other words, they will not be able to depend on only Japanese domestic market in the near future.

As figure2 shows, Singaporean export dependency is the highest in the world. In addition, it is already recognized that Singaporean government and companies including SMEs has intended to be internationalized because of their small domestic market¹. Therefore, considering our aim, we suggest the research question as follows.

How did Singaporean SME manufacturers acquire orders from foreign companies and internationalize their business relation?

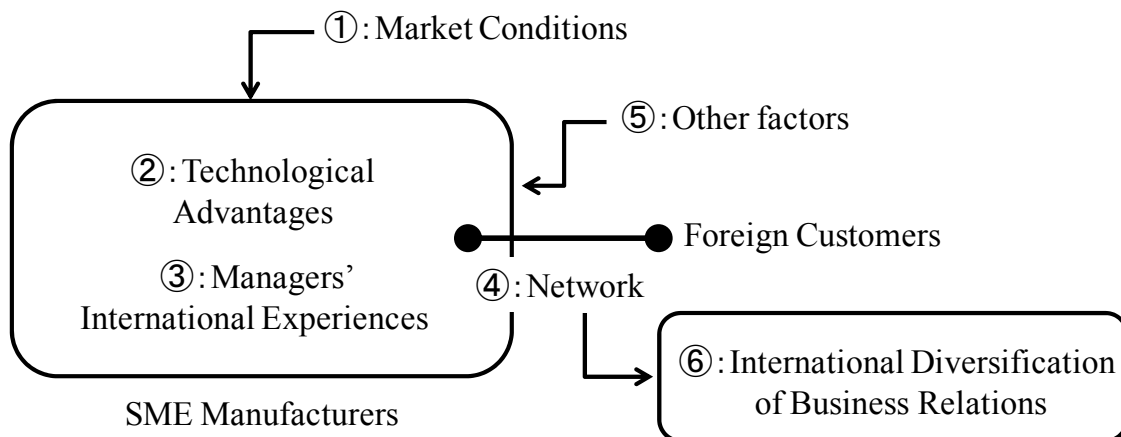
Particularly, we focus on Singaporean precision engineering service industry. In Japan, it is recognized as one of the most domestic industries under the pyramidal structure. Moreover, in Japan, it is generally considered that the manufacturing sector in Singapore faced the de-industrialization in the middle of 1990s. Thus, the number of Japanese articles that mentioned Singaporean precision engineering service industry is amazingly few. According to above reasons, it is meaningful to take it into consideration as the case study.

¹ For example, Tan and Tan (2002) and Dent (2003) indicated.

2. Literature Review and Theoretical Framework

In the beginning, we will build our theoretical framework for our aim. How do the SME manufactures become internationalized? Several literatures have already focused on the process of internationalization of SME manufacturers. For example, Nürnberg and Birgit Enßlinger(2006) reviewed the several factors on success of internationalization for SMEs. First, we can naturally suggest that market condition such as home country’s market size and change is the success factor. Secondly, Westhead, Wright and Ucbasaran(2001) mentioned that technological advantage is the success factor of internationalization for SME manufactures. SME manufactures are strongly required to provide more differential technologies and products to local companies in foreign markets. Third, to be internationalized, managers were suggested to own international experience. If they have the working experience in MNC, it should be easy for them to overcome language barriers and business customs of foreign countries. In other words, they can obtain know-how to acquire business relation from foreign companies through their international experience. Fourth, SME manufactures need networks to enter in foreign markets (Reuber&Fischer(1997)). Yamamoto (2010-b) analyzed that SME manufactures can acquire new customers through their managers' formal and informal networks. Hence, we can insist that network connected to foreign companies is the important factor to acquire orders from them, although it is difficult for usual managers to build it. Fifth, there should be other success factors such as Government support. From above discussion, we can make our theoretical framework as following.

Figure2.Theoretical Framework

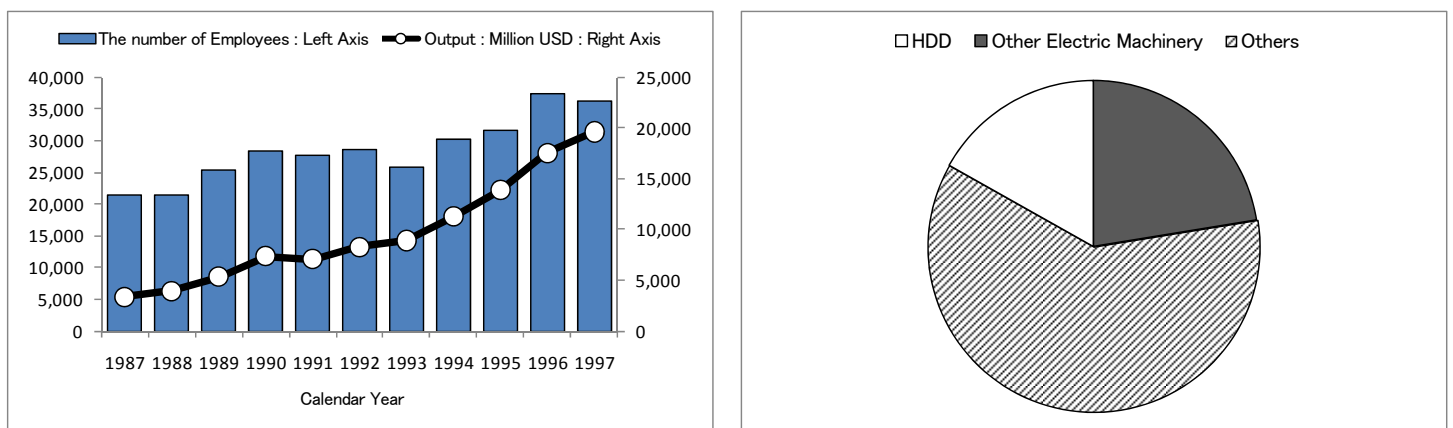


3. The Background of Singaporean Manufacturing Sector

To analyze the process of internationalization of SME manufacturers, first, we must understand how machinery industries have developed in Singapore. One of the most detailed papers on this topic is Wong (1999). For a long time, the base of the Singaporean manufacturing sector was Hard Disk Drive (HDD) industry. Wong(1999) depicted that Singapore has a dominant position as a regional hub for HDD assembly with both of the large share of HDD output and significant and advanced assembly line by major HDD makers in the world. The first-step of this industry started from the location of Seagate on 1982. Then, due to success of Seagate operation, many of the USA and European MNC sequentially located in Singapore. As a result, HDD and related supporting industries such as various precision engineering services agglomerated in Singapore. In other words, a lot of technologies were transferred from major MNC to local SME manufacturers. For example, among my interview, CEL Coatings commented “We started to shift towards providing plating services for the hard disk and electronics industries in the mid nineties. There was an increased focus on quality systems and mass production capabilities”. Almost similar to this process, several electric industries also located in Singapore (Wilson et al (2003)). Finally, in 1997, the ratio of output of Singaporean machinery industry was graph 2.

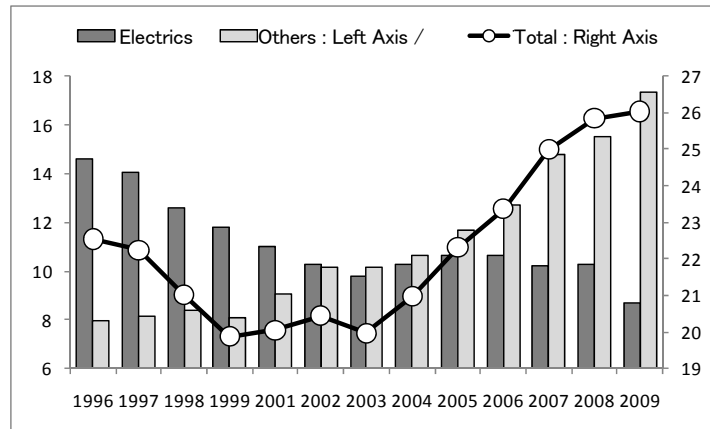
However, from the end of 1990s, HDD assemblers started to shift outside of Singapore such as Thailand, Malaysia and China because of increase in wage and land cost. This means that Singaporean SME manufacturers faced serious decrease of sales. This is the very typical experience of Singaporean SME manufactures. Actually, in other electric industries, almost same situation occurred. Therefore, to keep their business, many of them chose to diversify their business relation internationally. For instance, Sim and Pandian (2003) analyzed internationalization of Singaporean SME manufacturer that belonged to electronics industry.

Graph2.The Trend of HDD Industry in Singapore and the Ratio of Singaporean Machinery Industry in 1996



Source: Wong(1999) and Statistical Yearbook of Singapore

Graph3.The Change of Industrial Structure in Singapore after 1996



※ The number of Employees: 10 thousand, Source: Statistical Yearbook of Singapore

As a result, the total number of employee in machinery industries was about 220 thousand in 1996 (See graph3). Then, it became about 226 thousand in 2009. This means that Singapore could develop manufacturing sectors including SME manufacturers against de-industrialization. Especially, it is clearly understood that the industrial structure changed from electrics-oriented style to diversified-style including general, transportation and precise machineries.

4. How did Singaporean SMEs Internationalize Business Relations? : Case Studies

How did Singaporean SME manufacturers make it possible to diversify their business relations internationally? To answer this question, we chose 11 SME manufacturers that belong to precision engineering service industry as case studies. All of them depended on Singaporean domestic market in the beginning. Then, through the change of the industrial structure, they also changed their business relation. The period of the interview was from 11th to 15th October 2010.

CASE1. MICROCAST PTE.LTD

On 1989, Microcast was established by Mr. Lim to provide the small and precise parts through the zinc die-casting. Microcast Pte Ltd is an SME based in Singapore. They own ISO 90035.

Mr.Lim, currently 50 years old, spent several years in the die casting industry before setting up Microcast. In the beginning, there were only two die-cast machines and 5 - 6

Figure3. Microcast' s Product



employees. Additionally, the size of his factory was only less than 5,000 square feet. He believed that zinc die casting was a relatively niche business and decided to go into this industry. He started marketing to Singaporean local companies initially and gradually expanded this business to MNCs.

After 2000, MNC in Singapore started to shift their production basements to outside of Singapore such as Thailand or China because the cost for the production had already become high in Singapore. With this change, they began to focus more on exports out of Singapore. Singaporean logistics industry sustains the huge advantage and their productions are small and light. Additionally, their customers are located in all of world, so it was not so important for their business to be located in other Asian countries. Thus, it is possible to obtain the scale merit to produce in one place. Therefore, they preferred export from Singapore to shift of their production function to other places. Government trade agencies also supported local industries and these trade agencies assisted in internationalizing Singaporean companies through exhibitions and overseas trade missions. Currently, the number of their customers becomes over 50 in the USA, Europe, North and South Asia. Their customers are from very diversified industry sectors including those from the electronics, industrial equipment, automobile, avionics and medical industries. The geographic contribution to their business is also fairly evenly distributed. These factors have all combined to help them maintain a steady growth in their business over past years. The number of items that they provide is over 500, and they created over 20 new items annually. Some of customers, especially the USA customers frequently show and transfer their know-how on the technology and the management through the business relation to Microcast. Hence, they can accumulate new knowledge in their company.

On the other hand, most of their process technology relied on the machines, and they can make foreign employees talented on their work with the educational support from Singaporean Government at least 2 years. There are business groups in their company and all of them are multilingual who can speak Chinese, English and Malay. Thus, they can communicate with customers in all of world. Additionally, because the financial industry in Singapore is strong, they also own financial operation abilities. For instance, they negotiate with their customers twice per year and adjust the price with the change of the currency rate. Then, both of them can avoid the exchange risk.

CASE2. Fong's Engineering and Manufacturing PTE.LTD

On 1982, Fongs' Engineering and Manufacturing was established by Mr. Fong, the younger brother of Mr. Jeremy Fong. After graduation, Mr. Fong learned how to do milling and turning in the machinery shop and became the founder of his company. In the beginning, they mainly provided the Jig and Fixtures. On 1988, Mr. Jeremy Fong entered the company. He had the know-how the company needed, such as production, sales, management, the quality control and network with the aerospace industry because he was working in the small SMEs about the rebuilding of aerospace. Because of his network and know-how, they started to provide the parts to the aerospace industry. Especially, they

became the subcontractor of ST Engineering group. In addition, they obtained the CNC machine and ISO 9002 in the beginning of 1990. They utilized their capital and license as the tool of the advertisement and at the same time, they utilized the support from EDB, SPRING and IE that have so many officers in abroad for the marketing. Because of this situation, they started to have the business relation with big MNC in Singapore. However, from the middle of 1990, MNC started to shift their production basements to Thailand, Malaysia and China. Thus, they were also forced to change their business. For that, they entered the advanced industry such as biomedical&life science industries or optics and electronics industries. In 2002, they made their production basement in China. Currently, they are providing the parts of VSAT antenna(See Figure4).

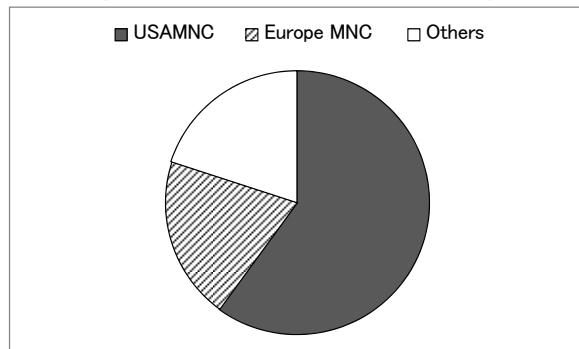
Their annual sales is about 20 million SD. Currently, their main customers are the USA companies and Swedish company(See Graph4). In other words, they do not focus on the Japanese market as much as the USA and European markets. That is because they need to build the quite unique long-term relationship with customers with high quality and relatively low price in Japanese market.

Although, in the beginning, they tried to enter the Japanese market, finally, prefer the USA and European markets with support from the Government such as the attendance of the international exhibition. Additionally, they could obtain human resource from National University of Singapore students or from China and India through the Singaporean policy. In addition, they can hire the person who has the working experience at MNC, for the financial section and rely on the strength of Singaporean logistics industry.

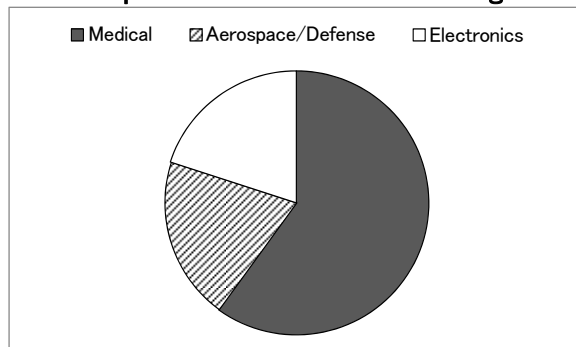
Figure4 Fong's Factory for VSAT antenna



Graph4. Ratio of Customers : Fong's



Graph5. Ratio of Industries : Fong's



Their subcontractors are in China, Malaysia, Germany for laser-processing and the UK for surface treatment. In other words, they are the hub of the global supply chain. Some knowledge is transferred from their customers to them. For example, the USA customer had invited them to the USA and showed their factories and know-how of the technology. Otherwise, they obtain information about the subcontractor and machines.

CASE3. YUDO WANCO PTE.LTD

On 1990, YUDO WANCO is established by Mr. Kwan to provide mold base for stamping die and die-cast die. Mr. Kwan had been working in German MNC, HASCO as the product manager in 10 years. One day, one person suggested him to establish his company as a Singaporean supporting industry with his know-how and reputation. There were only several mold base companies in Singapore. Hence, after establishment, they started to build up the business relation with MNC such as Japanese electric companies or die-makers.

However, after 2000, MNC started to shift their production basements to Thailand and China. Thus, they were also required to follow them and to build the factories in both of Thailand and China. Additionally, they had relationship with trading companies in Vietnam, Malaysia and Philippine. Singaporean, Thai and Chinese basements have same functions for the production, but faced different customers in those areas. For example, Singapore factory provides mold base to MNC in Singapore, Indonesia and Malaysia. On the other hands, they face Japanese companies in Thailand and Singaporean die-makers in China. Additionally, they accept the request from the customers to produce the products with new technologies. For instance, they learned how to process the frame that is made of aluminum for the solar panels from the USA customer.

Additionally, they could obtain technician from English speaking countries such as Malaysia and India. In addition, they also rely on the strength of Singaporean logistics industry. Additionally, they buy machines from Germany, Japan and Taiwan. By utilizing 3 countries' machines, they can balance their management from the view points of production and finance. At the same time, they use German machines for the tool as advertisement to German and European customers. They often attend the exhibition at least once per a year in each country. The number of employee is totally 260: Singapore 150, Thailand 70, China 40. The amount of annual sales is 20 million SD. Half is for mold base and another, and the other is for machining. They provide the mold base with USD and buy materials with USD to avoid currency risk. In addition, they always ask customers to have prior payment before they submit their mold base or parts.

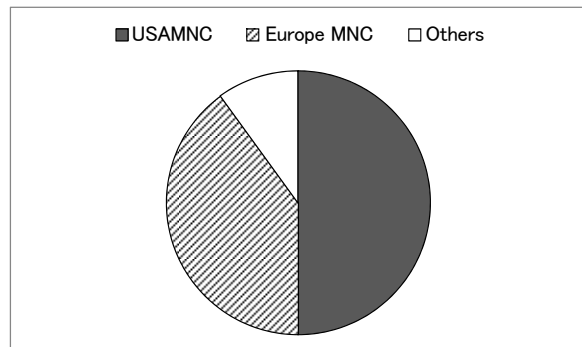
CASE4. CEL COATINGS INDUSTRIES PTE.LTD

CEL Coatings was established by Mr. Shu, the current Managing Director, in 1984. The company was established when EDB : Singaporean Economic Development Board, suggested that the surface treatment industry might be a good niche market to enter. They started by providing plating services for oil drum caps and bicycle parts. However, as these requirements shifted out to lower cost countries

like Thailand and China, CEL Coatings started to shift towards providing plating services for the hard disk and electronics industries in the mid nineties. There was an increased focus on quality systems and mass production capabilities. Their end customers include Japanese MNCs in these industries. CEL also utilized government support in the form of grants and consulting projects. Towards the end of 2003, CEL Coatings started to see a trend that the hard disk drive industry would shift out of Singapore. As 60% of their business was dependent on hard disk, they saw a need to diversify their business base. An internal R&D department was set up, and they also developed a subsidiary company in China that started operations in 2008. Based on word of mouth publicity and their R&D efforts, they are now serving a wide range of industries. Their business from Hard disk is now less than 5%. They are also serving the beauty and cosmetics, automotive, semi-conductor, electronics, telecommunications and bio-medical industries.

Currently, their customers including MNCs based in Singapore, Malaysia and China and their sales is SGD21 million in 2010 and the ratio of customers is as Graph6. They target to double their sales in the next 3 years. Their customers also asked them to solve the problems of the parts on the cost or technique. Then, they often suggested how to solve those problems from the viewpoint of the surface treatment.

Graph6. Ratio of Customers : CEL



CASE5. Onn Wah Precision Engineering PTE.LTD

Onn Wah was established in 1961 by Mr. Lam's father who is currently 81 years old. In that era, there were few manufacturing industries in Singapore and Onn Wah was producing drive shafts and propellers for small boats. They gradually bought machines from Japan and started to acquire machining technology from Japanese companies. Then, they began to supply mechanical components to Japanese MNC's that were located in Singapore. In the late 1990's, the low-value industries that they belonged to started to move to Thailand or China. Facing these changes, they entered the semi-conductor industry that was of higher value, started business with American MNC's in Singapore and acquired additional machines from Germany and Japan. After that, they focused on processing

complex parts of ever higher value. In the meantime, Mr. Beaufre, a French Lean Manufacturing consultant, had come to Singapore after visiting Taiwan and HK. He realized that Singapore was the only English speaking country with a significant manufacturing industry among all Asian developed countries. He started his consulting business with Singapore manufacturing SMEs, such as Onn Wah, Cel Coatings and many others. In particular, he developed a good business relationship with Onn Wah for over seven years and eventually joined the company as the General Manager in February 2009 with the deep trust of the Lam family. He is now in charge of the company business development in the European markets, using his own network and experience. Onn Wah's objective is to develop high -value markets such as the biomedical, semi-conductor and optics industries world-wide. Today, Onn Wah has 15 main customers and directly exports around 50% of its sales to MNC's in the USA, France, the UK, China and New Zealand. Onn Wah's local market is also mainly MNC's operations in Singapore.

Mr Lam and Mr Beaufre commented that key factors supporting Onn Wah's development strategy were Singapore sound financial system and efficient logistics infrastructure.

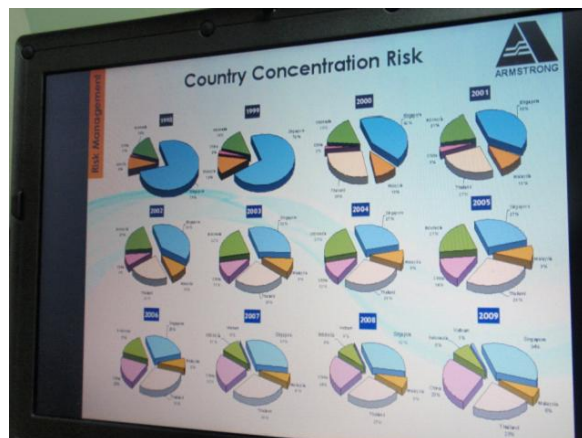
CASE6. ARMSTRONG INDUSTRIAL CORPORATION LTD

In 1974, ARMSTRONG INDUSTRIAL was established by Mr. Gilbert ONG, who was previously serving as a technician in a local rubber company supplying foam and rubber parts for the marine industrial sector. The name "Armstrong" was inspired by the great international achievement of Mr. Neil Armstrong, the American command pilot who became the first man to set foot on the moon in 1969. After 1980, Armstrong expanded their range of products and services to serve not only the construction industry but also the telecommunications, consumer electronics, office automation and computer peripheral industries. During the 1980's, many MNCs were locating in Singapore and were

Figure5. Mr.Lam and Mr. Beaufre



Figure6. Armstrong's Internationalized Business Relation



seeking local suppliers. In 1988, there was a joint-venture with a Japanese automotive MNC. After that, they started to acquire know-how on high-quality production and networked with more Japanese MNCs. Overseas subsidiaries in Malaysia, Thailand and Indonesia were also set up to tap into more markets beyond Singapore.

However, they faced business failures in the mid-90's because a lot of inefficiencies happened in new businesses such as color printing and metal stamping which were beyond their core competencies in rubber and foam products. Then, in 1998, Mr. Steven Koh, who had more than 20 years of working experience in the banking industry came on board to help the restructuring of Armstrong. First, Mr. Koh analyzed the major risks and threats to their business. 79% of their total sales depended on Data Storage Industry of which 78% relied on the Singapore market. Thus, he tried to decrease these risks by divesting into other potential industries such as consumer electronics and automotive.

Partnerships followed with a German company in 1998, an Australian company in 2003 and an Indian company in 2008 to acquire know-how on technologies and network with new markets. Interestingly, their partners were also their competitors in each market. Mr. Koh paid attention to great details in the company, down to the cost of their ventilation system, their maintenance systems and the conditions of the employees. Additionally, Mr. Koh often visits abroad to collect overseas market information.

Finally, they focus their business sectors to the data storage, office automation, automotive and consumer electronics industries. Their current customers are mostly global Japanese, German, the USA and Korean companies such as Denso, GM, Ford, VW, Audi, Toshiba, Philips and Samsung, LG. They have around 1,400 customers. In addition, sales are derived from a balance spread of countries namely Singapore, Malaysia, Thailand, China and Vietnam. To obtain the business relation with these companies, they hire Japanese managers. They have 10 Japanese managers in their branches. The headquarters in Singapore always checked whether or not the ratio of their branches' sales are in line with the customers. If not, they tried to improve. Additionally, their marketing strategy is to focus on key customers in the core industries. With this strategy, they can better manage their market. They also build their product road map to serve their customers best. They utilized Japanese, European and Taiwanese machines. Recently they start to work more and more with the European materials but not Japanese materials as their customers are not able to accept higher pricings with similar level of quality and deliverables between the two. It was interesting to see how Armstrong is living its aspirations of great achievements by overcoming so many difficulties to become a successful company in Asia today.

CASE7.CFM

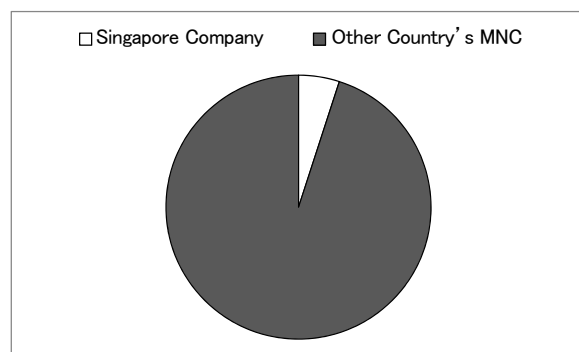
In 1979, CFM was found by Mr. Lp, Kwok Win, who had the working experience of metal stamping, tool and die and fabrication in Singapore local companies. At early 1980's, CFM became the supplier of one Japanese electric MNC and supplied the metal pressing parts. Then, they made the joint venture with that Japanese company, and acquired the skilled technician from that company. Through this joint venture, they obtain new technologies about metal pressing. Then, their reputation expanded from mouth to mouth among Japanese companies and acquired the new customers, especially in the hard disk industry. From the middle of 1990's, CFM customers shifted to outside of Singapore. They asked CFM to follow them. Due to this reason, CFM began to set their subsidiaries in China, Malaysia, Slovakia, Thailand and so on. In each area, they attempted to avoid over-dependence on one industry to balance their business. For that, they hired local people for the marketing. They, especially, Ms. Janet Lim, often visited potential customers, utilizing government support such as the business matching. Then, they acquired new customers such as automotive companies of the USA. For that, they set a marketing group that was consisted of local people. Additionally, all of the general managers in their subsidiaries are local people. Currently, the total number of their customers is 200 in whole areas. They also entered the new generation industries such as LED and the medical electronics. In headquarter which is situated in Singapore, they focus on R&D. All of the production functions have already shifted to their branches. General managers in each areas frequently come to Singapore with problems on production to their R&D. CFM has 3 people for R&D and all of them are from China.

There are only 20 Singaporean in CFM, while total number of employees is over 1,000. Ms. Janet Lim who got the bachelor and Master degree from an Australian university and had the working experience related to the management in another Singaporean SMEs, often goes to overseas countries, especially the area that their subsidiaries are located. Actually, she only stays in Singapore for five days per month. She commented that because they have business relation with both European and Japanese

Figure 7. CFM Factory



Graph7. Ratio of Customers : CFM



companies, she can learn both of business styles and can obtain more flexible way to manage her company. On the other hand, they do not have any business relation with Singaporean local companies as Graph7.

Their subcontractors are located mainly in Malaysia and they buy materials from Japan and Europe. In addition, they bought machines from Taiwan and asked Taiwanese companies to transfer advanced technique on their machines. Now, they are trying to make the joint-venture with Uzbekistan government company to enter the Russian market.

CASE8.SANWA Plastic Industry

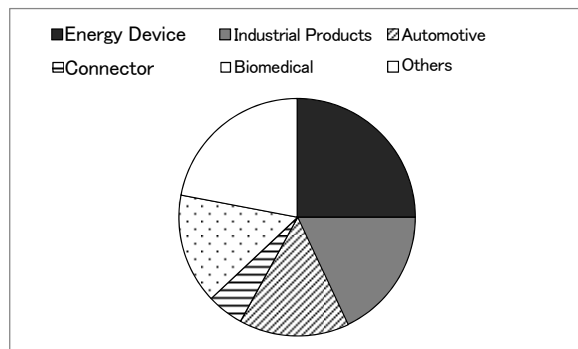
In 1977, SANWA was founded by 3 shareholders and the Company is manufacturing the precision injection molding plastics components. In 1979, Dr. Souw, who was born in Indonesia and worked as the nuclear scientist for 10 years in France with Ph.D and got the MBA in France came to Singapore, and joined as a share holder and became the company managing director. He brought knowledge on methodologies and focus into the quality, problem analysis and solving, and re-orient the business focus based on his experience. At the beginning, SANWA moved to the electronics industry such as audio / video products, and almost 90% of Singapore plastics molding SMEs were also focusing into this sector. However, Sanwa has changed the focus in 1987 by exiting from that electronics industry because they tried to distinguish itself from other injection molding SMEs. In the middle of 1980’s, Sanwa entered into the energy device related industry and in late 1980’s, they also started to focus into the connectors industry used for the disk drive industry.

Sanwa believed that the future in Singapore for the injection molding companies should look into highly precision and small plastic components parts based on the continuous up grading of the technology capability. They believed the ability of producing connector is technologically tough, and the technology is continuously improving. Sanwa will be able to continuously up grade and advance their technology capability if they are in the connectors business.

Figure 8. The Headquarter : SANWA



Graph8. Ratio of Industries : SANWA



By the end of 1980s, they focused on the overseas market (2nd wing of Singapore economy expansion) by setting up the Batam plant (Batam is an island of Indonesia, located about 16 miles south of Singapore island). In 1996, Sanwa extended the industry focus to automotive industry and started up a Joint Venture with an American company and serving some special sectors of the automotive industry with higher value added such as Sensor module, Door Closure module, ECU, Fuel Pumps module etc. This activity was supported by Singapore Economic Development Board (EDB). Because they had experiences in the precise and complex electric parts and connectors, so it was not so hard to started up the supply of the automotive parts. In 2003, they started to look into the new area such as Bio-Medical Technology plastic components industries requirement and started to become a supplier of the Swiss contact lens company in around Singapore. Now, their sales are like graph 8. In addition, they also balance their sales between Japanese, European and the USA MNC.

Currently, they have two plants in Singapore for making high precision parts and is looking into the R&D capability with certain intellectual property. They have also plants in Malaysia (1 plant), Indonesia (2 plants) and China (3 plants). They also made die and mould but, sometimes also ask their subcontractor to make it. However, their productions are not only molds. They buy the material and machine from Japan, USA and Europe. They use various currencies in their International Transaction such as Singapore Dollars; YEN; Euro; Malaysian Ringgit; RMB and USD to balance the foreign exchange rate risk. Currently, Sanwa Group employed a total of about 1,800 employees.

CASE9. Interplex Singapore

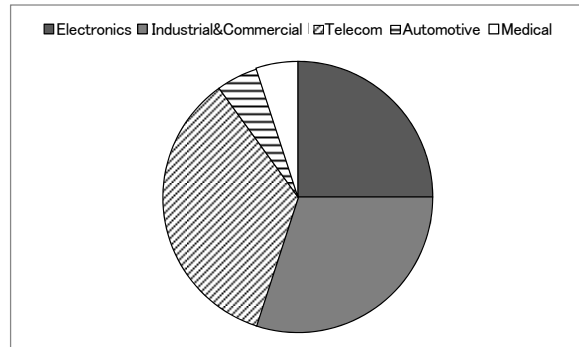
In 1994, Interplex Singapore was found to manufacture the metal stamping. Interplex is a MNC and its headquarter is located in the USA. Mr. Gan had working experience as the manufacturing engineer in a large American MNC, GE, from 1978 to 1988 and as the manager in another American MNC from 1988 to 1996. In 1996, he moved to Interplex as the general manager through the head hunting because he had the network among American MNCs in Singapore. Because one main customer of Interplex, American commercial electrics company, would make the subsidy in Singapore, Interplex Singapore was found. Technology transferring between plants was difficult as there was no system in place for such collaboration. This also applied to sales and marketing. Interplex system is for each location to be a profit centre and to service customers within the region. Mr. Gan's was often taught by his ex-boss that he must be more sales oriented. Thus, after that, they began to acquire the MNC as new customers on their own sales group, utilizing Mr. Gan's

Figure 9. Utilizing American Devices

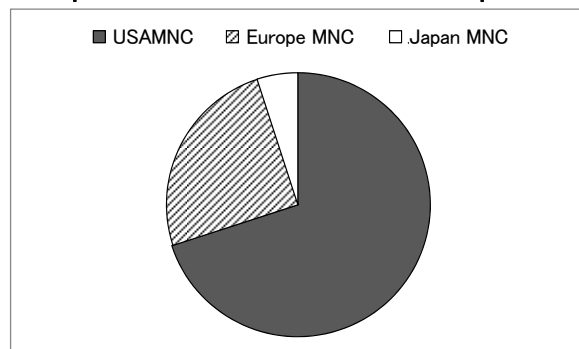


network in American MNC and some of support from the Singaporean government. Singapore is small and many MNCs are always looking for good subcontractors, so it is easy to see their managers. Especially, once managers function and quality, they try to make the contract in the USA companies admit their production immediately. Thus, they mainly had the business relations with American MNCs because their business styles to choose the subcontractors are so flexible. In addition, Interplex have one more advantage because they are also the USA MNC. Currently, the ratio of their sales is as Graph9. At the same time, they made the production basement in Malaysia on 2007 to manufacture the injection mould and got the American license, ISO/TS16949 to deal with the automotive parts.

Graph9. Ratio of Industries : Interplex



Graph10. Ratio of Customers : Interplex



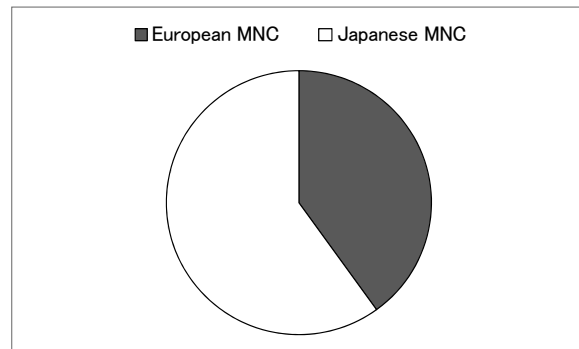
Additionally, they attempted to get the in house solution, so now they can do the plating and insert moulding except for the metal pressing with making die and mould. They utilized the Japanese, European and Taiwanese machines, and Japanese and European materials. Especially, they commented that Taiwanese machines that were made in China were low-cost and good functions. Right now, the number of their customers is 12-13 and the ratio of their consumer is as Graph10. Moreover, the number of employee is 80 and half of them are not Singaporean.

CASE10. Juken Technology Limited

On 1984, Mecplas, the ex-name of Juken, was found to manufacture the precision engineering of plastic components by Mr. David Wong. Mr. David Wong had the working experience in Japanese MNC on plastic injection. After that, he thought that it was better for him to establish his own company for his career. Mecplas started to provide the parts of the plastic injection. First, they started to supply the parts to one Japanese company and accumulated the technology. After that, they built the business relation with that Japanese company. Then, through one acquaintance, Mr.Wong knew Mr.Matsura in Juken Kogyo in Japan. Mr. Wong made the joint venture with Juken Kogyo in 1992 and changed the company name from Mecplas to Juken Technology. Juken Technology got the know-how and the special machine from Juken Kogyo. Then, they started to obtain new customers among Japanese MNCs in Singapore and Malaysia. Additionally, they made subsidiaries in China, Thailand and Malaysia following their customer's oversea shift. In the late of 1990's, Asian crisis occurred and they thought

that they should not solely depend on Japanese companies mainly in consumer electronics industries. Thus, they attempted to have the business with European companies, that mainly focus on automotive industries and cherish longer-term business life, and imposed higher barrier of entry in terms of technology and quality. Before 2005, Juken mainly supplied the mechanical components of the camera.

Graph11. Ratio of Customers : Juken



However, due to technological changes in camera industry in 2005, digital camera became the main stream in the camera market and the demand for mechanical plastic components for traditional camera has plunged significantly. Since 2005, Juken began to get itself involved in automotive industries and supply the automotive parts in bigger scale in 2007 and thereafter until present. Juken made a joint venture with Indian companies that engaged in the automotive industry in 2006 and acquired the stepper motor business from Swiss automotive company. Currently, the number of their customers is 20 to 30 and the ratio is as Graph11. Additionally, they have the business relation with most of the tier one automotive companies who has business world-wide.

Majority of their production functions are out of Singapore and they only have 30 Singaporean employees, although the number of their employee is over 1,300. Although they utilized foreigners such as Japanese to manage their subsidy in Thailand, many of their subsidies are controlled by local people. The number of the employee is 600 in China, 400 in Malaysia, 150 in Thailand and 100 in Indonesia. They also accept the German technical consultant to invent new parts as business. Over ten years ago, they have started to make die and mould in house.

CASE11. LONG TECH ENGINEERING PTE LTD

Long Tech Engineering was founded by Mr. Poon Cheng Seng in Singapore in November 1986 as a precision machining workshop to serve the semiconductor industry. Prior to the finding of Long Tech, Mr. Poon had worked in a local machining company with the scale of less 10 employees. The initial customers of Long Tech were mainly from American & European multi-national companies in Singapore serving electronics and hard disk sector. In view of the increasing market competition from other local competitors and the trend of many of MNCs starting to shift their production bases to overseas, the management of Long Tech decided to reposition itself to serve another fast growing market, plastic molding industry, after two persons with mould-making experiences joined the company in 1996. The company began by providing manufacturing services of mould bases to multi-national companies to leverage on the previous business experiences with MNCs and then gradually expanded its services to other Singaporean local companies. In middle of 2000, the company faced another challenge decision as

many of their customers started to expand overseas due to business globalization and relocated some of their operations outside Singapore. The management of Long Tech had to make the strategic business decision whether “To Follow Customers by Shifting to Overseas” or “To Stay in Singapore and Export”. The final decision was made to stay after they considered various key reasons. First that Singapore has a good logistics industry and signed various free trade agreements with many countries. Second, the company can have better quality control in Singapore. Third, Singapore is an English-speaking country and many of skilled foreign professionals hope to work here. The company can gain key competitive advantages in getting highly skilled machinists to grow its business by securing more complicated machining works from overseas, at the same time drive its key efforts to enhance productivity and efficiency of workforce to international level. To grow the business in overseas, Mr. Simon Png, the business development manager joined the company. Mr. Simon is at age of 49, graduated from University of London, and previously worked in few American MNCs for 14 years as a principal engineer in the field of mechanical & manufacturing engineering.

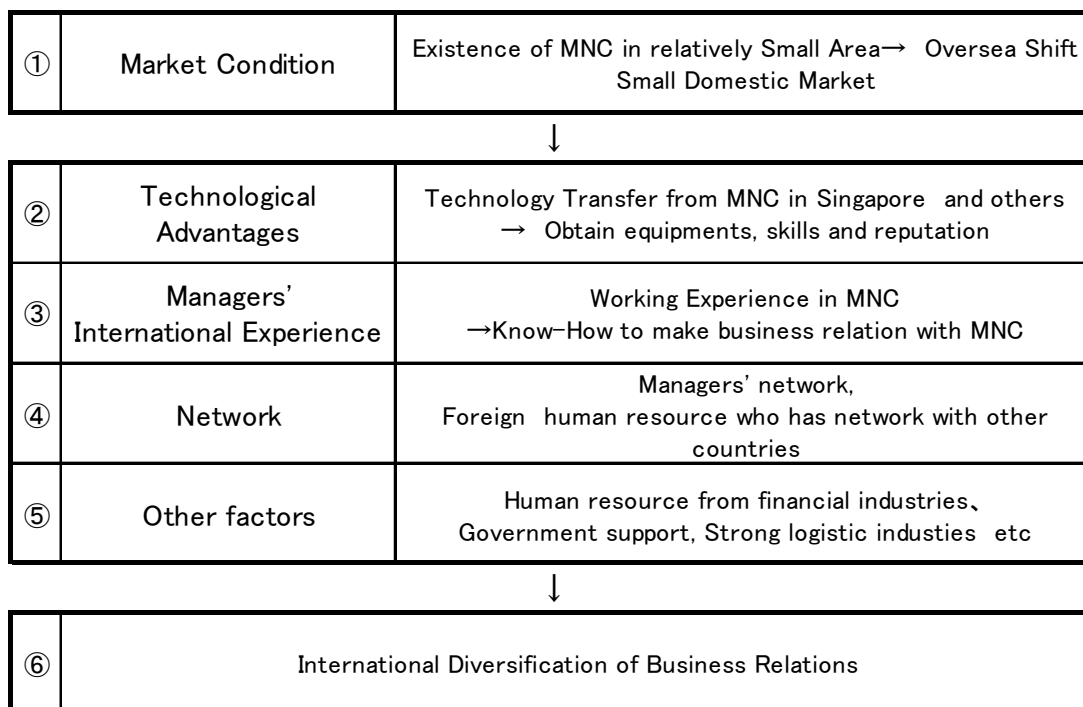
The key markets focused are in Indonesia, Malaysia, Thailand, Australia and India for the company growth. Mr. Simon always first found a reliable foreign partner with good business network in the country and focuses on one good customer and then grows the business gradually. Currently, sales revenue of the company is ~ S\$14 million (Singapore Dollar) and half of their sales is from outside of Singapore. One of the main customers is an Indian famous local automotive company. Long Tech is capable of making customized mould bases within 14 days. The company equips with machinery from Germany, Japan and Taiwan; Taiwanese machines are getting more popular in recent years due to its better prices and improvement in quality. The strength of its workforce is around 60% of 140 employees from Malaysian, Indian and China. The company has been conferred the Singapore SME 500 status (Top 500 of Small & Medium Enterprises) since 2003. Over the years, Long Tech also clinched the Best Supplier Award from Global Companies like Tyco Electronics Ltd and FCI Technology.

5. Analysis of Case Studies

From cases, we can depict the process of international diversification of business relation of Singaporean SME manufacturers as Figure 10. First, a large number of the USA, European and Japanese MNCs located in Singapore and made business relation with Singaporean SME manufacturers. However, those MNCs started overseas shift after the late of 1990s. Then, because there is only a small domestic market with the small population and narrow area, Singaporean SME manufacturers had to diversify their business relation internationally. Second, through business relation with MNCs, they could obtain technological transfer. For instance, from some cases, they learned advanced processing technology from Japanese MNCs directly and indirectly. Additionally, they had invested R&D and equipments to form technological advantages. It also can be interpreted to acquire the reputation.

Third, among Singaporean SME manufacturers, they own human resource who had working experience in the USA, European and Japanese MNCs on management teams. An example of this is that several of their founders had working experience in MNCs. This means that Singaporean SME manufacturers had know-how to build business relation with MNCs in foreign countries. Fourth, managers and other members had various network connection to foreign companies due to their working experience in MNCs. For instance, Onn Wah hired French consultant who brought business relation with some of European companies. Long Tech also utilized reliable foreigners who have network with their countries' companies. Finally, we can point out other factors of internationalized process. Interestingly, they avoid exchange risk by the natural hedge through internationalization. A example of this is that SANWA utilized various currencies in their International Transaction. It is observed that Singaporean SME manufacturers often utilized human resource with financial knowledge from Singaporean international financial industry. Moreover, Singaporean government support and logistics industries played important roles in the internationalization for Singaporean SMEs.

Figure 10. Process and Factors of International Diversification of Business Relations of Singaporean SME manufacturers



6. Conclusion

In this paper, we analyzed the process of internationalization of Singaporean SME manufacturers from the viewpoint of diversification of business relation. In Japan, there is myopic thinking that Singaporean companies became more internationalized than Japanese companies because they use English and Chinese as their official languages. Undoubtedly, language is one of important factors to explain their internationalization. However, through our case studies, it is revealed that they have technological advantages, manager's international experience, network and other factors to build various business relations with various MNC. In other words, we can insist that they establish their own business model to enter the foreign market including new developing countries such as India. Moreover, they enter so-called next-generation industries such as aircraft and biomedical, by utilizing those business models. Japanese SME manufacturers are definitely required to enter the new markets sooner or later due to the de-industrialization. Hence, the Singaporean experience should be good for Japanese SME manufacturers.

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