Chapter 5

SUPPORTING INDUSTRIES FOR MACHINERY SECTOR IN VIETNAM

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ABSTRACT

This paper addresses the current situation of supporting industries in the machinery sector in Vietnam, particularly their development in the automobile and motorcycle industries. Four case studies of local and foreign invested suppliers are used in the paper to show the various types of supplier development in the country. The paper also addresses how the development of supporting industries in the machinery sector in Vietnam indicates new factors and trends in industrial development in developing economies.

INTRODUCTION

Supporting industries, which are known as industries that provide material and component parts for assembling industries, play an important role in industrial development in developing economies. They are considered to be the root of industrial development. The development of these industries by a host country provides foreign assemblers with favorable conditions to set up their own production systems with a high level of efficiency and a global competitive advantage. Supporting industries provide local manufacturers with the opportunity to incrementally increase their internal production capability, to join production systems of multinational companies, as well as global production systems. Building supporting industries by promoting local supplier development and attracting foreign parts and component producers has become an important strategy in developing economies.

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The global economy has undergone significant changes during recent decades, particularly with the onset of globalization and regional integration. Production systems of companies have been enlarged, regionally and globally; new production networks benefit many countries' ability to participate in the world's production network and to develop their industries. The development of such industries has an effect, in turn, on other countries at a faster and wider pace.

Compared to other countries in the region, Vietnam is late in developing its economy, which started to emerge in the early of 1990s. Foreign direct investment (FDI) in Vietnam began after the government policy change in 1991 and has rapidly become an important power for its economic development, especially its industrial development. The role of FDI is significant in the machinery sector, which includes a range of products from agricultural tools to motorcycles, cars and even ships. The development of machinery industries in Vietnam is consistent with the development of supporting industries, which in many sectors have undergone remarkable development over the recent decade.

This paper addresses the development of supporting industries for the machinery sector in Vietnam. Section 1 of the paper reviews concepts and roles of supporting industries in the economic development of developing economies. In Section 2, two important machinery industries in Vietnam, i.e. automobile and motorcycle industries provide the main focus for analyzing the development of supporting industries. Section 3 contains four case studies of suppliers in Vietnam, and concluding remarks are offered in Section 4.

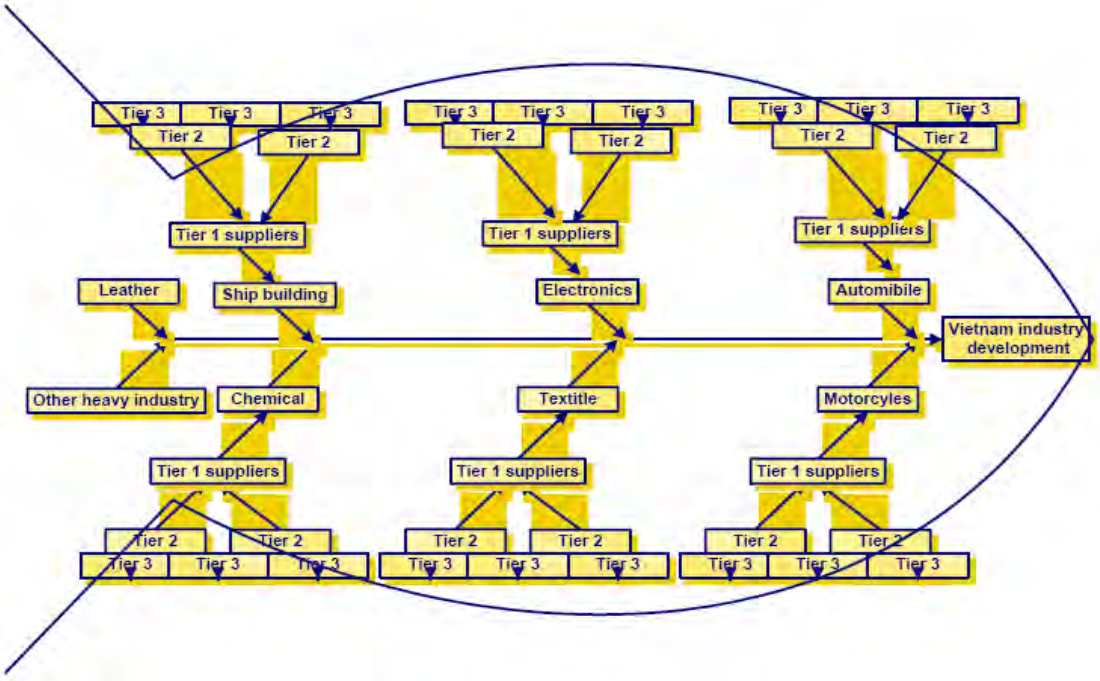
1. OVERVIEW OF SUPPORTING INDUSTRY

1.1. Concepts

In the traditional understanding of the term, a supporting industry is a system of production that provides inputs for the final product assembling industry. To have an industrial product, we need to have a production process with many stages, with the participation of many manufactures. The starting point is raw materials which are then

refined by different production processes to become input for component production. Components include various levels, from simple separated ones to sub-assemblies, which are assembled for completed products. In today's modern production, most of component production processes occur outside of assemblers' factories. All component producers for an industry are grouped to become a supporting industry (Figure 1).

Figure 1: Supporting industries for separated sectors



Source: Ngo, 2008

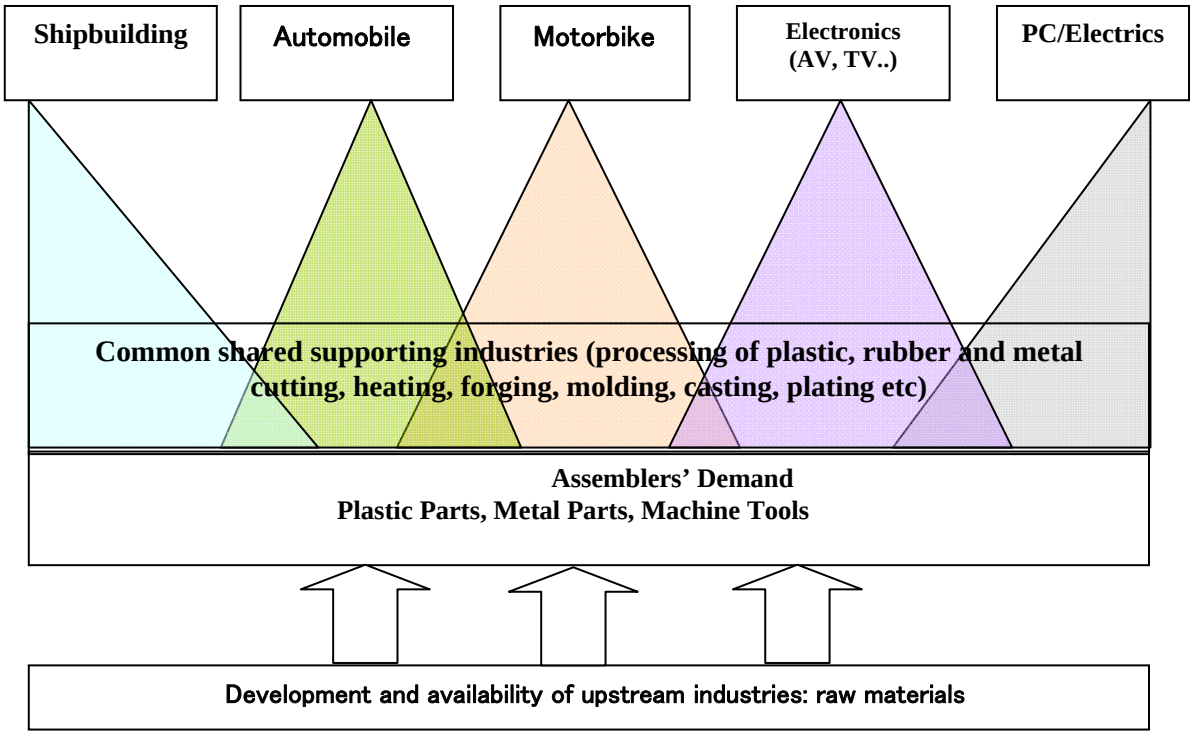
A typical example of a supporting industry can be seen in the automobile or motorcycle industries. A product, such as an auto sedan, is built by assembling about 40,000 different component parts a motorcycle is assembled from about 500-1000 different parts. All of these components are made from different materials, such as metal, plastics, rubber… Nowadays, no manufacturer produces all of these components; instead, most are sourced from outside, from a large network of component suppliers.

Outsourcing allows industries to optimize the whole production process. The buyers outsource to reduce investment costs, divide risk among various manufacturers,

and especially to take advantage of the technological capabilities and creation of component parts suppliers. From seller's perspective, the development of open production systems and supporting industries brings a wider customer base, increases specialization and technology, and enhances productivity. The development of supporting industries is vital for core industries development.

The production specialization of suppliers allows them to offer different products across industries. For example, a mechanical component producer can provide its product to automobile, motorcycle, ship building assemblers or even to electronic producers, just as a mold and die producer can similarly become a supplier for various industries. They are common suppliers for different core industries (Figure 2).

Figure 2: Common supporting industries



Source: Adapted from (K.Ohno and J.Mori, 2005)

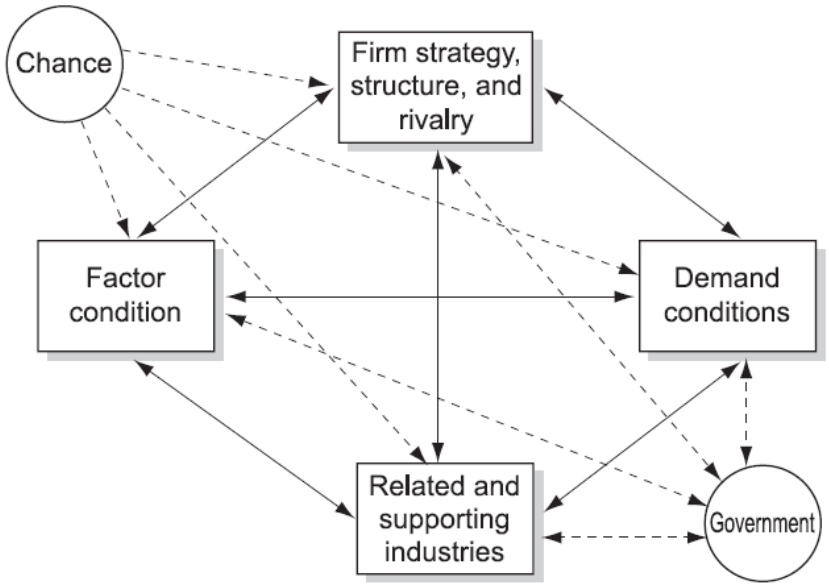
In the production processes of different industries, there exists a layer of manufactures who provide components for various industries. Production specialization

widens the concept of the supporting industry as *a separate industry*, building the fundamentals for industrial development in general. This concept of the supporting industry was initially developed in Japan in the 1980s, before being applied in various developing economies (Nguyen 2007). This paper, however, uses the concept of the supporting industry in its narrow concept, i.e. a supporting industry for a specific core industry.

1.2. Role of supporting industry in development of developing economies

In the model of the competitive advantage of companies, the supporting industry is considered as one of the critical factors building competitive advantage of firms (Porter 1990). In the famous Diamond model (Figure 3), the supporting industry, aligned with the other three core factors of demand, namely a firms' strategy, factor conditions and government, decides the competitive advantage of an industry in an economy, specifically, and the competitive advantage of a country in general.

Figure 3: Diamond Model



Source: Porter, M.E. (1990: 127)

Having this role, supporting industries in developing economies are defined as an important factor in attracting foreign direct investment, which is considered to be critical for the growth of developing economies. When protective tariffs are gradually removed, international competition becomes a main consideration of foreign companies when deciding on investing abroad, especially in today's globalization. Foreign producers pay more attention to the development of supporting industries in host countries. Some decades ago, host country incentives had a strong effect in attracting foreign investment. But today, the competition among developing economies to attract FDI has led to an incentives race. As result, incentives for investment are fading out (Narula and Dunning 2000) and the development of supporting industries is becoming more important. While foreign investment is the vital power for the economic development of developing economies, supporting industries have themselves become important incentives for attracting it.

In the long-term growth of developing economies, building supporting industries is one step in building the industrial sector. The development process of a developing economy goes along with the process of capability building of the country, which includes several steps, from simple assembling, supporting industry development, production and product improvement to innovation (Ohno 2005, Pham 2007). Building supporting industries allows developing economies to obtain technology, and companies to accumulate and mobilize this resource in their development.

2. SUPPORTING INDUSTRIES FOR AUTOMOBILE AND MOTORCYCLE INDUSTRY IN VIETNAM

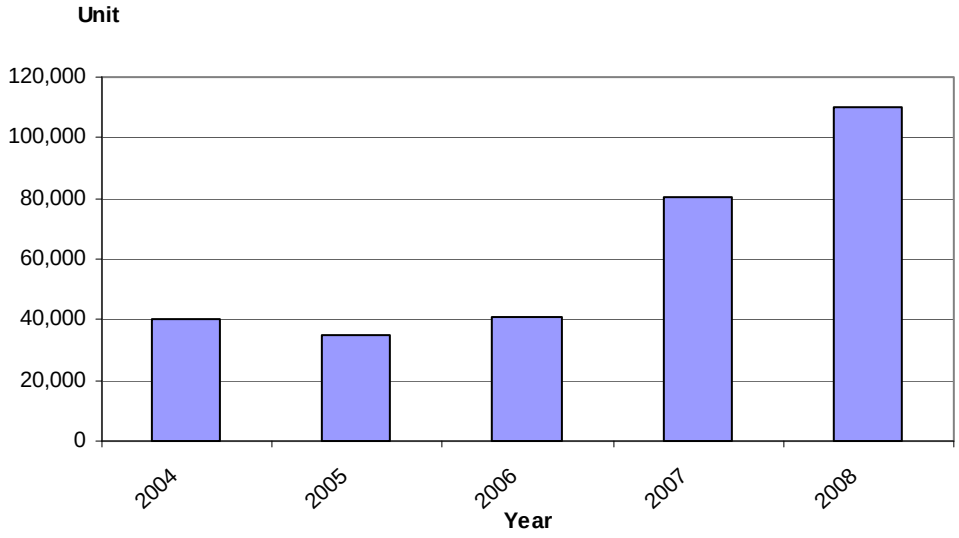
In mechanical industries of Vietnam, automobile, motorcycle, shipbuilding and agricultural machines production are often mentioned. Among these, the motorcycle and automobile industries attract much attention when comparing the development of Vietnam with other ASEAN economies. These two industries need large supporting industries, with many tiers of suppliers, a high level of international competition, and require technologies from medium to high levels. This paper takes the two aforementioned industries as its main focus.

2.1. Supporting industry for automobile industry

2.1.1 The development of automobile industry in Vietnam

In comparing automobile industries in ASEAN region, Vietnam's is still very young. With car sales of about 110,000 units in 2008, Vietnam's automobile industry is still at the starting point; however, automobile industry in Vietnam is developing at a high speed, particularly in 2007 and 2008 (Figure 4).

Figure 4: Automobile sales in Vietnam (2004-2008)



Source: Created by the author based on the data of the Vietnam Automobile Manufacturers Association (VAMA). This data excludes sales of several non-VAMA pure Vietnamese automobile manufacturers, whose products are mainly trucks and bus.

The sale of automobiles in Vietnam is still tiny in comparison to those in other ASEAN countries, such as Thailand and Indonesia. Toyota is the largest automobile manufacturer in the country, but it sold only 25,000 units. This amount is far from the level necessary to allow a company to invest for large-scale production; however, with a potential market of 85 million people, most of large automobile producers in the world have entered the Vietnamese market.

2.1.2 Localization of component production

Fifteen years after the first automobile producer entered Vietnam, despite many stimulating policies for local production, the localization of component production has happened slowly. According to the research of Nguyen (2008), the maximum localization ratio of Vietnam is only about 40% for bus and truck production.

Table 1. Local Content Ratio of Automakers in Vietnamese Auto Industry in 2006

	Automobile companies	**Types of cars**	**Local content ratio (%)**
JVs	Toyota Vietnam	Passenger cars, minibus	15-25
	Ford Vietnam	Passenger cars, pick-up, minibus	6.45
	Mitsubishi Vietnam	Passenger cars, truck	10-14
	Isuzu Vietnam	Passenger cars, truck, pick-up	12
	Vietnam Suzuki	Passenger cars, truck, van	10
	Daewoo Vietnam	Passenger cars, bus	8
	Mercedes-Benz Vietnam	Passenger cars, minibus, bus	1.5
	Honda Vietnam	Passenger cars,	23
	VMC	Passenger cars, truck	12
	Hino Vietnam	Truck	2.06
	Daihatsu Vietnam	Passenger cars, truck, van	4
	Mekong	Passenger cars, pickup, truck, minibus	4.6
PVCs	Samco	Truck, bus	40
	Vinamotor	Truck, bus	40
	Veam	Truck, bus	40
	Vinacomin	Bus	35
	Vinaxuki	Truck, bus	60
	Truong Hai	Truck, bus	40

Note: - JVs: Joint Venture Companies; PVCs: Pure Vietnamese Companies

- Local content ratio includes both in-house production and local outsourcing. For in-house production only, the processes of car body welding, painting and assembling account for 12% of local content ratio.

Source: Nguyen 2008

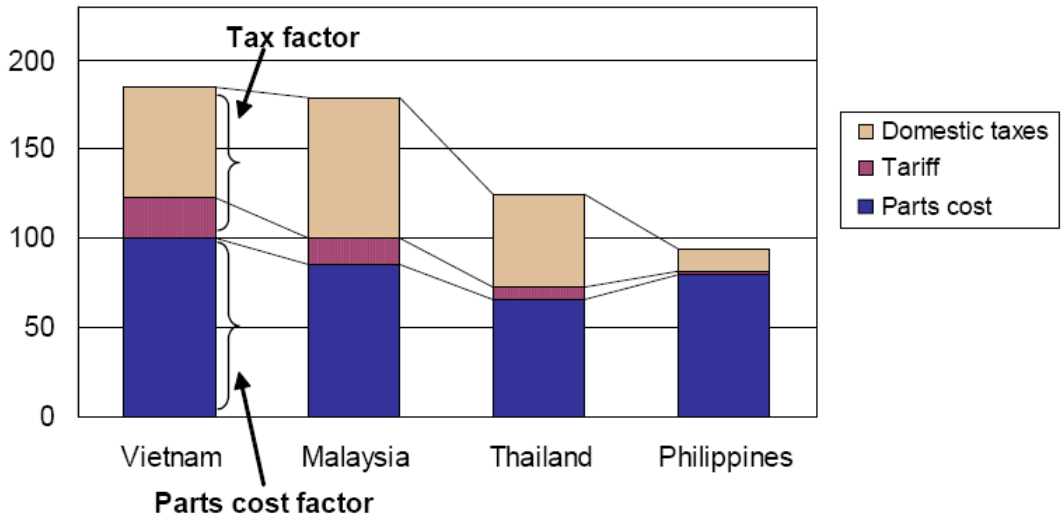
Meanwhile, for under-9-seats car production, this ratio was less than 25% in 2006 (Table 1).

In addition to a remarkable rate of in-house production, car JV manufacturers are now outsourcing a limited amount of locally produced parts: seat sets, door console box, quarter trim, spare-wheel carrier, separator bar, wire harness, tool set, jack handle, alpine radio, manual antenna, battery, exhaust pipe, side members right hand/ left hand, roof side inner, wheel house inner & outer, floor panel, fuel & brake tube, instrument panel reinforcement bar, sensor assy, accelerator pedal, break oil pipe, seat ankle, mudguard, and air bag (Nguyen 2008). Among joint-venture producers, the one with the highest localization ratio has only 9 component suppliers, mainly Japanese and foreign suppliers, such as Thai or Malaysian companies.

PVCs have a higher localization ratio with components such as interiors, tires, tubes, batteries, air-cons, shock absorbers, antennas, leaf springs, coil springs, lamps, wire harnesses, seats, breaks, mufflers, bearings, technical rubber parts, and plastic parts (Nguyen 2008). Some of these companies have widened their component sourcing system by developing component production within their corporation, calling for joint-venture in component production with automobile component producers from Korea or China.

Figure 5: Automobile Cost Comparison in 2004

(Vietnam's parts cost = 100)

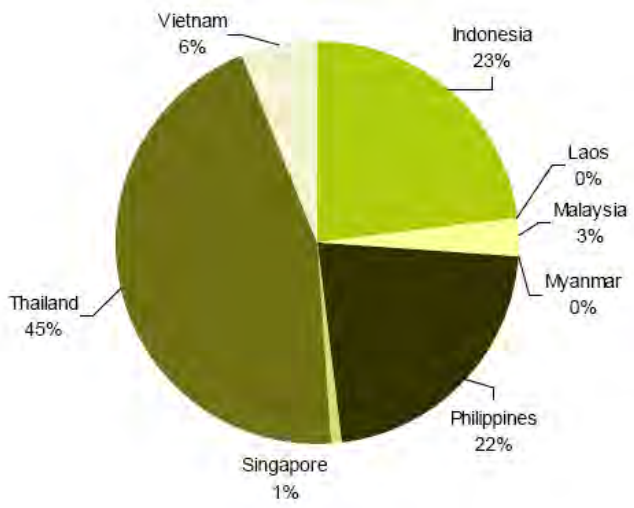


Source: VDF estimate for a typical Japanese car model.

Two main reasons for limitations in the development of supporting industries in Vietnam are the small scale of the automobile industry and the characteristics of automobile component production itself. According to many automobile producers, the market scale needs to reach hundreds of thousand units to achieve have high productivity. However, the scale of Vietnam's automobile market is much lower than this requirement. The highest sales rate for a product model is in the tens of thousands. This scale does not provide incentive to automobile producers to concentrate on large-scale production and to build a large supporting industry in Vietnam. Although cost for component parts of automobiles in Vietnam is higher than in other countries (Figure 5), importing component from abroad is still more efficient, importing component from abroad is still more efficient.

With regard to automobile production characteristics, the common trend is towards global specialization; component production is not scattered, but is often concentrated in specific countries and regions. In the ASEAN region, Thailand has been a component production base for several decades, and other countries, such as Indonesia and Philippines, are also large-scale component production bases (Figure 6). Compared with Thailand or other countries in the region, Vietnam is a latecomer, and the development process of the automobile industry requires time.

Figure6: Japan auto parts import from ASEAN countries in 2005



Source: PWC, 2007

According to a PWC report in 2007, automobile component exports of Vietnam to the United States accounted for only 0.03% of the total component import value to the United States. Meanwhile the export value of the ASEAN countries to the United States was US$885 billion, and accounted for 9% of the total import value to the United States.

2.2. Supporting industry for motorcycle industry

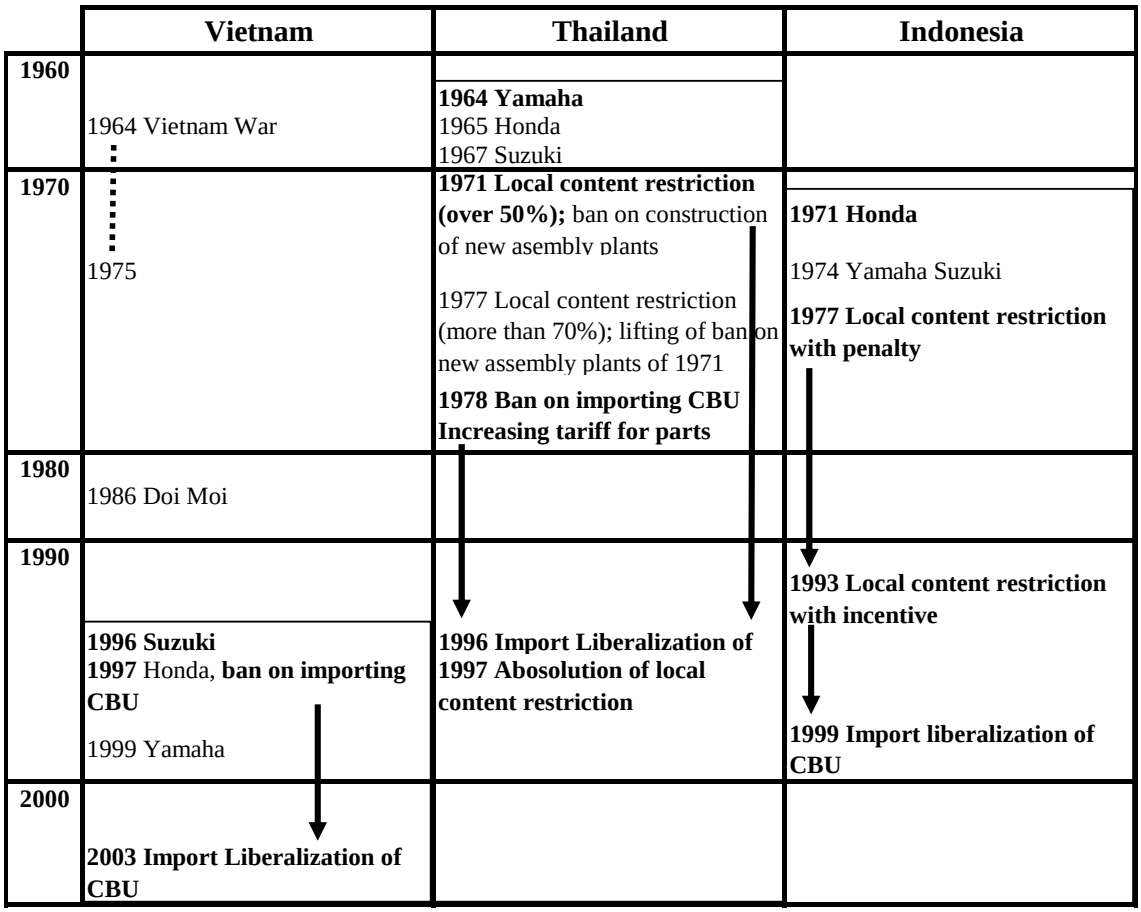
2.2.1 The development of motorcycle industry in Vietnam

Different from the automobile industry, the motorcycle industry in Vietnam has experienced dramatic development in recent years, along with the development of local component production. Since 1994, when the first motorcycle assembler, i.e. a Taiwanese company, entered Vietnam, followed by Japanese motorcycle assemblers in 1997-1999, the localization ratio increased; to about 80% in 2008. In the ASEAN region, the countries with a longer history of development, Thailand and Indonesia, took about 20-30 years to reach this ratio. Counting the time of import liberalization of completely built units (CBU) as the signal for maturity of a motorcycle industry, it took only 6 years for Vietnam from the time that its first assembler started operating, while it took 30 and 25 year in Thailand and Indonesia, respectively (Figure 7).

Another significant difference in the development of motorcycle industries in Vietnam and those in Thailand and Indonesia is the role of foreign component parts suppliers. In Thailand and Indonesia, the power behind their motorcycle industry development is Japanese motorcycle producers, i.e. Honda, Yamaha and Suzuki. These companies have established their own production and subcontracting systems, with close relationships. Meanwhile, in Vietnam the development of its motorcycle industry in the late 1990s and years 2000s showed the significant role of Taiwan, Chinese and Korean investment. The Taiwanese producers were the first entrants in Vietnam's motorcycle production. Then, in the late 1990s, due to the influence of the motorcycle industry in China, Vietnamese motorcycle assemblers and component parts producers emerged and existed side by side with foreign invested companies. There exist two kinds of production systems in Vietnam: One is the production system of Japanese

Figure 7: History of Motorcycle Industry of Vietnam, Thailand, Indonesia

(Arrows indicate duration of local content restriction or import ban)



Source: Mishima, 2005

companies, with an integrated model; the other is that of Vietnamese companies following the modular model (Hoang 2005). The production systems of Vietnam have competitiveness in low cost, especially in the early 2000s, when Vietnamese companies accounted for 70% of the total market. This phenomenon has not been seen in other countries, such as Thailand and Indonesia, where motorcycle industries had a longer development time and had not been influenced by the newly emerging economies in the East Asia. It was that new context, when the motorcycle industry was developing in Vietnam, that led to the rapid development of supporting industries in this field.

2.2.2 Localization and supporting industry development

The development of motorcycle production in Vietnam was accompanied by the development of local suppliers. Before 1999 the number of suppliers was about 30-40, which serviced Taiwanese motorcycle assemblers and newly arrived Japanese Suzuki and Honda. Since 1999, due to the Vietnamese government's policy of localization, which aimed at heightening the value of local production in completed motorcycles, component production in Vietnam rapidly developed. In 1999 only about 20-40% of components were produced in Vietnam, but in 2005 this number passed 70% in both foreign direct invested (FDI) and local Vietnamese motorcycle assemblers (Table 2). Noteworthy, besides the suppliers form Japan, who come to Vietnam to support Japanese assemblers, there are numerous motorcycle component producers from Taiwan, Korea and China. Along with some local newly-emerging companies, some of these firms became suppliers to Japanese assemblers. Besides this, Taiwanese, Korean and local suppliers have also aggressively carried out reverse engineering and modifying motorcycle components provided to local assemblers.

Table 2: Local content rate of different assemblers 2000-2005

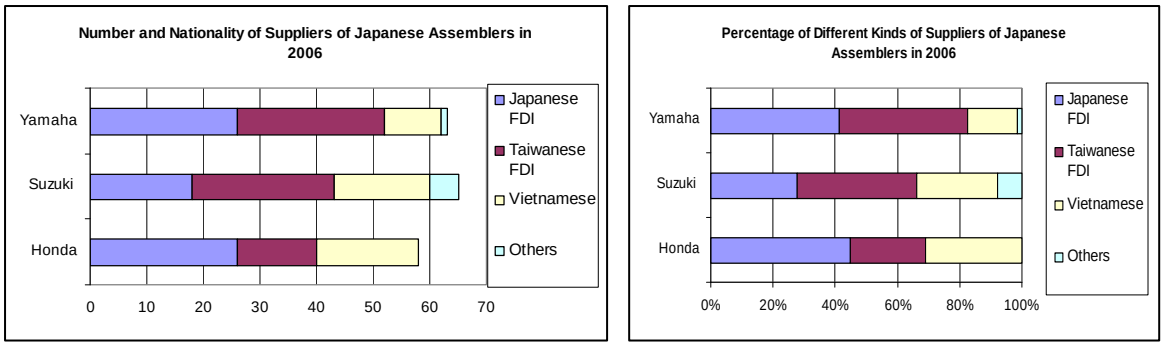
	2000	2001	2002	2003	2005
Honda Vietnam Company	52	51-54	52-66	60-70	70-84
Yamaha Motor Vietnam	50-54	49-55	52-74	n.a.	70-80
Suzuki Vietnam Company	39-45	50-56	n.a.	n.a.	70
Local Assembler A	30	40	60	80	70-80

Source: The author's and VDF's interviews

An important feature in the development of supporting industries in Vietnam's motorcycle industry is the participation of local suppliers, which, remarkably, even supply Japanese assemblers in Vietnam (Figure 8). Another noticeable feature is that some of these suppliers are first tier suppliers. Therefore, just in a very short time these Vietnamese companies rapidly enhanced their technological capabilities to respond to

the requirements of FDI customers. This phenomenon has not been recorded much in Thailand, where tier-1 suppliers are mainly Japanese companies, while local companies are often 2nd or 3rd-tier suppliers.

Figure 8: Number and Percentage of Suppliers of Japanese Assemblers in 2006



Source: created by the author based on interviews

Table 3: Parts Procurement Structure of Japanese Motorcycle Assemblers, March 2007

(Percent of part items)

	In-house	Domestic purchase				Imports						Total
		JP	TW	VN	Other	JP	TH	INDO	MAL	TWN	Other	
All parts	2.6	28.1	28.4	10.6	4.0	2.3	19.5	2.3	0.7	0.7	1.0	100.0
Engine	6.3	14.3	16.1	5.4	0.0	2.7	47.3	4.5	1.8	0.9	0.9	100.0
Exhaust	0.0	50.0	50.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	100.0
Body	0.8	32.0	44.3	9.0	9.0	0.0	3.3	0.0	0.0	0.8	0.8	100.0
Electric	0.0	75.0	7.1	10.7	3.6	0.0	0.0	3.6	0.0	0.0	0.0	100.0
Other	0.0	15.2	24.2	36.4	0.0	12.1	6.1	3.0	0.0	0.0	3.0	100.0

Source: VDF Survey, 2007.

Note: JP: Japan, TW: Taiwan, VN: Vietnam, TH: Thailand, INDO: Indonesia, MAL: Malaysia. These percentages are based on the questionnaire on supply sources of 82 parts conducted on three Japanese motorcycle assemblers in Vietnam (see Appendix to Chapter 2). The results are combined over all assemblers. Since each part may contain more than one individual part, and there may be more than one supplier for each part numbers in the table are not proportional to the number of individual parts or their value.

Regarding the types of components of different suppliers, engine related components are mainly imported from Thailand, mainly from Japanese affiliates in Thailand, and from Japan. Meanwhile, other components, which have a lower technological requirement, are purchased from local suppliers (Table 3). However, there still exist several local suppliers who are producing engine related components, such as engine shafts and cylinders for Japanese companies. However, the number of these companies is still limited.

Besides the role of Japanese motorcycle producers, the development of motorcycle production in China, Taiwan and even Korea significantly influenced the development of supporting industries in Vietnam (Hoang 2005). The scenario was that from the beginning, Chinese low-priced motorcycles penetrated the Vietnamese market and led to the emergence of local motorcycle market in the late 1990s and the early 2000s. The next stage was competition between more than 40 local assemblers and 4 FDI assemblers, following a change in government policies about localization in 2000-2004, which roused the development of supporting industries, including local and Taiwanese, Korean, Chinese and Japanese suppliers. The supporting industries formed rapidly in a short time to replace imported components.

Due to changes in the business environment in Vietnam in recent decades, a variety of suppliers developed in the machinery industry in Vietnam. The next session analyzes four typical models of supplier's development in Vietnam.

3. FOUR CASES OF SUPPLIERS IN MACHINERY

3.1. Supplier A

Supplier A is a member of a Vietnamese state-owned corporation in the machinery industry. The company was established in the 1960s and is still a state-owned company. The main technologies used in supplier A include casting, forging, heating and mechanical processing with high-specification tools. Currently, the company has more than 1000 employees. The products of supplier A include cylinders, axe pistons, gears,

and shafts. In addition to products for the supporting industry market, the company also has their own completed products, such as gear boxes and some kinds of agricultural machines. However, products for motorcycles account for 80% of the company's total sales. Honda is the main customer of company A, and this supplier also has a subcontracting relationship with other Japanese motorcycle producers. Two years ago the company started receiving orders from overseas customers and is now increasing the portion of its exported products.

The development of supplier A (Table 4), especially since 2000, is consistent with the development of foreign corporations invested in Vietnam, particularly Honda. Before 1998, when the company was a small factory, and although it had a labor force with good technological capabilities, it had lower productivity. The main reason was its management system, particularly the fact that its production management was less effective.

Table 4: The development of supplier A

	Business condition	**Firm development**
Before 1998	Produce agricultural machinery and parts	Good labor force, but not good management
1998 – 2001	Start subcontracting with Japanese FDI (Honda …)	Significant improvement in production technology and management
2002 – 2006	Japanese FDI rapid development	Expand production, product an improve management
2006 – now	Global integration development in Vietnam	New customers and exports

Source: Created by the author's interviews

Supplier A has significantly improved since the late 1990s, after having a subcontracting system with Japanese companies, and especially after having a contract from Honda. Its subcontracting relationship with Honda includes technology transfer, and production management cooperation. The company gradually adopted and built up its own production system, following the model of Japanese manufacturers.

Technologies were transferred through dispatched engineers from Honda. In the early stage of subcontracting, the dispatching time was 2-3 months. Subsequently, when the company had its own technologies, the dispatching time reduced to some days. Since 2002, after the first stage of striving to respond to its customers' requirements, the company has rapidly enlarged its production capacity. The company has oriented itself to foreign markets since 2006.

The development model in supplier A is in the traditional model of firms in developing economies. By participating in a FDI subcontracting system, these firms enhance their technological capabilities and expand internationally. This process starts by improving production technologies, then moving to improve products before they have the capabilities to design and create new products. In Vietnam, numerous suppliers were developed by this model; especially in the industries oriented toward local markets.

3.2. Supplier B

Supplier B is a private machinery company, founded in the 1960s as a motorcycle repair workshop. A long time working in repairing motorcycles helped the founders accumulate experience and technologies related to motorcycle engine parts. The owners decided to move to component parts production in1992, with cylinder products for the after-sale market. In 1995, when the first Taiwanese motorcycle assembler started operating in Vietnam, supplier B had subcontracts from the assembler and became a supplier for the assembling market.

Until the late 1990s, when the local motorcycle market boomed, the need for motorcycle component parts dramatically increased. Supplier B expanded its product line to more than 50 kinds of products, from engine related to peripheral components. Its factory has been enlarged from 2,000 to 20,000 square meters and its employees increased from 70 to 400 in 2004 and to 450 in 2008. Since 2007, the company has new automobile spare parts products.

Table 5: The development process of supplier B

	Business condition	Firm development
Before 1994	Small repairing workshop	Technology accumulation of founders
1994 – 1998	Enter motorcycle component production	Mobilize experience for after-sale market to assembling market
1998 – 2002	Rapid expansion of local assemblers	Rapid development of production, product, new product development (by imitation)
2002 – now	Severe competition	Back to after-sale market, new market automobile (after-sale)

Source: Created by the author based on interviews

The development of supplier B (Table 5) is based on the process of self development, actively seeking and learning technology. During the early period of the company's formation, technological accumulation of the company's founders was the only key for its development. During the period of 1994-1998, there was a dynamic shift from the spare parts market to the component market, which required significant effort to develop its production system. The supplier developed briskly in 1998-2002 by diversifying its products. To do this, the company has to learn and apply many new production technologies. Technologies were obtained from its partners in China and Taiwan. Even after 2002 when the low-priced motorcycle component part market was narrowed down, supplier B kept focusing on finding new products and improving existing products.

The development of supplier B shows the importance of the local market to the formation and development of suppliers. The development of a low-priced motorcycle market in Vietnam was fundamental for supplier B to develop production and learning technology. An emerging local market creates opportunities and motivation for both local suppliers and assemblers, when multinational corporations have not firmly established their system in the new investment destination.

The development of supplier B has also shown the role of technology from vicinity countries. Different from company A, when technologies are transferred though a close subcontracting relationship with a multination corporation, supplier B obtained

knowledge by actively seeking, learning and receiving its technological transfer by purchasing machinery and factory visit to small- and medium-sized companies in other developing countries, especially Taiwan and China.

Normally, a development model like that of company B is rapid over a short-term when the market emerges. However, the companies following this path need to face challenges of accumulating technologies which need a longer timeframe, such as production or quality management. Dynamics in business can allow companies to swiftly adopt new products and sustain their development; however, this shift also needs to be parallel with accumulating new technologies and improving the capabilities of the company.

3.3. Supplier C

The above two models of supplier development are those of local firms. In the supporting industry for machinery in Vietnam, the other important players are foreign direct invested companies. Two models of these companies are seen in the cases of suppliers C and D.

Supplier C is a component parts producer in the Honda Group. Its factory in Vietnam was established following the opening of Honda Vietnam in 1997, and the first customer of supplier C was Honda Vietnam. Since then, the company has expanded its market to other Japanese assemblers in Vietnam, but with a small amount of products. Supplier C has developed rapidly since 2002 and has started exporting indirectly, i.e. through the export products of Honda Vietnam. Since 2005 the company has directly exported its products, mainly to Honda's affiliate factories in ASEAN and the United States. The company has had high growth in recent years and the different types of its products have increased.

The development of supplier C (Table 6) is similar to other typical FDI companies (Shusa 1989). In the early stage of development, these companies receive production system transfers from headquarters; followed by the accumulation of production related technologies, improved production efficiency, product quality and

Table 6: Performance of business of supplier C in 2006 – 2008 (and plan to 2010)

	Sales Increase (%)	Export in Sales (%)	No. of Type of Product
2006		13	4
2007	166	18.2	5
2008	116	22.8	6
2009	112	40.6	8
2010	142	44.2	

Source: Created by the author based on interviews

subsequent move towards exports. Companies supplying component parts for the host country market become global suppliers, providing to corporations worldwide. Some support from the government can be used during this process, particularly in human resource development. AOTS programs for training employees are examples.

The model of supplier C is typical for suppliers who are in a foreign corporation's group. Along with assemblers, these companies enter the markets of developing economies and build global production bases there. The penetration of this group of suppliers is meaningful not only for building supporting industries for the local needs of host countries, leading host country industries to global production networks, but also in having a spill-over effect to local firms. The significant contribution is through turnover labors and subcontracting with local firms.

3.4. Supplier D

The last case study is the model of small and medium sized enterprises (SME) investing in Vietnam and participating in supporting industries in the host country. Factory D in Vietnam, which was established in 2005, is one of several of the company's factories in the world: 2 in China, 1 in Thailand, 1 in Indonesia, 1 in Philippines, 1 in Vietnam, and 1 in America. Supplier D's products are precision functional products, such as valve springs, ABS sensor rings, and wave springs, (automobiles); digitronic products, such as wire springs and multi-forming parts, (electronics); and devices, such as adapters and optical transceivers (communications). Supplier D (in Vietnam) has 370 employees, and

its customers are mainly FDI companies in Vietnam (about 80%) and export (about 20%). After a few years operating in Vietnam, the factory runs efficiently.

Regarding Vietnam as good location for building a production base, supplier D concentrated on exploiting the country's low labor cost in its early stage of development; it then focused on building its technological capabilities and worker' skills in particular. According to supplier D's managers, for its long-term development the company needs to have highly skilled labor. To have a good worker, it takes about 7 years at the factory in Indonesia, 4-5 years at the factory in China and about 3 years for workers in Vietnam. To have highly skilled labor may take the company more than 10 years, but these laborers are critical for sustaining the competitiveness of the company, as well as its capabilities to improve and innovate products.

SMEs in Japan as well as other countries, such as Korea and Taiwan…contribute significantly to supporting industries in Vietnam. SMEs often have limited resources, so they tend to be slower to invest abroad. Only when SMEs consider that the risk for investing in a new destination is not so high will they decide to invest. However, since the number of SMEs is very large, when there are positive signs from an investing environment a considerable amount of them will take that step and invest. Furthermore, the development of SMEs in Vietnam has had a strong effect on building industrial clusters, which can enhance the productive capacity of both FDI and local companies in Vietnam, and attract more FDI.

The trend of SMEs expanding their production systems internationally has been strengthened in recent decades. On the one hand, today's SMEs have more independent technological capabilities and production capacity, so that they are more independent of large corporate production systems. They can have their own products, and participate more in large corporations' new product development. With their own capabilities, they can more easily invest abroad. On the other hand, globalization and the development of global networks push SMEs to invest abroad. The global investment environment is now less risky to SMEs. Supporting industries in developing economies have more chance to host SMEs, such as in the case of supporting industries in the machinery sector of Vietnam.

4. CONCLUDING REMARKS

The development of supporting industries for the machinery sector in Vietnam suggests new trends and opportunities for industrial development in late developing economies. Although the critical role of FDI for industrial development remains, the effects of FDI are varied, based on their models of production. FDI companies focusing on local markets foster the formation of local production systems, and although the timeframe for building these systems has been shortened, these processes still take time. Meanwhile, FDI focusing on global markets can have the effect of attracting additional FDI and developing industrial clusters. Companies with this kind of FDI ask for favorable investment conditions from government policies.

The development of global production and technologies leads to new chances for building supporting industries, as well as an overall industry. While developing economies have to compete to attract FDI, foreign firms have to compete to enter new developing economies to sell technologies, set up production bases and gain the advantage of being a forerunner. This trend leads to more dynamic policies for industrial development in developing economies. Nowadays, many traditional policies to foster local production, such as local content requirement, have become less effective. Instead, creating an environment to foster competition for FDI from different countries with different models of production can become a new tool, since it has significant influence on the development of various production networks and suppliers in the host country.

In recent years, the development of supporting industries for the machinery sector in Vietnam is noticeable, but it was only a first step for its development. Since building supporting industries is vital for its industrial development, the country needs more effort and favorable policies to foster these industries. Support from the government on taxes, capital, land, technologies and human resource development is important. Meanwhile, the competition among developing economies to develop supporting industries creates additional challenges for building these industries in Vietnam.

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