Chapter 6

The Process of Improving Technology and the Perspective of Domestic Suppliers in the Motorbike Industry in Hanoi

Truong Chi Binh
Institute for Industry Policy and Strategy, Vietnam

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6
The Process of Improving Technology and the Perspective of Domestic Suppliers in the Motorbike Industry in Hanoi

Truong Chi Binh

Abstract

In the manufacturing scene in Vietnam, the motorbike industry is assessed as the most developed one in recent years. Japan, Taiwan and China are the main sources of foreign direct investments (FDI) in the industry with Hanoi and neighboring areas as the main focus. The development of the motorbike industry has significantly contributed to the establishment of domestic enterprises involved in manufacturing and supply. Enterprises with 100-percent Vietnamese capital have been able to manufacture and supply technology-demanding components to multinational corporations (MNCs) such as Honda, Yamaha, Piaggio, and VMEP in Vietnam and also export these to their parent companies. However, there are only a few enterprises that can satisfy the standards of multinational assemblers to be able join their production network. The research of these enterprises is a practical lesson for developing the motorbike industry as well as considering the development perspective of supporting industries in Vietnam.

1. INTRODUCTION

In the manufacturing scene in Vietnam, the motorbike industry is assessed as the most developed one in the last years. Japan, Taiwan, and China are the main sources of FDI with Hanoi and neighboring areas as the main focus. The development of the motorbike industry has significantly contributed to the establishment of domestic enterprises involved in the manufacturing and supply aspects. Enterprises with 100-percent Vietnamese capital have been able to manufacture technology-demanding components needed by MNCs such as Honda, Yamaha, Piaggio, VMEP in Vietnam and also export these to their parent companies. However, there are only a few enterprises that can satisfy the standards of multinational assemblers to be able to join their production network. The research of these enterprises is a practical lesson for

developing the motorbike industry as well as for considering the development perspective of supporting industries in Vietnam.

Based on the results of the research of ERIA in 2007 and 2008, this research focuses on finding some key points of firm innovation in the motorbike industry in Hanoi. In particular, it attempts to determine and analyze: (1) the objectives and motivation for innovation and upgrading of firms, including the technical requirement aspect such as quality, delivery time, environmental issue, and design, and the economic requirement aspects such as cost reduction, new client, new market, and new product; (2) the level of innovation (either incremental or radical manner) in terms of the international or domestic market and within the firm or outside the firm level; (3) the strategies of firms that will create efforts for innovation activities such as investments for manpower, new technology and machines, and R&D cost, business linkages, utilization of internal sources, and external support; and (4) the key factors for the success of firm innovation activities.

Research Question

1. How do domestic enterprises that are successfully supplying for MNCs develop? What are their obstacles and successes?
2. What is the role of FDI suppliers in the motorbike industry?
3. What is the development perspective of domestic suppliers in the motorbike industry?

Hypothesis

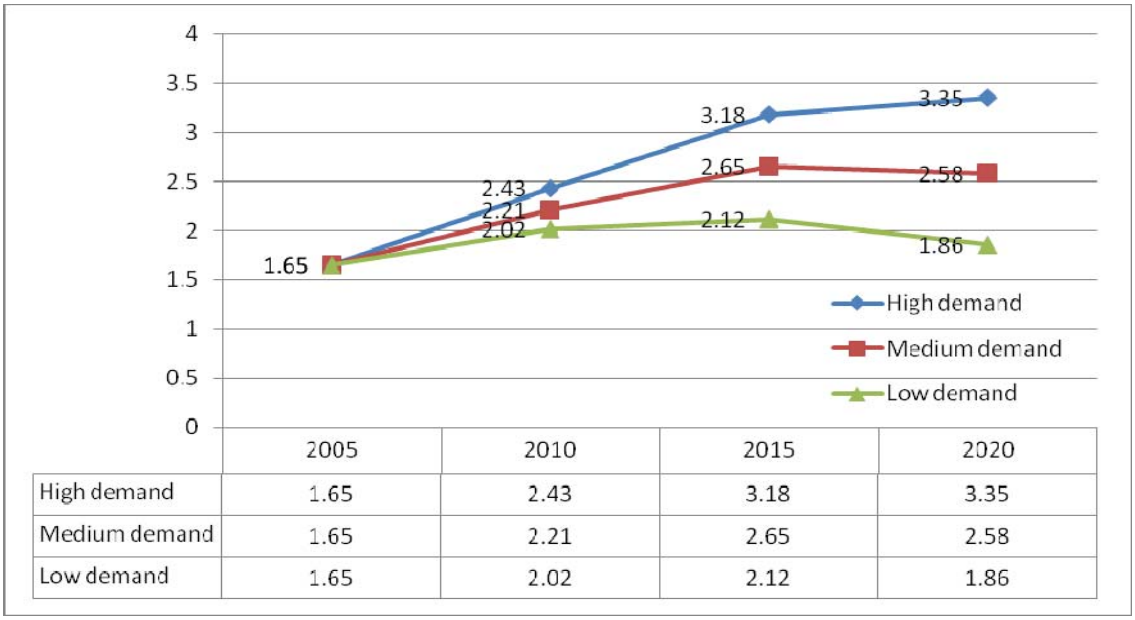
It is hypothesized in the study that the backward machines and the lack of investment capital of many industries hamper their ability to supply to MNCs. In this regard, several questions are also worth answering. Is the problem about upgrading product quality a technological issue? How do enterprises gain success in this field? What are the implications of problems that relate to improving manpower? Whenever

enterprises that have achieved success in this field continuously upgrade their technology and the quality of their products, can they supply for higher technology industries such as electronics, home appliance and automotive.

2. BACKGROUND: AGGLOMERATION AND PRODUCTION NETWORKS FOR UPGRADING AND INNOVATION

2.1. Current Conditions of Production Network for Upgrading and Innovation

Motorbike is a popular means of transportation in Vietnam. Vietnam is considered one of the biggest countries all over the world that manufacture and use motorbike. Having a large domestic market, it is expected that this market has a high level of growth in Vietnam.



	2005	2010	2015	2020
High demand	1.65	2.43	3.18	3.35
Medium demand	1.65	2.21	2.65	2.58
Low demand	1.65	2.02	2.12	1.86

Figure 1 Estimate Interior Demand according to Three Levels: High, Medium and Low

Source: The Motorbike Joint Working Group (2007).

Due to the characteristics of growth and the regulations of the Vietnamese

goverment about localization and the large capacity of supply in the downstream market, the supporting industry for the motorbike industry has rapidly grown in Vietnam. Products of Honda, Yamaha, and VMEP, including most of the component details, are manufactured locally. Because of the market capacity, assembly enterprises are encouraged to invest in Vietnam. According to the Ministry of Industry and Trade, the rate of localization has reached 95 percent. Technology transfer is taking place between foreign companies and Vietnamese companies that supply components. The machinery and plastic industries supply for the motorbike industry so they have strong growth steps in the technical, management and labour skills levels. Examples of sucessful supplying enterprises include Tan Hoa mechanics, Dong Anh mechanics, Hanoi mechanics, metallic tool for export, and Ha Noi Plastic. However, many important components and details with high value are still manufactured by foreign suppliers.

Table 1 Number of Enterprises Manufacturing Component and Assembling Motorbike in Hanoi

Unit: enterprise

Order	Type	Year 2004	Year 2006
	Total	**69**	**79**
1	Enterprises having 100% foreign capital	12	18
2	Enterprises jointing venture with foreign companies	4	5
3	Central state enterprises	3	1
4	Local state enterprises	1	1
5	Joint-stock companies having more than 50% state capital	1	3
6	Joint-stock companies having less than 50% state capital	0	1
7	Limited companies having less than 50% state capital	39	37
8	Private joint-stock companies	3	5
9	Private enterprises	3	6
10	Industrial co-operatives	1	2

Source: Statistics yearbook of Hanoi Department of industry.

In terms of specialization level, there are enterprises specializing in the manufacture of one kind of spare parts in Hanoi. However, there are still many enterprises that manufacture motorbike components and spare parts as their secondary products besides

other main products. Big enterprises specializing in manufacturing motorbike spare parts and components in Hanoi are Machino Motorbike Car Company that specializes in manufacturing buffer, clutch and brake, and Thang Long Goshi and Thang Long Machinery that specialize in manufacturing body, rim, and outlet. Beside these enterprises, there are about 100 household-level manufacturers producing the simplest motorbike components and details such as stabilizer, basket, and protection parts.

Table 2 Procurement of Japanese Motorbike Assemblers in Vietnam

	Inside firm	Local procurement				Import						
		Japan	Taiwan	Vietnam	other	Japan	Thailand	Indonesia	Malaysia	Taiwan	other	Total (%)
Quantity of Parts and component	2.6	28.1	28.4	10.6	4	2.3	19.5	2.3	0.7	0.7	1	100
Engine	6.3	14.3	16.1	5.4	0	2.7	47.3	4.5	1.8	0.9	0.9	100
Exhaust pipe	0	50	50	0	0	0	0	0	0	0	0	100
Frame/body	0.8	32	44.3	9	9	0	3.3	0	0	0.8	0.8	100
Electrical	0	75	7.1	10.7	3.6	0	0	3.6	0	0	0	100
Others	0	15.2	24.2	36.4	0	12.1	6.1	3	0	0	3	100

Source: The Motorbike Joint Working Group (2007).

With a combined production capacity of 30 percent, Hanoi and Dongnai are considered the two biggest centers of motorbike assembly in the whole Vietnam. Due to stiff competition and low quality, the consumption of low-priced motorbikes made from spare parts from China has experienced a downward trend in demand. This has quickly reduced the number of local assembling enterprises.

In general, the technical level of enterprises in the motorbike industry in Hanoi is at the medium level. A few are in the advanced level of technology. In general, two kinds of technology levels exist simultaneously.

(1) *Advanced modern technology*: This is typical of enterprises having foreign capital, equipped with modern lines from Japan, use a lot of specialized machines and robot technology, have a production line with a high level of automation and have a strict system for checking and controlling quality. These enterprises have manufactured some difficult product lines requiring a high level of precision such as transmission gears. These products have a large capacity and output, and a high level of quality is maintained.

(2) *Medium technology*: This is typical of local enterprises that mostly use single, backward, asynchronous equipment belonging to many different sources and generations. Most equipment and machines have a medium level of technology from Asian countries such as Taiwan and China. They are processed in many different small equipments that are mainly general purpose machines and lack specialized parts. Their accessories are simple; testers are backward and have a low level of accuracy. The procedure of controlling product quality is weak. Thus, they are only able to manufacture components and details that are uncomplicated. The degree of accuracy is low. Durability is also low and quality is unstable.

The number of machines and technologies used for manufacturing and assembly of motorbikes is large but they are asynchronous. Many enterprises generally invest in

some equipment and machines such as assembly belt, normal processing machine for cutting, and plastic detail extrusion machine. This leads to capacity redundancy but low quality. However, equipment for processing, manufacturing patterns, heat treatment, and surface treatment are lacking in quantity. Equipments like these also have a low technology level.

The total labor force of the motorbike industry in Hanoi as of 2006 is 16,971. It accounts for five percent of the total labor force in the industrial enterprises in Hanoi, which is also bigger by 1.4 times compared with the figures in 2004. On the average, one motorbike enterprise attracts 214 workers, 1.8 times larger than the average level in the Hanoi industrial enterprises. This proves that the motorbike industry has a strong ability to attract more workers than other industries can. The labor force of the motorbike industry in Hanoi, however, lacks experts who are adequately trained in managing enterprise and controlling production process. As production procedures become stricter in terms of requirements in design, adjustment, and operation, the workforce also has to enhance its technical ability, be proficient in multiskilling, and should have a thorough grasp of production processes to satisfy work requirements.

2.2. Government Policy for Upgrading and Innovation

Vietnam's science and technology system is dominated by public agencies of research institutes. Only few of state-owned enterprises (SOEs) have their own laboratories because of the legacies of the planned economy. In the past, the government took the responsibilities for technical change and industrial modernization. About 85 percent of the total R&D budget came from the state budget (UNIDO, 2000). The share of government budget has decreased to around 70 percent of total R&D investment. Government R&D investment has decreased dramatically in the 1990s since the *Doimoi* reform but recovered from between USD 50 and 60 million in 1997 to USD 270 million

in 2005.The small government R&D fund has been fragmented among the various research projects in each research institute and university.

The government research institutes consist of the Vietnamese Academy of Science and Technology (VAST), Vietnam Academy of Social Sciences (VASS), ministry-line research institutes, and local government research centers. Vietnam's direction for these institutes is to enhance their contribution to economic development and to promote the commercialization of research results. Accordingly, Decree 115 declared that government research institutes should be self-financed and should be S&T-based enterprises. As of 2004, there are 40,000 researchers in Vietnam, 14,000 of whom are PhD degree holders and 16,000 have MSc degree.

As one of the two biggest education centers, Hanoi has more than 50 universities and several colleges. However, the R&D activities in the universities have not been paid much attention. The educational system also requires further development to support the S&T system and this can be realized by producing qualified researchers and engineers.

In 2006, the technology priorities identified consist of information and communication technology, biotechnology, new and advanced materials, automation and machinery, energy, food and foodstuff, and aero plane. However, the national priority program is ineffective because of limited involvement of R&D institutes and high-technology firms from overseas and private/public enterprises. Moreover, the weak linkage among ministerial laboratories, national institutes, local laboratories, and universities results in poor performance in R&D.

This weak linkage is a major problem in Vietnam. There is a weak vertical and horizontal coordination between local government and central government in strategy building and priority setting.

Overall, the S&T system has many shortcomings that need to be fixed. FDIs are not strategically and efficiently utilized for technology capacity building of local industries.

SOEs also need to take a leadership role in promoting strategic industries. Additionally, the government does not play a guiding role in S&T for industrialization due to lack of strategies, coordination and sufficient funds. The educational system also does not provide appropriately trained workers for the industry and qualified researchers and engineers for the S&T system.

To transfer from a labor-intensive economy to a capital, knowledge and technology-based economy, it is urgent for Vietnam to develop a proper S&T system to support and promote the industrial sectors. Vietnam should design a comprehensive policy framework for industry targeting, prioritized S&T, focused human resource development, and strategic technology transfer. The key point in strategy setting is to select and focus. The success of building and maintaining a strategy will mostly depend on how determined the government is about its strategy and not so much on the technological aspect.

3. CASE STUDIES

Ten firms were interviewed: two MNCs (Honda Vietnam, VMEP Vietnam), three FDI firms (Taiwan, China, Malaysia) and five local firms (Tan Hoa, Toan Luc, Freewheel and Chain Dong Anh, Export Mechanical Tool Stock Company, Hop Phuong). Most of Vietnamese suppliers are in the metal component manufacturing aspect.

3.1. Honda Vietnam (HVN)

HVN is a motorbike supplier and manufacturer. It has the largest market share in Vietnam. The total capacity of its two factories is 1.5 million motorbikes a year. HVN is one of the biggest factories that manufacture motorbikes in the world. Along with the development of the motorbike industry, HVN continuously increases its rate of

localization and it has now reached a localization rate of 90 percent with 78 of its suppliers coming from Vietnam. Among them, there are 19 enterprises that have officially become suppliers of HVN and are directly taking part in the first supplier class. Examples of these companies include Hanoi Plastic Company and Dong Anh Chain Company. Their number, however, is not high and account only for 24 percent of the total number of suppliers of HVN in Vietnam compared with 59 FDI suppliers. While the number of FDI suppliers has been increasingly rapidly, the number of Vietnamese suppliers has only gradually increased in the last three years.

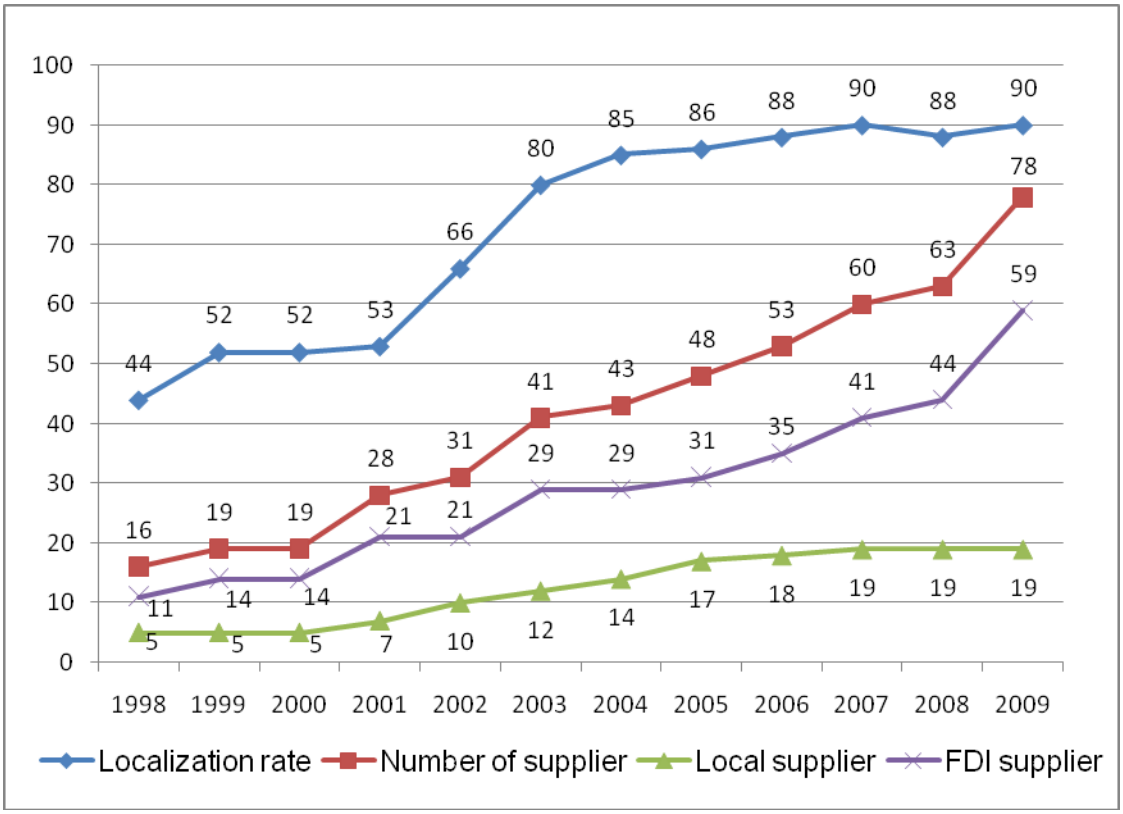
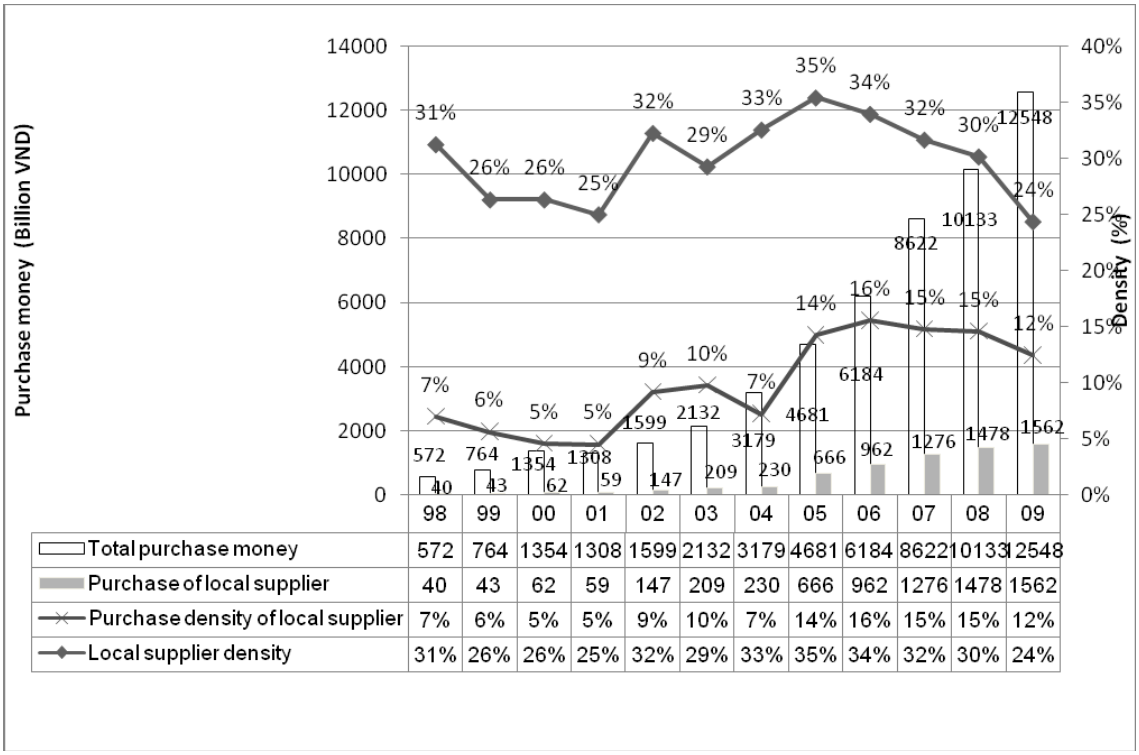


Figure 2 Rate of localization and number of suppliers of HVN

For motor components, the products require a high a degree of accuracy. They are mainly imported from Thailand, while the interior part is mainly from Japanese and

Thailand FDI enterprises. For electric components, 75 percent are supplied by Japanese FDI enterprises. Motorbike body and outlet are mainly supplied by Japanese and Taiwanese FDI enterprises. Vietnamese enterprises mostly supply components that have low technology content. This explains why components manufactured by local suppliers do not have a high value and only account for 15 percent of the total volume of procurement purchased by HVN.



	98	99	00	01	02	03	04	05	06	07	08	09
Total purchase money	572	764	1354	1308	1599	2132	3179	4681	6184	8622	10133	12548
Purchase of local supplier	40	43	62	59	147	209	230	666	962	1276	1478	1562
Purchase density of local supplier	7%	6%	5%	5%	9%	10%	7%	14%	16%	15%	15%	12%
Local supplier density	31%	26%	26%	25%	32%	29%	33%	35%	34%	32%	30%	24%

Figure 3 Total purchase money of HVN and rate of interior suppliers

Source: HVN

HVN's rate of localization of 90 percent is considered ideal and increasing this rate is not necessary. However, HVN still wants to diversify its local suppliers for each kind of component to eliminate the risk of depending on just one supplier for each kind of component or finding other suppliers that are more capable and can supply higher quality components at a cheaper price. In addition, the company continuously changes

its design, provides new motorbike types so the demand of developing new components is very high. According to the assessment of HVN, Vietnamese enterprises are still weak in terms of quality, cost and delivery (QCD) and they have not considered improving in these aspects.

Item	Japanese suppliers	Suppliers having foreign capital (Taiwan)	Vietnamese suppliers	Chinese suppliers
Quality	Good	Good – moderately good	Moderately good-medium	Moderately – Medium
Price(Mold)	1	0.9	0.85	0,60
Good delivery	Good	Good	Good – moderately good	Good – Moderately good
・Development ・Management	・Have ability to develop highly ・Self control in improving quality ・The system for ensuring quality is complete ・New structure/new technology	・Need to improve quality ・Have ability to develop more highly ・Management is better ・Quality system is sufficient	・According to assessment level of customer ・Have a large difference between management ranks and people directly manufacturing ・Analyze the reasons of weak matters ・Management aspect is not complete ・Need large supports if bring the products into the use.	・According to assessment level of customer ・Checking quality in each stage is not strict, so errors still exist ・Management is not complete ・Dependence on the level of leader ・Development ability is not stable

Figure 4 Assess QCD Quality of HVN.

Source: HVN.

3.2. VMEP Vietnam

Vietnamese VMEP Company now has 1,881 workers, which include 40 Taiwanese staff and 1,841 Vietnamese staff. The main products of VMEP are Enjoy (2% of

revenue), Attila (54%), Excel II (2%), Angle EZ(14%), Elegant 100 (6%), and Sanda (22%). VMEP takes the lead in the market share for scooter motorbike manufacturing in Vietnam.

In 1994, when VMEP started to invest in the Vietnamese market, only 12 Taiwanese supporters were investing in Vietnam. Today, there are now 59 FDI enterprises and more than 10 local enterprises supplying body details. Most Vietnamese suppliers are private enterprises. Local Vietnamese suppliers contribute to reducing the production cost which means savings for the company. VMEP usually signs a yearly contract with these enterprises.

VMEP faces many difficulties in looking for good local auxiliary enterprises in Vietnam. The number of auxiliary enterprises for manufacturing components is limited. Importing normal cast iron materials from overseas impacts negatively on the working time. Auxiliary enterprises have a low engineering level, which affects production time. Resources of suppliers are insufficient. VMEP resolves these issues by consulting other companies for suggestions of auxiliary enterprises to tap. The company sometimes finds out auxiliary suppliers via the internet or telephone directory, enterprise associations, locals or fairs, exhibitions, and promotional trade fairs. When choosing suppliers, VEMP considers factors such as product quality, production ability (size), self-design and innovation, delivery on time, reasonable price, level of leaders, and long-term cooperative relationship. In addition, the company also considers factors related to homogeneous product quality, standards about production management, and environmental management. The company focuses on the support for auxiliary suppliers via supporting activities, designs, models, patterns, information support, and introduction about customers. Besides, the company sometimes appoints technical officers to guide, control, train workers for auxiliary enterprises and supply, lend machines and equipment, or support investment capital for auxiliary suppliers. It is

expected that in 2010, the company will expand its supplying capacity for the local market with the supply of input materials (3.4%), metal components (52.6%), electric and electronic components (15.1%), plastic components (20.6%), packaging, cellular, basket, carton (6.1%), and others (2.2%). To improve the ability of Vietnamese auxiliary enterprises; VMEP believes it is necessary to continuously attract FDI in auxiliary enterprises, improve the management level and skills of production workers, and improve the level of innovation and design of enterprises.

To become a company that strongly focuses on innovation and creation, VMEP established an R&D center in Vietnam in 2006. It invested USD 15 million to construct the center. It is envisaged to become a center for motorbike research and development of SYM in the ASEAN region. The planned area totals 300,000 m^2 and it is expected to be completed in 2009. Through this R&D center, VMEP would have the ability to carry out R&D activities and have a single center for testing standardized motorbikes.

VMEP will continuously service the Vietnamese market by focusing on expanding production of scooter motorbikes through innovation. Apart from this, it is involved in environmental causes, social activities, and charitable activities in Vietnam.

3.3. Export Mechanical Tool Stock Company

This export mechanical tool company belongs to the industrial machine and equipment head company under the Ministry of Industry. Its factory is located at 15A Parcel, Quang Minh Industrial Zone, Me Linh, Hanoi. The company manufactures the following products:

- Tools, accessories of motorbikes and cars for big firms such as Honda, Yamaha, VMEP, Suzuki, Toyota and many other local companies.
- Household goods such as grill stove and kitchen tools for export to Western Europe and domestic market in Vietnam.

- Mechanical products and medical equipment

Technical management, production management and technological innovation are pursued by this company. It has an R&D department with 20 engineers and technicians who specialize in designing and developing new products and testing manufactured products according to consumer demand. The department was established in 2002. Information on innovation and improvement is mainly received from customers and sometimes from enterprises involved in the same field or from mechanical enterprise associations.

The company is using technologies such as chemical process, heat treatment and surface treatment that are judged to have passed the ISO 9001:2000 standard certificate. Many products of the company have earned the goal medal awards in trade fairs and assessed as high-quality industrial goods. Many large consignments of the company are exported to Germany, United States, Japan, Eastern Europe, and Western Europe. The growth of the company is evidenced by its increasing revenues. In 2000, before capitalization, the output value of the company was VND 42 billion and in 2006, it increased to VND 165 billion. The yearly dividend interest is from 15 to 20 percent.

The most important customers of the company are Japanese motorbike assemblers in Vietnam such as Honda and Yamaha. By cooperating with these companies that have a strict quality control procedure and advanced production management, the company has built an efficient and effective system of management procedures (such as ISO, 5S), merchandise exchange and inventory management (JIT), and environmental protection. Japanese companies also help the company in coming up with a modern management model and there is regular exchange of information to improve product quality. Cooperating with big companies in Vietnam has been beneficial for the company as manifested by its advanced production level, improved product quality, and ability to export to the overseas market. The company considers its linkage with big companies as

the most effective method of innovation and quality improvement.

3.4. Toan Luc Company

Toan Luc Joint Stock Company was established in 2001. It specializes in manufacturing accessories for bicycle and motorbike. The company now has nearly 300 workers and its main factory is located in Phu Minh Industrial Zone, Phu Dien, Tu Liem, Hanoi.

Initially, Toan Luc was manufacturing pedals for the Thong Nhat Bicycle Factory and the LIXEHA Joint Stock Company. Due to the high demand in the Vietnamese market, the company has continuously innovated its technology and improved its ability to manage and manufacture new strategic products such as motorbike accessories. Today, besides pedals, the main products of the company include wheel bosses, brake pads, rims, and grip handles. Yearly, the company supplies about five million products in the market with the Toan Luc brand name.

From 2003 to 2005, the company has reaped awards given by the Hanoi City People's committee (2003,2004) and the Ministry of Finance and Taxation Bureau (2004, 2005) in recognition of its excellent performance. In December 2005, the company gained the certificate of quality standard ISO 9001:2001.

Toan Luc Joint-stock company is a main supplier of the Vietnamese NISSAN brake manufacturing company and the VMEP of Taiwan. In addition, Toan Luc has a technology cooperation with TRASAXE of France and NISSAN of Japan. Toan Luc provides products for THONG NHAT, VIHA, LIXEHA, and VINAMOTOR bicycle manufacturing factories.

The manufacturing components for NISSAN brake company is an important transition for Toan Luc. After three years of being a supplier for Nissan brake company, it started to directly supply for the VMEP motorbike assembling company in 2003.

Cooperation with a prestigious company in the Vietnamese market that has a strict method of quality management and production management has helped Toan Luc to improve its management level and the quality of its products. Through this cooperation, Toan Luc has steadily applied effective management methods such as ISO and 5S and enhanced its trade name.

Toan Luc identifies four crucial values as guideline for all of its activities:

- *Ceaselessly improve*: All Toan Luc staff should always aim for continuous improvement. The company sets objectives and its staff try their best to meet these objectives and continuously set higher objectives. Toan Luc believes that all things can be implemented in a better, quicker and more effective manner through inquiring and learning from experience.
- *Be enthusiastic with customers*: Toan Luc extremely focuses on products and services that their customers want and need.
- *Be creative*: Toan Luc is always creative in thinking, discovering advanced technology and implementing new ideas.
- *Working as a group*: Toan Luc gains success by thinking and working as a group. The strength of the company is striving for a high level of performance and promoting diversification.

Toan Luc is a joint-stock company that has a plan of development in the future. The reputation of the company is built through its high quality products, promoting a lasting relationship with its partners, enhancing the professional skills of its staff and learning from experience.

3.5. Dong Anh Chain and Freewheel One Member SOE

This company produces and processes mechanical products. It mainly assembles

details for motorbike such as chain, freewheel, bearing; front chain wheel for bicycle; industrial chains; and accessories for motorbike and car. Its customers include VMEP Vietnam, HONDA Vietnam and YAMAHA Vietnam.

Initially, the company specialized in providing VMEP Vietnam with some products related to motorbike chain. Then, after two years of processing for VMEP, it started transacting with Honda and Yamaha and also began a component manufacturing process for Japanese corporations. The company has applied 5S management system in its factories.

The customers are the company's information sources for implementing improvements. It enhances its production procedure based on customer demand. It also uses information and insights of supporting organizations based on their experiences. The company has received support from the Technology Assisting Center (TAC) of the Bureau of Enterprise Development, Ministry of Planning and Investment. The company has participated in training courses on 5S Kaizen. It is also supported by JICA experts who would come all the way from Japan to provide on-site training on the 5S procedure. This is an extremely useful support for TAC.

3.6. United Motor Vietnam (UMV)

UMV is a company with 100-percent foreign capital. It belongs to Trung Khanh Corporation in China. The company was granted with an investment license in March 2001. Its total capital investment is more than USD 10 million. The company officially started to operate in September 2001 at the Noi Bai Industrial Zone, Quang Tien Commune, Soc Son, Hanoi. Now, the company has nearly 800 staff.

Using correct strategies and orientations for production, UMV has continuously expanded production and business. Each year, UMV manufactures nearly 1 million of motorbike components which are supplied to the domestic market. The revenue of the

company has also quickly increased from VND130 billion to about VND600 billion a year.

UMV specializes in manufacturing spare parts for motorbike with machines and equipment that are mainly imported from China. The main customers of UMV are local assemblers whose goal is to produce cheap motorbike. In cooperation with local assemblers, the company has continuously changed models, improved capacity and reduced production cost to suit market demand.

Since it started operating, the company has continuously diversified its products. At present, UMV produces an almost-complete product line for the motorbike industry which includes motorbike plastic components, engine components, electric components, motorbike body, and many other mechanical components.

According to the general manager of UMV, investment and business in manufacturing motorbike components in Vietnam brings many opportunities and challenges for foreign investors. This creates many opportunities for agencies like UMV because some small companies do not have the ability to compete in the market. Another important thing is that the potential of the motorbike market is at least 20 years. The secret of UMV's success is making many products that suit the taste of consumers and that even low-income consumers can afford.

3.7. Chiu Yi Vietnam (CYV) Limited Company

CYV is a company with 100-percent Taiwanese capital. Its factory is located in 126 Ngo Quyen Street, Ha Dong, Hanoi. The company has more than 80 staff. Its main products are electric components for motorbike such as timers showing speed, petro level, and different kinds of motorbike lights.

Set up in 1999, Chiu Yi Company is an important supplier of VMEP. After its establishment, majority of its products are supplied to VMEP.

Being a trusted partner of one of the biggest corporations in the world, the company's products require a high degree of accuracy. Thus, the company has a relatively modern and complete facility. Its machines and equipment mainly come from Taiwan and Japan. The company also applies meticulous systems of quality and product management such as 5S, ISO, and TQM.

VMEP and CYV has a close working relationship. VMEP usually appoints technical staff to support the technology for CYV in order to enhance product quality as well as support the development of new products and designs. Meanwhile, CYV appoints technical staffs to examine and process errors on the spot or take part in meetings about quality as well as give proposal to VMEP on improving technology and product styles.

VMEP also helps Chiu Yi in developing its human resources. VMEP usually appoints staff to take part in courses about technical advisory and organizational and production management.

Chiu Yi also continuously diversifies its products and seeks out new customers. Its target customers are Japanese motorbike assemblers in Vietnam. In 2007, the company became an official supplier of components for Yamaha Vietnam Company. Chiu Yi always strives for continuous innovation, technology upgrading, improvement of management system, and creative development of new products with the aim of enhancing product quality and expanding market.

3.8. Hop Phuong (HP) Technology Limited Company

HP is located at Buu Bridge, Way 70, Tan Trieu Commune, Thanh Tri, Hanoi. It was established in 1997. Its main products are margin struts and main struts for motorbike. Now, the company has more than 30 staff.

With its small space, backward technology and little investment capital, its products

have a low degree of accuracy. Thus, they are only consumed in cheap motorbike markets and the company's main customers are mainly local assemblers.

Being a small enterprise, the awareness of its managers about innovation is not high. Thus, creation and innovation activities of the company are restricted. It products have not diversified and until now consist of different kinds of struts for motorbike which are consumed only in the local market given its low competitive ability.

The company has backward and small punching machines (less than 80 tons) and because of this, the capacity of the company is relatively low. Some main components needing large size machines and a high degree of accuracy have to be imported overseas. Thus, the profit from each product is very low. The lack of a strict quality managing system leads to inconsistent product quality and a high rate of faulty goods.

The production relationship between HP and its customers is not very close. However, customers have been helpful in providing feedback on product quality. The company has received good support from its customers in developing production management and in checking the quality of its products. However, because the recommendations and concerns of customers are not addressed, the effect is low.

3.9. Armstrong Component Parts Vietnam (ACPV) Co., Ltd.

Armstrong is a company with 100-percent foreign capital. It belongs to Oriental Holdings Bhd Corporation (OH) - Malaysia. The company was established in 2005 and its factory is located in Lot 23, Noi Bai Industrial Zone, Soc Son, Hanoi.

The company officially started to manufacture in Vietnam in 2006. Its first products were spokes and rims of motorbike. With a professional, modern, comprehensive, and mostly automated machine system, the products of the company have a high quality.

Belonging to a big corporation specializing in manufacturing components for motorbike and car, the company is known in the motorbike market for its high-quality

products. After officially operating, the company has immediately become a component supplier of leading motorbike assemblers in Vietnam. Its customers include Yamaha and VMEP.

The company has a strict system of quality management. Its products have passed strict quality testing.

Since it was established, the company has applied advanced management system such as ISO, TQM, and 5S. The company also holds training courses for its staff to enhance their awareness of standards in management and production.

The connection between Armstrong and customers is relatively close. The company usually discusses quality problems and appoints engineers to customer companies to immediately solve any problems that may arise in the production process. Meanwhile, customer companies also periodically appoint their staff to check the production activities of the company, check the origin and quality of input materials as well as support and cooperate with Armstrong in the development of new components.

3.10. Tan Hoa Mechanical Limited Company (Tan Hoa)

Tan Hoa was set up in August 2000. Its forerunner was Tan Hoa Cooperative which has more than 20 years of operation and development in manufacturing components for bicycle, motorbike, home mechanical products, and domestic goods.

Tan Hoa factory was built in 2002, in an area of more than 5000 m^2 at the Tu Liem Small and Medium Industrial Zone, Hanoi. It is equipped with a machine system that is relatively modern and has a high level of automation. The company has nearly 200 skilled staff.

Its main products are components for motorbike such as outlets, rims, and struts. Its customers are leading corporations that manufacture motorbike in Vietnam such as Honda, VMEP, and Piagio.

Form a small and medium enterprise with a backward management method, due to the correct orientation and determination to innovate of its managers, Tan Hoa has risen to become a big and trusted company in the motorbike component manufacturing aspect in Vietnam. Its efforts to build a strict and scientific management system led to the success of Tan Hoa. Following are some of the details:

- In December 2004, the company built and applied a system of quality management according to internal standard ISO 9001:2000, which was assessed and granted by BVQI organization.
- Along with the ISO system of quality management, the company deployed and applied management methods such as 5S Kaizen in 2006, with the aim of improving ability of quality management, reducing cost, and delivering goods on time.
- In 2007, the company conducted awareness-raising activities on the JIT (just-in-time) manufacturing system which it also began implementing. Then, in 2008, it promoted awareness of the philosophy “creative spirit in production”.

The management system is implemented seriously and strictly and it is always promoted within the company through awareness-raising activities. For instance, the company always holds training courses for the staff. In training staff, Tan Hoa has also received active support from JICA and customers such as Honda and VMEP.

Besides innovation and application of advanced management methods, the company always upgrades its equipment, hires advisory experts to diversify products, improves quality, and expands market. In 2009, the company received support from Toyota Vietnam in sampling manufacturing car components.

According to Director Le Ngoc Tuan, the key factors of the enterprise’s success are:

1. Determination of the executive board

2. Thorough promotion of company principles and procedures; providing regular training to staff
3. Suitable investment for environment improvement
4. Patience in solving cases using precise and scientific methods
5. Regular check and control
6. Having a suitable award policy.

This small enterprise is able to satisfy foreign customers without using too large investment due to the efforts and determination of its leaders and the serious work of its management staff. Enterprises should follow the example of Tan Hoa in building their own corporate culture, seeking for continuous innovation, and establishing a comprehensive management system.

4. ANALYSIS

4.1. Statistic Analysis

Concerning innovation, all 10 firms confirmed about “significant change in packaging or appearance design”. It was one of the most important things for innovation and upgrading in the last three years. Firms upgraded their design and packaging based on customers’ orders. “Significant improvement of an existing product/service” and “development of a totally new product/service based on the existing technologies” was implemented by all 10 firms. Using existing technologies is being implemented by upgrading current equipment or changing the key parts and components of these machines without huge investment.

All 10 firms said ‘yes’ to most of the subquestions in Q11 (improved existing machines, equipment, or facilities; introduced new know-how on production methods). They explain that there are a frequency innovation of suppliers while assemblers always develop their products in the motorcycle industry in Vietnam.

Table 3 Plan or Achievement in Innovation of Interviewed Firms

Indicator	Yes
1. Decrease defective products	10/10
2. Decrease inventories of products	7/10
3. Reduce raw materials and energy	6/10
4. Reduce labor input	4/10
5. Improve quality of goods or services	9/10
6. Improve flexibility of production or service provision	10/10
7. Reduce lead time to introduce a new product or service	8/10
8. Enter new markets or increase market share in the domestic market	10/10
9. Enter new markets abroad or increase exports	5/10
10. Reduce environmental impacts caused by factory operations (noise, waste disposal, etc.)	7/10
11. Meet regulatory requirements on products.	10/10

For manufacturing, there are only six firms that have reduced raw materials and energy, while all 10 firms have decreased defective products, and only seven firms were concerned about the decrease in inventories of products.

The two most important sources of new technologies and information for business upgrading and innovation were the company's own R&D efforts and their cooperation with MNCs. Some Vietnamese firms said the support from MNCs push them to change method of production and firm culture.

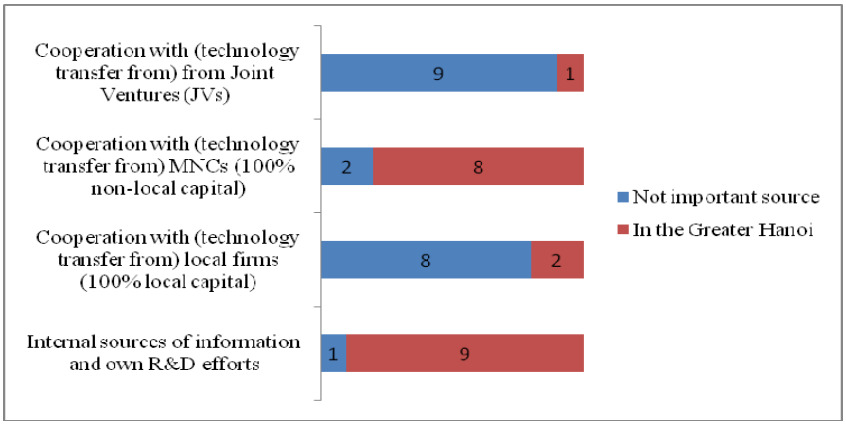


Figure 5 Sources of New Technologies and Information for Business Upgrading and Innovation in the Last Three Years

Source: Author.

Because internal sources are the most important factor to implement innovation and upgrading activities, most of the interviewed firms did not subcontract or outsource R&D work. Seven of the 10 firms have their own R&D department. Some of them have few engineers (such as Toan Luc, Hop Phuong) but despite this, the department can implement many R&D activities.

Table 4 R&D Activities

R&D expenditures	Yes
Does your establishment incur R&D expenditures at present?	9/10
Does your establishment subcontract or outsource R&D at present?	2/10
Does your establishment have R&D facility, R&D center or R&D department?	7/10

The interviewed firms described their technical capabilities in detail as follows. Most of them have adopted ISO, operated QM (quality management) or QC (quality control). As evidence of their technical design capability, more than half of firms have CAD, CAM or CAE. They have also built a just-in-time (JIT) system of delivery. Only less than half of the firms produce their own designs (original design manufacturer or ODM) or their own brands (original brand manufacturer or OBM). On the aspect of training, seven of 10 firms have an on-the-job (OJT) training program for workers and only three of 10 firms have an off-the job (OFF-JT) training program for workers. However, even if many workshops and seminars were conducted frequently, many firms were not paying much attention on providing theory training for their workers.

All of the top management of the 10 firms has a bachelor (BA), master or Ph.D. degree. Most of them can speak English well. This is a very important capability of general directors, especially in domestic firms.

Table 5 Technical Capabilities

Technical capabilities	Yes
1. Does your establishment manufacture products according to design, specification, or drawings made by your establishment?	4/10
2. Does your establishment have CAD, CAM or CAE (Computer-Aided Design, Manufacturing, Engineering)	6/10
3. Is your establishment an OEM (Original Equipment Manufacturer)?	8/10
4. Is your establishment an ODM (Original Design Manufacturer)?	4/10
5. Is your establishment an OBM (Original Brand Manufacturer)?	3/10
6. Has your establishment adopted ISO 9000, 14000 series or other international standards?	9/10
7. Has your establishment operated QM (Quality Management) or QC (Quality Control) circle activities?	9/10
8. Has your establishment adopted just-in-time delivery	6/10
9. Does your establishment have an on-the-job (OJT) training program for workers?	7/10
10. Does your establishment have an off-the job (OFF-JT) training program for workers?	3/10

Source: Author.

4.2. Motivation of Innovation and Upgrading

(1) The following are needed to ensure the quality of products that assemblers require.

Enterprises have to strictly control manufacturing process and ensure quality according to customer demands. In the beginning, this control is usually assisted by engineers from assemblers (Japan, Taiwan, and Italy) or customers (Taiwanese, Japanese, Vietnamese suppliers). Japanese partners usually send more engineers and allow them to stay longer to control and monitor quality.

On upgrading equipment and machines, domestic enterprises often only partially invest in new equipment and machines. Many of them purchase secondhand machines to save cost while some enterprises only use part of the components of these machines in upgrading their current machines.

To reduce cost and to have enough competitiveness to become suppliers, enterprises have to carry out a standard manufacturing process (such as 5S) and control material and time waste as well as product errors in particular.

Human resources are the most important matter for innovation and upgrading of

products and technologies. The awareness level of workers is an important factor in making this happen and it is dependent on their education, qualification, and professional skills. However, a firm's culture has a big effect on forming this awareness. A professional and creative working environment helps to make workers obey company rules and encourages them to continuously improve their work.

(2) Upgrading of product quality and technology in local enterprises usually takes places in two stages.

Stage 1: Manufacturing components and parts for other suppliers (Japan, Taiwan, and Vietnam). This stage takes place from two to five years. The enterprises face difficulties and get little support from customers. Thus, they are easy to be eliminated from the market. Successful enterprises mainly gain from factors like joining suppliers market, assessing standards about quality, technology and machine, training human resources, and reducing investment costs by upgrading current equipment. However, they have low profit. Successful enterprises usually turn into directly manufacturing for Japanese assemblers (and Taiwan/Vietnam too). The enterprises with less success will stop at this stage or still manufacture for middle class suppliers.

Stage 2: When supplying for Japanese enterprises, it is difficult at first. Enterprises require more investment. Workers have to be more active and initiative. Problems related to upgrading and innovation happen more frequently. Many enterprises think that innovation is not a big matter. Sometimes they only make some adjustments to the machine to ensure that the details of components are able to reach the required standards in the shortest time. This stage has a close connection with the process of manufacturing management and quality. Therefore, this stage requires more investment with high cost. For assemblers, the technical support is also higher. Along with receiving control engineers, enterprises also get support from customers through direct discussion about

technical obstacles from suppliers. There are some enterprises detailing their engineers in the factories of their customers to take part in short courses.

At stage 2, many enterprises receive training programs and support from business promotion organization, especially in addressing problems on organizing manufacturing management (5S). There have been some enterprises that received Japanese experts from JICA who volunteered to work in Vietnamese enterprises through the North enterprises supporting center.

Most of the enterprises that have taken part in production network of motorbike assemblers have good prospects for continuous development. Many enterprises plan to continuously train staff, standardize manufacturing process, continuously create to improve product quality, and manufacture details that have a higher demand from customers or manufacturer for high-end customers in the higher quality motorbike market to gain more profit. Many enterprises focus on the market supplying for electronics, home appliance, and automotive enterprises and have started to connect with these enterprises.

(3) To upgrade technological ability and ensure the supply for assemblers and manufacturer having FDI capital, the main successful factors of local enterprises include the following:

Quality of human sources. The Hanoi mechanical industry has the advantage of having skilled and experienced engineers and staff. However, other skills such as active ability, management ability, and systematic characteristics are not high. Many enterprises assert that training human resources with the aim of satisfying the demand of the market economy is the most difficult matter to ensure that objectives of enterprises are met.

The process of production and management ensures systematic characteristics and

easy control. This is a weakness of most Vietnamese enterprises. Interviewed companies believe that this is the biggest barrier that makes it difficult for them to become suppliers for foreign customers.

System of machine and technology. Components and technology have an extremely important role in innovation system of enterprises. In the past, Vietnamese enterprises usually use old machine systems that seem to be backward but relatively sufficient. Successful enterprises have upgraded these components sparingly based on cost considerations. They did this gradually by adding new machines or replacing old components and equipping their factories with modern ones as need arises. Private enterprises usually purchase old components, import secondhand machines, self-manufacture, or take most parts of old machines for their own machines. In general, only few Vietnamese enterprises in the motorbike industry invest in modern and large machines immediately. These enterprises are investing in CNC processing machines that have a high degree of accuracy.

Controlling production cost and cutting down on product errors as much as possible and on material waste are very important. To ensure competitive price, successful companies focus on cost reduction. Many initiatives on innovation and improvement have taken shape. Enterprises realize that it is necessary to identify clear objectives to help staff improve and innovate successfully.

Continuous innovation and improvement. The establishment of self-improvement system in labor force is a key factor in the success of some enterprises (Toan Luc, Tan Hoa, Dong Anh Chain and freewheel). The key issue is to have clear objectives for the system. Many enterprises have set up an innovation system based on two main objectives: reducing cost and ensuring quality according to customer demands.

(4) The technological development and upgrading of domestic suppliers are mainly

based on certain factors. Most enterprises believe that from the three requirements of quality, price and delivery time, supplying enterprises form motives and objectives for continuous innovation and improvement. The resources for innovation include the following factors:

Requirements of customers. Requirements of customers about product, design, quality, and price continuously change. This forces enterprises to change. Unlike in the production of final products, supplying of components varies and is highly dependent on customers.

Internal force of enterprises. Most initiatives of innovating technology, machine, and manufacturing process come from human resources in their own enterprises. They are the biggest and the most effective innovation source because they know an enterprise's weakness and the points where innovation is needed. Successful enterprises believe that encouragement for innovation coming from within the enterprise brings unexpected but positive results. Tan Hoa has formed a reward system for encouraging innovation from within and also systemized some innovation initiatives for workers related to different production lines.

Information from enterprise association and competitors. Information has a big effect on innovation. Information sources having strong impacts come from mechanical enterprises with information related to a product or a technology that is popularly used in the market. Unofficial information from competitors also helps enterprises to have a good orientation for innovation (Toan Luc, UMV, Hanoi Plastic).

Support from enterprise assisting organizations. Many enterprises highly appreciate the support of the North technology assisting center (TAC). Dong Anh Chain and Tan Hoa have received training courses on 5S Kaizen from TAC, including support for its application in the last two years. These companies have also received technical support from Japanese experts (JICA) who came to work for one year to support the 5S

application. The program was highly appreciated by Dong Anh and Tan Hoa because it helped increase the awareness of their workers about work quality and efficiency.

5. CONCLUSION AND POLICY IMPLICATIONS

The development of local motorbike suppliers indicates a promising future for the supplying industry of Vietnam particularly in the metal aspect.

For Vietnamese enterprises, continuous upgrading and innovation is a key to become suppliers for foreign assemblers. However, the technology level is not the only key. It is also important to identify the main points needed for improving the manufacturing process, building a good corporate culture, continuously enhancing the working environment, and standardizing the manufacturing process. Investments in innovation can be gradually implemented according to stages depending on manufactured components.

The enterprises in the motorbike industry particularly the FDI companies are able to continuously develop and provide components requiring higher technology as well as supply for higher technology industry such as electronics and car. They will progress more quickly if they have the support of intermediary organizations or potential customers. The Vietnamese government should have associations that can provide assistance programs both to motorbike enterprises and assemblers.

Vietnamese enterprises have the ability to join the production network of electronic, automotive, and automobile industry in the ASEAN area. Vietnam has just entered the middle-income class market, while Malaysia is at the end of this stage and is trying to penetrate the high-income class market in the next 10 years with the focus of developing higher technology industries and considering the upstream and downstream markets. The components for technology industries such as electronics, home appliance, and automotive produced in Malaysia can easily be transported to Vietnam if there is a

suitable policy that can promote the cooperation between these countries. ASEAN nations should discuss and come up with policies for optimizing the role of each nation in the production network for each industry.

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Appendix Case Study

Orientation for Diversification of Private Enterprises in the Plastic Industry in Ho Chi Minh City

Institute for Industry Policy and Strategy (IPSI)

Abstract

The plastic industry is one of the fastest growing industries in Vietnam in the last few years. The export turnover of plastic packaging has continuously increased over the years. The domestic market for industrial plastic products is strongly developing. It is an aspect that has attracted large investments from the private sector. Most of the plastic enterprises in Vietnam are small- and medium-size companies and privately owned. The industry does not receive much investments and support from government. Thus, the private sector has a decisive role in the market economy. The plastic industry of Vietnam, however, primarily focuses on manufacturing plastic packaging and products for the local construction industry. There is only a small amount of enterprises supplying plastic parts and components for other industries or aiming to satisfy the demand of multinational corporations in the domestic market. Many plastic products for industrial supply are still imported, while the low manufacturing and technology levels of Vietnamese enterprises permit them to take part in supplying to other industries. This research focuses on the private enterprises in Ho Chi Minh City where strategic changes can quickly take place. It seeks to analyze the current situation of the plastic industry and provide recommendations for its development.

1. INTRODUCTION

Vietnam's plastic industry is considered as an industrial branch which is relatively young but with a high potential for development, especially because of the emergence of an increasing number of plastic products with fine characteristics that are comparable to other products such as glazed terra-cotta, porcelain, wood and metal. The continuous development of the economy determines the chances for the development of Vietnamese plastic products, with their demand to potentially become bigger when other materials have become increasingly scarce and production costs have become higher. During the initial stage of its development, Vietnam's plastic industry has chosen a suitable path by

focusing on manufacturing simple plastic products that are popularly used and that do not require strict adherence to quality standards. Among these key plastic products include those that are used for transportation and packaging. However, along with the production development of the entire branch, these products are gradually being replaced by higher quality and more sophisticated types and models with high added value. Thus, plastic products used in transportation and packaging and certain kinds of plastic bags that have a certain role in producing and exporting plastic products have been experiencing a downward trend in demand.

Table 1 Market structure of exporting plastic products in 2009

Products	**Density according to Value (%)**
Products using for transportation and packaging	44
Slabs, plastic films	14
Industrial plastic products	8
Domestic plastic products	7
Canvas	5
Tools in office, school	4
Others	18

Source: VPA 2009.

In 2009, the export turnover of plastic bags was estimated to have reached USD 250 million, or 34 percent of the total export turnover of the entire branch. This shows the important role of this product to the total export of plastic products. The export of plastic products has given Vietnam an important position in the international markets. Although 2009 has been a difficult year, still the export of plastic bags was relatively successful as compared with the situation in 2008. They were exported to 85 markets, some of which were new ones.

Although the export of polyethylene (PE) plastic bags to the American market in the last months faced difficulties, 2009 was still a satisfactory year. America is the biggest importer of Vietnamese plastic bags. As of November 2009, the export turnover

of PE bags has reached USD 63.7 million, accounting for 27 percent of total export turnover for this kind of product. The second biggest market of PE bags is Japan, with an export value of USD 36.1 million or 15 percent of the total export turnover. England is third with a value of USD 22.4, or 10 percent of the total of export turnover of PE bags.

Table 2 Structure of Plastic Bag Plastic Exporting Market

Market	Value (%)
America	27
Japan	15
England	10
Germany	9
Cambodia	8
The Netherlands	7
others	24

Source: VPA 2009.

In general, the export of plastic products suffered a downward trend because of the effects of the financial crisis and economic recession. A closer look would reveal, however, that in many markets, there was a big decline in export demand while in others the relatively strong demand has been maintained. America is one of the markets that recorded the strongest decrease; the export turnover to this market in the last year decreased by 36 percent compared with the export in the corresponding period. The export of plastic bags to Japan was not really satisfactory; export turnover reduced by 32 percent compared with the export in the corresponding period. The third biggest market, England, also registered a negative growth with only USD 22.4 million, a reduction of 10 percent compared with the corresponding period. In general, all of the three biggest markets for plastic products in the world registered a reduction of exporting turnovers at different levels. Nevertheless, this may be a chance for Cambodia to seek other foreign markets and create a more reasonable exporting structure.

In other export markets, the picture has been positive. For instance, the export to the fourth market, Germany, increased to 124 percent. Even if the economic recession has strong impacts on the export of plastic products, the market size is relatively large. This indicates promising growth prospects that should be reinforced particularly for other potential markets. Besides Germany, many other markets also recorded relatively high growth levels such as Italy (37%) and Spain (46%).

Although the markets for exporting plastic packaging are developing and growing strongly, the development of other aspects seems to be at a snail's pace. Many plastic packaging manufacturing enterprises can shift their operations to manufacturing components for industrial, manufacturing and building industries. However, because the attraction of the packaging market is too big, enterprises are not encouraged to try these other aspects.

This paper presents the results of the ERIA research in 2007 and 2008 which generally aims to find key points of firm innovation for the plastic industry in Ho Chi Minh City. In particular, it seeks to determine : (1) the objectives and motivation of innovation and upgrading of firms, which include technical aspects such as quality, delivery time, environmental issue and design, and economic aspects such as cost reduction, new client, new market and new product; (2) the innovative level (either incremental or radical manner) whether in the international/domestic level or within the firm/outside the firm level; (3) the strategies of firms that will create efforts towards innovation activities such as investments on R&D, manpower, new technology and machinery, utilization of internal resources and external supports; and (4) key factors for the success of firm innovation activities.

Research Question

The study hopes to answer the following research questions:

1. In what areas have private enterprises in the plastic industry in Ho Chi Minh City succeeded in? What were the problems met and the development orientations?

2. Where were the obstacles of enterprises in joining production networks of multinational corporations?

Hypothesis

The success in manufacturing plastic packaging for export is affected by the market objectives of enterprises. There are some enterprises gaining success in becoming suppliers for manufacturing industries but only a very small number of private enterprises in the plastic industry in Vietnam are following this route. It is hypothesized in the study that the reason may be attributed to the difficulty of penetrating this market and the need for large investment to switch to manufacturing in this area.

2. BACKGROUND: AGGLOMERATION AND PRODUCTION NETWORKS FOR UPGRADING AND INNOVATION

The plastic industry is becoming one of the fastest growing industrial branches in Vietnam. It has shown considerable progress and a steady growth rate of 15 to 20 percent per year.

According to Vietnam Plastic Association (VPA), Vietnam's plastic branch has about 2,000 enterprises that are mainly concentrated in the southern provinces. Among them, Ho Chi Minh City makes up more than 80 percent. In 2007, the plastic branch reached an export turnover of USD 750 million and USD 1 billion in 2008. However, plastic enterprises are facing difficulties in providing materials as they are heavily dependent on import resources and usually affected by the constant changes in the cost of materials for production. In 2009, it had to import 1.8 million tons of these materials valued at USD 3.1 billion.

According to the Ho Chi Minh Plastic Association, the import of high-quality and cheap plastic waste is a unique method to help Vietnamese plastic enterprises to reduce production costs, enhance competitive ability in the domestic and export markets, and help exporting enterprises to quickly increase output and export turnover. The selling price of export plastic products from Vietnam is usually higher by 10 to 15 percent compared to the price of China and India. Thus, although output and export turnover has been increasing at 20 percent each year, the actual value is still lower. Nearly 100 percent of the materials and equipment in the plastic branch are imported. Local suppliers can provide only about 300,000 tons (about 18%) of the materials needed each year. The demand for imported materials is actually 1.6-1.7 million tons.

A representative of a plastic joint stock company in Vietnam relates that the company plans to cooperate with Merlin Plastics Company (Canada) to set up a joint venture to invest in building two plastic waste processing factories in the southern and northern parts of Vietnam. However, after nearly three years of preparation, the two factories have not started operating because the existing equipment could not meet the required standards. The domestic waste collecting system is in poor condition and has not reached the minimum standards of quality and quantity.

According to VPA, if average import cost is USD 1,800 per ton, it will cost Vietnam USD 2.5 billion to import materials for production. Importing plastic waste could help in meeting between 35 percent and 50 percent of the demand for materials, which is equivalent to 650,000 tons of high-quality waste. At a current cost of USD 600 per ton, Vietnam saves USD 780 million each year. Importing plastic waste increases 25 percent of the cost of input materials and reduces 15 percent of production cost. This enhances Vietnam’s competitive ability in exporting and helps to make its plastic products at par with those from China and India. In addition, American, European and Japanese customers require that Vietnamese plastic companies make plastic products

from at least 10 percent recycled plastic to reduce the selling price and to create products that are environment friendly.

The import of waste is actually a sensitive matter. There are cases violating the import of materials .Thus, along with giving proposal for importing of materials, the VPA also has released certain guidelines or regulations. For example, when importing waste, the goods must have a clear origin and the detailed characteristics of the imported wastes should be indicated. Meanwhile, entities exporting wastes must have a valid license to operate. Besides releasing the regulations on importing waste for production, the Association has also proposed regulations on recycling waste.

These are enterprises having waste processing factories with advanced technologies. The Association performs a supervisory role by conducting regular and unscheduled checks of recycle enterprises. Many countries have learned from past experience that massive importation of waste is detrimental to the environment due to its harmful effects. The fore, not only the quantity should be regulated but the area where the waste will be used should be carefully planned to prevent any negative outcomes.

Currently Vietnam is building a plastic waste recycling center in Cu Chi. VPA appeals for investments in the project. The operational capacity is 150 tons of materials per day for the first period and 750 tons per day for the last period. It is estimated that in 2010, the project will start to operate in the first period. It will perform various processes from collecting of waste to choosing and recycling. The activities of the center will be under the strict control of related specialist bodies.

Although Vietnam can import and recycle plastic waste, it still does not have the ability to satisfy the domestic and foreign demand for plastic materials. Because most of these materials are withdrawn by its own manufacturers for reuse, the quantity being supplied in the market has become even more restricted. Thus, enterprises have to purchase waste materials that are relatively more expensive than the main materials.

3. CASE STUDIES

The research team in Ho Chi Minh City interviewed 10 enterprises. Only two enterprises, both European ones (Germany and Poland), have 100 percent foreign capital. Six private enterprises and two state enterprises have 100 percent domestic capital. There are five enterprises involved in manufacturing plastic packaging for export market. Their customers are big multinational corporations such as a global supermarket chain system and firms manufacturing cosmetics and medicines. Two enterprises manufacture materials for the construction industry such as water pipes and plastic pipes. One company specializes in manufacturing plastic doors for the domestic market. Only two companies manufacture components and equipment for supply to other manufacturing industries. One company manufactures plastic components for motorbikes and electronics for the domestic market. Another company manufactures patterns for the plastic industry and spare parts for the steel industry. The survey group also interviewed representatives of the Vietnam Plastic Association and some plastic experts in Ho Chi Minh City.

3.1. Tung Vinh Limited Company

This is a company with 100 percent domestic capital. Established in September 2002, its factory is located at 26/11 Tran Van Muoi, Xuan Thoi Dong Commune, Hoc Mon District, Ho Chi Minh City. The main products of the company include tarpaulins, packaging materials, plastic coating and advanced paper classes, among others.

From its inception, the company has used 100-percent machines imported from Japan, which are modern ones and highly automated. The company has applied a strict procedure of maintenance to ensure that their machines always operate perfectly and products are always of high quality. The activities of innovating and upgrading

technology of the company are mainly processing techniques and upgrading of workshop and working environment. The company also applies a very strict system of controlling quality. The control and monitoring staffs continuously checks threads each hour and make reports each day.

The products of the company are endorsed or guaranteed by Vietnam Maitai Limited Company. Maitai is a company with 100 percent foreign capital and belongs to a big corporation in Japan. It is located at Tan Thuan Processing Zone in Ho Chi Minh City. It has a cooperative relationship with Tung Vinh from time the latter has started to operate. According to Director Ngo Chanh, the relationship between the two companies is very close. Matai Company usually appoints its staffs to visit, check the quality and guide Tung Vinh in developing new products. Maitai Company also helps Tung Vinh in training its staff and building a system for controlling product quality. Maitai also introduces and provides input materials to Tung Vinh.

3.2. Viet Nhat Phu Packaging Joint Stock Company (VNP- Pack JSC)

Established in 2006, it is a company with 100-percent domestic capital. Its physical location is in F12/4 Hamlet 6, Vinh Loc A, Binh Chanh District, Ho Chi Minh City. The company is a designer and manufacturer of modern packaging materials and is comprehensively involved from the initial models to the final products.

The functional activities of the company are as follows:

1. Specializes in manufacturing and providing pallet papers, corner rods by paper that protects interior products and are used for imported products in many aspects such as woodwork, ceramics, electrics, and garment for exporting. In addition, it also provides stretch films, belt laces, product packaging and air bags.
2. Manufactures business papers, plastic materials and plastic packaging
3. Specializes in designing and printing advanced packaging which is used in

industries such as confectionery, coffee, beer, wine, soft drink, gift, promotional materials, (paper, plastic, compress carton).

4. Designs and prints many kinds of desk calendars and wall calendars, catalogs, brochures and flyers

The main customers of the company are enterprises operating locally such as food processing companies and producers of consumer goods such as pottery, glazed terra-cotta and woodwork. From 2008, the company has started to export some of its products to Thailand and Malaysia.

The company uses advanced printing technologies from Germany and Japan and combines these with mechanical machines from Vietnam and China. The company also uses precise checking equipment from Germany and Japan to ensure product quality.

The company has continuously changed models and improved product quality. Based on demand for similar products in the local market and based on available technologies, the company has designed and manufactured many high-quality products that have satisfied customers' demands.

According to its director, the company is also aware of upgrading technologies and improving management system. Information sources of innovation are collected both locally and overseas through direct visits, seeking specialist opinion and learning from other companies.

3.3. Nhat Tien Trading and Manufacturing Limited Company

An enterprise with 100-percent domestic capital, its factory is located at C5 Lot, Duc Hoa Plastic Industrial Zone, Duc Hoa District, Long An Province. The company has more than 300 staff. It main products are plastic baskets, plastic flasks, plastic bottles, construction components (kinds of bearing) and products for the farming and horticultural industries (e.g., flowerpots, breeding facilities). The main customers of the

company are enterprises manufacturing chemicals and medicines for veterinary use and farms all over the country.

The company mainly uses machines and materials from Taiwan with casting and flushing plastic as the main technology. Although the machine system is not modern, the company always endeavors to innovate and enhance the quality and mode of products with the aim of meeting all requirements of customers. Recently, the company has used a new electric system that reduces material expenditure and a new technology for supplying materials to help staff do their job easier.

Realizing the high demand of the Vietnam breeding industry, the company has done early research on and manufactured and brought to the market some plastic products for breeding facilities with better properties compared to traditional materials. Aside from manufacturing plastic products for raising cattle and poultry, the company has recently introduced new plastic products for the honeybee breeding industry with many advantageous features.

The company is using the ISO 9001:2000 system for ensuring quality and managing the enterprise comprehensively and strictly. This is in view of its objective to continue bringing out products with the best quality, exactly like what its business guideline says: “Access customers by quality”.

3.4. Ly Xuan Lan plastic manufacturing and trading limited company

Its forerunner is a small manufacturing establishment set up in 1982. The current manufacturing plant is located at Tran Dai Nghia Street, Binh Chanh, Ho Chi Minh City.

The company has 130 staff and its main products are plastic pipes, ribbed pipes, small-sized net pipes that are used for supplying and draining water in family homes and supplying gas and liquid air, and colorful plastic polyvinyl chloride (PVC) plastic grains. These products are mainly consumed in the local market and a small percentage

is exported to Cambodia.

Although it is a small manufacturing establishment with relatively backward and asynchronous machines and equipment, the company strives to upgrade them in order to diversify its products, improve production processes and come up with better quality products that suit the demand in the market. According to its director, Ly Xuan Lan, the company usually conducts visits of other manufacturing companies to be exposed to other technologies and attends local and international fairs to learn about new products and processes. This helps the company to position itself in the market.

These days, the company is facing stiff competition from China which offers cheaper products. The company has tried its best to upgrade its equipment, improve product quality and reduce production cost. However, due to the small size of its manufacturing plant and its asynchronous machines, the company has faced many difficulties in innovation and upgrading. Thus, in 2007, the company decided to build a new factory in Vinh Long. It also planned of replacing all of its machines and equipment with new ones that use Taiwanese and Italian technologies. It is estimated that the new factory will start to operate this year. With the new factory, the company also plans to expand its market and export products to Laos, Thailand and some African countries. Asked about his comments on the connection and innovation between the local enterprises, Director Ly Xuan Lan said that this aspect is still weak, the associations and related organizations operate ineffectively, and information exchange between enterprises is also still very restricted.

3.5. Lotus

A company in Ho Chi Minh City with 100-percent foreign capital, it is owned by a Vietnamese businessperson with German nationality. From a small limited company engaged in technology transfer, Lotus has steadily expanded and now has three

subsidiary companies operating in three specific aspects namely, technology transfer, manufacture of plastic packaging, and manufacture of plastic components for water and construction industries. The process of innovation and development of Lotus Company can be summarized as follows:

- In 1989, Lotus Pitching Technology Limited Company was established with technology transfer in plastic and packaging industries as its main operation.
- In 1996, Lotus started to manufacture packaging products for export and became one of leading enterprises in Vietnam. In October 2004, Lotus joined RKW Corporation, one of the leading corporations that manufactures films and fibers in Europe, with the aim of combining their forces to become the leading suppliers in the Asia-Pacific region.
- In 1997, Hai Phong Lotus Factory started to manufacture and provide PVC grains and flours replacing imported goods and servicing the industry manufacturing plastic pipe and flat. With this operation, Lotus was able to access and seize the demand of the water and construction industries in Vietnam, investing in developing business in new manufacturing aspects.
- From 2000 to the present, Lotus has expanded its manufacturing and business activities and is also engaged in product diversification. The company is now focusing on developing sanitation products such as disposable nappies and sanitary napkins.
- The plastic packaging products of Lotus has mostly been exported to the European market. Its exports account for 80 percent of the total production capacity of the company. To sustain this success, the company has continuously been pursuing innovations in terms of equipment and application of modern technology with the aim of increasing its competitiveness in production cost and quality vis-à-vis Thailand, Malaysia and China. In the service aspect, the

company has continuously upgraded the quality of service from small things like replying to email inquiries within 24 hours to the use of English by all departments and staff in business transactions.

At an early stage, the company has applied for standard system ISO 9001:2000 to control all procedures in technology transfer and service as well as its manufacturing and trading activities.

The business guideline being followed by the company is to always try its best to cooperate, study, innovate, apply new methods and technologies, and update backward ideas and technologies.

3.6. European Building Material (EBM) Company

"European quality for Vietnamese houses" is the slogan of EBM. Established in 2005 and operating in Ho Chi Minh City, it is a company with 100-percent foreign capital and belongs to ASG Corporation–Poland. It specializes in manufacturing advanced building materials using European technologies. The main products of the company currently include PVC advanced plastic doors having consolidated steel core and windows made of INOUTIC bar imported from Germany.

EBM door products are manufactured at the EBM factory located in Nhon Trach 3 Industrial Zone, Dong Nai Province. The factory is equipped with advanced, comprehensive, highly automated machine and equipment produced by leading firms in the world such as URBAN and RAPID (Germany). Important components are mostly imported from Europe.

The system of controlling product quality of the company is assessed and granted with certificate ISO 9001:2000 by Bureau Veritas (England). All products of the company are strictly controlled and monitored to ensure that they reach European quality standards.

EBM door products have been certified to have passed European quality standard and have received many awards in Vietnam such as Gold Cup of Vietnamese brand integrating WTO, Gold Cup of the Vietnamese building industry, and Gold Medal of product quality.

Although a newly established company, EBM always tries its best to innovate and diversify its product line to expand its market coverage. The company always strives to provide excellent customer service such as in the aspect of technical support in installation and design. It also invests in equipment and continues to enhance its design ability in order to produce products that also suit the taste of the Vietnamese market. Each year, the company sends staff to Europe to study and it also invites local and foreign experts to directly guide and train its staff.

3.7. Binh Dong Hung plastic machinery Company (BPM)

A company with 100-percent domestic capital, it was established in February 1992. Its factory is located at 275B Phan Anh – Binh Tân, Ho Chi Minh City. BPM has over 15 years of specialized experience in producing materials for the plastic manufacturing industry and the light industry.

The company currently has over 50 staff with a high level of technical expertise. The main products of the company are producing equipment, machines (such as mixing machine, pushing machine, fuel providing system), patterns for plastic manufacturing industry, and conversion technologies for manufacturing plastic (PVC in particular). The main customers of the company are local enterprises operating in Ho Chi Minh City and neighboring local industries, which provide 70 percent of the company’s total revenue.

The company has a team of experts; mostly professional engineers in manufacturing plastic equipment. It also has a team of freelancers who are experts and

professors in universities and in technological and engineering companies in Vietnam and overseas. These freelancers provide support in engineering and methods.

BPM has a factory with a small space, but it is arranged scientifically and sufficiently with advanced machines imported from big companies in Japan (CNC Bed), Germany and China. These machines have electric and mechanical components that have a high degree of precision thus ensuring that final products are of excellent quality.

BPM also applies the most advanced standards of managing the quality of its products. The KCS department is sufficiently equipped with advanced checking equipment and follows a strict quality checking system.

Although it is already a leading company in manufacturing equipment and machines in the plastic industry, its board of managers is aware of the need for continuous innovation and creation. Each year, the company sends its staff overseas to visit, study and collect technical documents and participate in trade fairs. The products of the company are made using advanced technologies from overseas which are also regarded as suitable for the manufacturing situation in Vietnam. Some products have been assessed highly in terms of innovation and technology creation such as its tube expanding machines which are used in the production line of plastic tubes.

The company also has a close relation with customers. It usually appoints engineers to guide customer in using and maintaining equipment and also performs periodic consultation with customers. According to Nguyen Minh, the company director, the ideas and demands of customers are the most valuable motives of the company to continuously innovate and bring out products suitable to the needs of the market.

3.8. Dat Hoa Company

This company is a manufacturing enterprise established in 1978 in Ho Chi Minh City. Initially just a small manufacturing establishment under the name Dat Hoa Limited

Company, it was officially established in 2003 as Dat Hoa Plastic Company with a charter capital of VND 600 million. Of late, the charter capital has increased to VND 55 billion.

Currently, Dat Hoa Plastic Company specializes in manufacturing and providing plastic products for the water supply and drainage industry within Vietnam and overseas. In addition, the company also manufactures some products for building, refrigeration and interior decoration such as net tubes and ceiling straps.

Important factors that determine its production technology include product quality and product competitiveness in the market. Dat Hoa Company continuously invests in modern automated equipment imported from Germany, Korea, Taiwan and China. The company also continuously reinforces association and joint ventures with economic organizations to expand its market. From an initial factory in Binh Tan District, Ho Chi Minh City, the company has opened two new factories, one in Vinh Phuc Province (operational in 2003) which supplies the north market, and one in My Phuoc II Industrial Zone, Binh Duong Province (operational at the end of 2008), its biggest factory occupying a land area of 60,000 m^2. The product supply system of the company is also spread all over the country.

Dat Hoa Company critically applies advanced management systems. In August 2002, it was granted the certificate of quality management system according to standard ISO 9001:2000 by Quacert organization.

Working around the principle “satisfy all demands of customers”, Dat Hoa Plastic Company is always active in studying the market to ensure its products meet the demands of its customers.

Thus, products with trade mark VINA – DAT HOA have always received the appreciation and support of customers in recent years. It is expected that this pleasant reception will continue in the coming years, considering that its products have been

known to be of high quality as also evidenced by the Gold Cup of Vietnam Construction Industry award it received. The company continues to strive in making innovations to maintain the trust of its customers and its position in the market.

3.9. Hanoi Plastic Stock Company (HPC)

HPC used to be Hanoi Plastic One Member State Limited Company. Its forerunner is the Hanoi Plastic Branch House which was under the Ministry of Light Industry. It was established in January 24, 1972 and now has nearly 500 staff.

It specializes in manufacturing plastic products for the domestic market and produces patterns for the production of these products, previously using pressure injection technology as its main technology for production. Being an old technology, it had led to low quality and low capacity of production. Thus, HPC has endeavored to continue implementing innovation in technology and methods of production management and its efforts have paid off as it is now one of the strongest brands. From 1995, the company has focused on manufacturing industrial products with high quality by improving the quality and design of its plastic patterns, enhancing plastic processing technology and improving management system. This development strategy stirred the potentials of HPC and helped it to become a significant company in the plastic manufacturing industry in Vietnam.

Hanoi Plastic Company has two main departments. One is involved in pressing plastic and the other produces patterns; both use advanced machines and equipment. From 1998, the company has continuously invested, installed modern production lines, and applied automatic technology into production. Equipped with a complete machine system from Western Europe, United State and Japan and staffed with engineers who are skilled, experienced and have the ability to use automatic technology proficiently, the company has manufactured hundreds of plastic products using advanced technology

for the domestic and foreign markets thereby satisfying local demand for imported goods and strengthening export turnover at the same time.

Plastic products manufactured by the company have complicated structures and a high degree of accuracy but are cheaper. Production time is also shorter. These aspects render its products the ability to compete strongly in the domestic and foreign markets. Products are manufactured using imported materials and automated machine system and advanced technologies which are controlled and maintained according to international standard of quality ISO 9001:2000. They have a high quality according to the standard of Japan JIS 10K. These products are used in the motorbike and car industries, electricity and electric communications industry and as materials and equipment for construction. The company is now supplying products to many local companies and big foreign companies such as Honda, Ford, Tostem, Hashimoto, Shoden and Sanko.

The company has built a department that manufactures patterns. It is staffed by an engineering force that utilizes professional software such as AutoCAD, CAD/CAM/CAE to design and program for CNC processing centers and modern CNC electric shock machine. Along with the design and production of frames for its own needs, the company also designs and manufactures frames that are complicated and require a high degree of accuracy. These frames are supplied to customers such as Honda Vietnam, Sanko Japan, Shoden Japan, Asian Plastic Company, Hoa Phat Refrigeration Company and soon it will also be supplying plastic products to Toyota Vietnam.

4. ANALYSIS

4.1. Statistic Analysis

Interviewees highly evaluated the role of upgrading in design in the plastic sector. All 10 firms confirmed the “significant change in packaging or appearance design”. It

was considered the most important factor for innovation and upgrading in the last three years. They upgraded their design and packaging based on customers' orders. Most of the customers were foreigners. Only a few interviewees mentioned the domestic market. "Significant improvement of an existing product/service" and "development of a totally new product/service based on the existing technologies" were implemented by all 10 firms.

There were only 4 out of 10 firms that responded 'yes' to most of the subquestions in Q11, which consisted of improved existing machines, equipment or facilities, and introduced new know-how on production methods.

For manufacturing, there were only five firms that have reduced raw materials and energy, while more firms have decreased defective products, and only four firms were concerned about the decrease in inventories.

Table 3 Plan or Achievement in Innovation of Interviewee Firms

Indicator	Yes
1. Decrease defective products	8/10
2. Decrease inventories of products	4/10
3. Reduce raw materials and energy	5/10
4. Reduce labor input	2/10
5. Improve quality of goods or services	4/10
6. Improve flexibility of production or service provision	8/10
7. Reduce lead time to introduce a new product or service	3/10
8. Enter new markets or increase market share in the domestic market	4/10
9. Enter new markets abroad or increase exports	5/10
10. Reduce environmental impacts caused by factory operations (noise, waste disposal, etc.)	3/10
11. Meet regulatory requirements on products.	9/10

Source: Authors.

R&D activities were not so important for enterprises. There were only two out of 10 firms that have their own R&D department. They also did not need to subcontract or outsource for their factory.

There were only five firms that manufacture products according to design,

specification, or drawings made by their establishment. Focusing on exporting and packaging plastic products, most of the firms have adopted ISO, but only half of them applied QM (quality management) or QC (quality control). Only one firm is producing products using its own design or specification (ODM or original design manufacturer and OBM or original brand manufacturer) and four firms are OEM or original equipment manufacturers. Only two firms used computer-aided design, manufacturing or engineering (CAD, CAM or CAE)) for enhancing technical design capability and built a just-in-time (JIT) system of delivery.

Table 4 R&D Activities

R&D expenditures	Yes
Does your establishment incur R&D expenditures at present?	2/10
Does your establishment subcontract or outsource R&D at present?	0/10
Does your establishment have R&D facility, R&D center or R&D department?	2/10

Source: Authors.

In terms of training system, only two firms have an on-the-job training (OJT) program and an off-the job training (OFF-JT) program for workers. Although workshops and seminars were conducted frequently, many firms did not pay much attention on providing theory training for their staff.

Table 5 Technical capabilities

Technical capabilities	Yes
1. Does your establishment manufacture products according to design, specification, or drawings made by your establishment?	5/10
2. Does your establishment have CAD, CAM or CAE (Computer-Aided Design, Manufacturing, Engineering)	2/10
3. Is your establishment an OEM (Original Equipment Manufacturer)?	4/10
4. Is your establishment an ODM (Original Design Manufacturer)?	1/10
5. Is your establishment an OBM (Original Brand Manufacturer)?	1/10
6. Has your establishment adopted ISO 9000, 14000 series or other international standards?	9/10
7. Has your establishment operated QM (Quality Management) or QC (Quality Control) circle activities?	5/10
8. Has your establishment adopted just-in-time delivery	2/10
9. Does your establishment have an on-the-job (OJT) training program for workers?	4/10
10. Does your establishment have an off-the job (OFF-JT) training program for workers?	2/10

Source: Authors.

4.2. Motivation for Innovation and Upgrading

The plastic industry in Vietnam is guided by the private economic sector which focuses on manufacturing packages that are mostly for export. There are a few enterprises taking part in manufacturing network of multinational corporations in the process aspect.

Innovation and upgrading process of plastic enterprises take place based on customers' demands. Enterprises have still not been aware and active in this process. They have not been aware of the need for continuous upgrading and innovation.

The good prospects of plastic enterprises rest on manufacturing packaging products with higher quality for industries such as health and cosmetics. Examples would be medicines with plastic packages having high quality and beautiful styles and colors. This outlook is being considered by many enterprises. Many are also turning to the aspect of manufacturing small industrial details and components. Some interviewed enterprises have considered supplying to process industries because they are aware of the long-term profit and they can also increase the value of their own products. However, information on this area is too little in Vietnam.

Different from the motorbike enterprises in Hanoi, the plastic enterprises mainly supply the overseas markets. Majority of plastic enterprises manufacture packaging products for export, supplying retail or trade firms. Innovation of products is an essential requirement to Vietnam's plastic enterprises to meet customer demand for new product models. However, innovation usually happens on a case-to-case basis and is not part of the regular operations of enterprises like plastic enterprises. Due to the particular characteristics of plastic packaging products, upgrading and innovation activities are mostly based on demands of design and are not directly related to technical matters. These activities are also mainly based on customers' demands which explain the reason why they have not been actively pursued by the local enterprises.

Most new plastic enterprises are in the beginning stage of innovation and upgrading. Some enterprises have started to manufacture plastic components for other branches such as motorbike, home appliance and automotive industry. Enterprises have had growth steps gradually like motorbike enterprises. For the remaining enterprise, due to the characteristics of manufacturing plastic packaging for export or construction for domestic demand, innovation activities have not had detailed long-term strategies. Few enterprises are not aware of the importance and effects of innovation on their own enterprises.

Many plastic packaging manufacturing enterprises have succeeded in the market and this success can continue through market expansion and developing more advanced and better quality products. But enterprises relate that profit remains very low and increasing concerns regarding the environmental impacts of plastic products are affecting the industry. However, Vietnam still has many opportunities for improvement and development, including manufacturing products that are environmentally friendly.

Admittedly the market for plastic components in Vietnam is still too young and weak and enterprises are hesitant to consider expanding their business. The success of

exporting plastic packaging is a main barrier for innovation in becoming suppliers for other manufacturing firms.

4.3. External Support

VPA and Ho Chi Minh Plastic Association show the role of profession associations relatively well. This is a different point compared with the motorbike industrial branch in Hanoi. This is a general characteristic of associations with members that are private enterprises in Vietnam. The interviewed enterprises mentioned the following main supporting activities of VPA:

International fairs. Due to the import-export activities, the role of plastic associations is clearly demonstrated and enterprises have appraised their function to be relatively good. Plastic packaging exporting enterprises highly appreciate the role of VPA. In 2009, VPA facilitated the participation of enterprises in the Tiprex International Plastic-Packaging Fair which took place in Bangkok, Thailand, from 23 to 26 September 2009. Through VPA, 10 Vietnam plastic enterprises participated in the Tiprex Fair 2009 to display their products. In addition, the VPA team also had 50 members from more than 30 enterprises along with the team visiting and accessing new machine technologies. The Vietnam plastic fair, Vietnamplas 2009, was also organized by VPA. It was conducted on 22 to 25 October 2009 at Phu My Hung Fair Center, Ho Chi Minh. It was participated by many plastic enterprises. More than 250 kiosks had displays of machines, equipment of plastic branch, additives, and chemical substances. Enterprises displayed their plastic products including plastic components. In 2009, VPA also supported enterprises to attend the biggest plastic fair in Asia, Chinaplas 2009, held in May 2009 in Quangzhou, China. VPA had the participation of more than 120 members from nearly 80 enterprises all over the nation.

Training: In 2009, VPA held three training courses on plastic materials and

additives, operating and servicing, maintaining thermal plastic equipments, production management towards reducing costs in production, recycle technologies, transfer technologies, manufacturing soft and soldering packaging, and packaging printing technologies. These training courses attracted nearly 20 trainees. They are one of VPA's annual activities that are highly appreciated by the interviewed enterprises.

Trading support. On 31 March 2009, American companies submitted a petition to the US Department of Commerce (DOC) to sue Vietnamese enterprises for devaluation and provision of subsidies for their PE carrier plastic bags. According to documents provided by DOC, the list of defendants included nearly 50 enterprises. VPA established an appeals committee to support the enterprises involved in the case. They include nine members, three of which are members of the Association and the rest are representatives of domestic and foreign-owned enterprises.

5. CONCLUSION AND POLICY IMPLICATIONS

This study has revealed a number of important points.

(1) The government needs to orient and guide the plastic industry to move towards supplying products, details and component parts for manufacturing industries such as motorbikes, electronics, home appliance and automotive industry.

(2) The government should continue to attract foreign investments into Vietnam particularly in aspects related to manufacturing plastic details and component parts.

(3) The government should come up with methods to encourage plastic enterprises to shift investments and production operation to manufacturing component parts for other industrial branches. At present, even the VPA is not aware of the potential of this aspect. The government should also come up with policies on

tax incentives or preferential treatment on land, workshop and labor cost for enterprises that manufacture plastic additives for industrial branches.

(4) For developing macro policies for nations in the ASEAN area, it is necessary to have a detailed assessment of each industrial branch. For example, for the plastic branch, it is necessary to examine the relationship between branches in each area. Then, for each area, there are also national inter-area polices about the development of these industrial branch groups.

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