Chapter 4

Evaluation on Fragmentation and Relocation of Electronics and Automotive and related Industries to CLMV Countries: Viewpoints from Thailand

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CHAPTER 4

EVALUATION OF THE FRAGMENTATION AND RELOCATION OF ELECTRONICS AND AUTOMOTIVE AND RELATED INDUSTRIES TO CLMV COUNTRIES: VIEW POINTS OF THAILAND

Apichat Sopadang and Korrakot Yaibuathet

Abstract

The electronics and automotive sectors in Thailand are among the forefront businesses that generate major export income for the country. This study aims to identify factors that are associated with the possible fragmentation and relocation of these sectors to CLMV countries. Primary data collection was conducted through direct interviews of ten electronics, six automotive and six business organizations and policymakers. Based on cost structure, preliminary results revealed that instead of being labor intensive, the sectors appear to be heavily material intensive. In contrast to the previous push factor of inducing companies to relocate due to cheap labor, the actual reasons found by this study relate to: (i) political climate and government stability; (ii) market volume; and (iii) access to port facilities. Based on the respondents' answers, Viet Nam was ranked no. 1 among the CLMV countries where companies would want to relocate. Challenges have been identified and recommendations have been proposed to steer this group of

countries towards becoming strong investment bases for electronics and automotive industries.

INTRODUCTION

At present, the automotive and electronics industries are considered as the most important sectors in Thailand's industrial goods export since they generate an annual income of over 2,000 billion THB (USD 59 billion) for the country. In 2008 and 2009, the electronics industry took the highest share among the industrial goods group at around 27 percent while the automotive sector captured the second spot with 10 percent share of the country's total earnings. The value and proportion of the export goods are shown in Table 1.

Moreover, the electronics and automotive industries play a significant role in supporting the country's workforce. More than 750,000 employees have been employed in these sectors, an extremely high number when compared with other industries. The Thai workforce has long been recognized worldwide for being highly skilled with inexpensive wages.

In recent years, the electronics and automotive industries have experienced a continuous increase in productivity. One of the reasons may be due to the government support which provided tax reduction for eco-car and labor training per industry requirements, among others. However, because of the global economic crisis in early 2009, industries, in general, experienced a slowdown in sale, leading to a great reduction in productivity. The electronics and automotive industries in Thailand were

Table 1: Thailand's export value of goods in 2008-2009

	Value : Million $US			Expansion Ratio (%)		Share (%)	
	2008 (Jan-Dec)	2009 Target	2009 (Jan-Jul)	2008 (Jan-Dec)	2009 (Jan-Jul)	2008 (Jan-Dec)	2009 (Jan-Jul)
1.Agriculture goods	29,366	27,241	13,559	30.1	-23.3	16.5	16.7
2.Industrial goods	117,981	119,509	54,732	12.0	-22.0	66.4	67.5
Electronics	**329,134**	**49,131**	**22,052**	**6.9**	**-25.2**	**27.6**	**27.2**
Automotive	**19,601**	**19,603**	**7,118**	**21.3**	**-38.6**	**11.0**	**8.8**
Plastics	8,212	8,623	3,661	9.3	-28.9	4.6	4.5
Fabric	7,200	7,343	6,667	2.4	-14.0	4.0	4.5
Construction materials	8,035	8,277	3,949	17.5	-14.6	4.5	4.9
Gem	8,270	8,270	5,686	53.7	25.4	4.7	7.0
Elastics	4,550	4,550	2,323	24.5	-12.4	2.6	2.9
Others.	30,428	31,091	12,825	17.2	-31.3	17.1	15.8
Total	177,775	177,841	81,115	15.5	-23.9	100.0	100.0

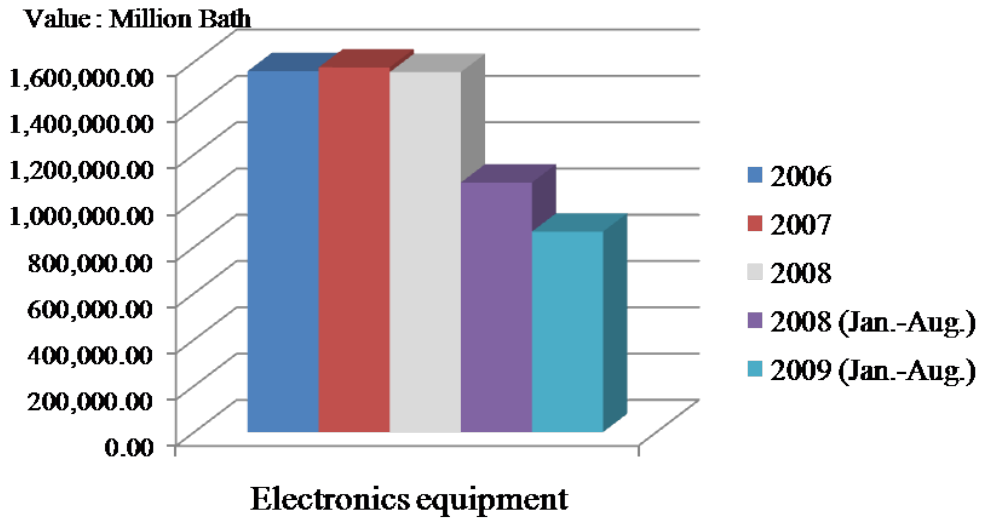
Source: Office of the Permanent Secretary of Commerce. http://www.ops.moc.go.th/MocCMS/.

affected as well, resulting in a number of layoffs among the labor force. The production capacity picked up, though, when the economy recovered in the latter part of 2009, leading to high labor demand and re-employment. The export values of electronics equipment and the automotive sector from 2006-2009 are seen in Figures 1 and 2, respectively.

Thailand is rated as the largest producer of electronic goods in the world. Government policies have been formulated for domestic industries to support domestic manufacturing. Later on, the Government introduced measures to promote production for export by inviting foreign investors to relocate their production activities to Thailand. Large investments from multinational companies or joint ventures between domestic and foreign firms were encouraged. To maintain the competence level of

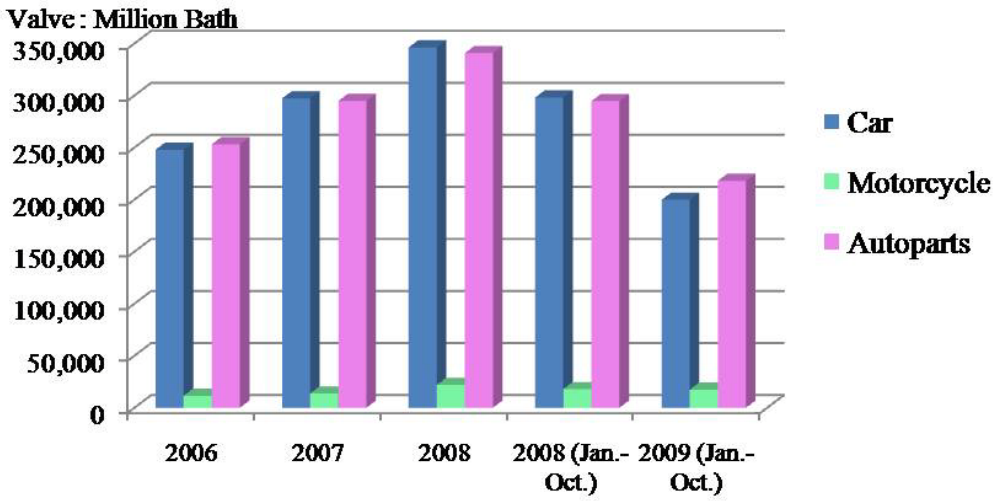
industries, the Government introduced many support projects for the electronics and automotive

Figure 1 : Export value of electronics equipment from 2006-2009



Source: Office of the Permanent Secretary of Commerce. http://www.ops.moc.go.th/MocCMS/.

Figure 2: Export value of automotive sector from 2006-2009



Source: Office of the Permanent Secretary of Commerce. http://www.ops.moc.go.th/MocCMS/.

industries such as investment promotion for electronic goods production, training and research for local companies to improve manufacturing technology and product development. These were meant to prepare the industries for increased competition from domestic and international sources.

For the automotive industries, majority are large investments by foreign investors. The Government has policies to support the growth of this industry, as can be clearly seen from the many support projects such as efficiency improvement in manufacturing technology for Thai auto parts manufacturers, and improvement of quality and standards to meet the internationally accepted level. Budget has been allocated to provide a technology database for the automotive industry, and infrastructure and promotion to further attract foreign investors to Thailand. Examples of these projects include the following: eco-car promotion, free trade area agreement, labor training to improve skills, and tax-related investment measures, among others.

Thailand is ready to provide great support for both industries in terms of labor force, infrastructures, government support policies, raw materials, and location. The country is considered to be a good logistic hub. Thai hospitality is well known. The workforce is relatively open-minded and happy to learn new technology and tools. As a result, the country had welcomed many investors in the past. In his study on automotive cluster, Leclear (2002) concluded that FDIs chose Thailand as their production base for three reasons, namely: (i) the size of market, which is the biggest among the ASEAN countries, (ii) the development of parts industry which is particularly important for the car industry, and (iii) the quality of infrastructure, especially the physical infrastructure. However, Thailand is no longer the only country in the region that offers great potential

for electronics and automotive industries. Other countries in Southeast Asia have also emerged as competitively attractive, providing more options for foreign investors.

The purpose of this study is to identify the possibility of fragmentation of industries from Thailand to CLMV countries, focusing on the electronics and automotive sectors. The significant relocation factors considered by investors in Thailand as well as an analysis of the attractive incentives for investors are presented. Guidelines and recommendations based on certain Thai good practices are likewise proposed for CLMV countries, if and when relocation is implemented.

1. INDUSTRIAL STRUCTURE

1.1. Thailand Automotive Industry

1.1.1. History

For the past 40 years, the Thai automotive industry has been developed with the objective of substituting imports with local vehicles. Large auto manufacturers established themselves in Thailand primarily to boost domestic sales, with exports meant only to be secondary targets. In 1997, however, the situation unexpectedly changed in the wake of Thailand's economic crisis which immediately cut the domestic demand for automobiles. Under this situation, automotive makers had to solve the problem of excess production capacity. As a solution, they decided to export their products to other countries. This led to the rapid increase of Thai auto exports from 14,020 units in 1996 to over 775,652 units in 2008, growing 55.3 times within the period of 12 years. Thailand's automotive industry is therefore poised for an accelerated

growth, currently employing more than 300,000 people and generating 12 percent of the national gross domestic product (GDP).

As a global player, the Thai auto industry has grown from an uncomplicated assembler into a major automotive production center. In 2008, more than 770,000 units of completely built up (CBU) automobiles have been exported to over 130 countries worldwide. At the moment, Thailand is the world's largest producer of one-ton pick-up trucks and the seventh-largest automotive exporter overall[1]. It is the top manufacturer in all of Southeast Asia, with great possibilities for expansion. This growth positively affects the fast rise of supporting extension industries involved in the auto parts production.

1.1.2. Current Situation of Thai Automotive Industry

With the second highest export value of all industries which brings in over 60 billion baht (around USD 2 billion) in excise tax alone, it is not surprising that the Thai government puts considerable effort in promoting and supporting the automotive industry.

In June 2009, the Thailand Board of Investment (BOI) expanded its automotive incentive scheme to cover automobiles that have high technologies that are new to Thailand such as hybrid drive, brake energy regeneration and electronic stability control. The BOI's new policy, which is designed to attract international automakers that are restructuring by relocating production facilities overseas, provides a range of incentives, including corporate income tax holidays of between 5 and 7 years. To be

[1] BOI: Thailand Investment Review, "Thailand's automotive industry to see growth accelerate", November 2009.

eligible, a project must involve a minimum investment of 10 billion baht[2]. Tax-based incentive also includes the exemption or reduction of import duties on machinery and raw materials as well as corporate income tax exemptions. At the same time, there are also non-tax incentives which offer even more advantages such as the permission for the international companies to bring in foreign experts and technicians, and allow them to own land and remit foreign currency abroad.

At present, there are 16 vehicle assemblers in Thailand, all large-scale enterprises that are either foreign-owned or joint ventures. In addition, Thailand also has more than 700 large-scale enterprises and small and medium enterprises (SMEs) which work as suppliers of original equipment manufacturers (OEM). This segment consists of companies with foreign majority shares (287), companies with Thai majority shares (68) and companies that are wholly Thai-owned (354). The OEM part suppliers in Thailand are employing more than 130,000 workers. In addition, the industry also accounts for 1,100 companies which all work as local suppliers who manufacture replacement equipment (REM). These are mainly SMEs.

The automotive industry in Thailand is very concentrated, with most factories located in the greater Bangkok area. The Thai government has announced that it has allocated around USD 2 million to promote clusters and one sector being targeted in this promotion is the automotive industry.

One of the most important reasons why Thailand has been considered an attractive country for automotive investment is that Thailand has no "national car program" like some of the other ASEAN countries. For example, the Malaysian national car is believed to be blocking the growth of foreign automobile sale. However, the Malaysian

[2] Source: BOI, 2009.

program has had enormous benefits for Thai auto part clusters because most of the assembly parts for the Malaysian car have been imported from Thailand.

Apart from this reason, Thailand is also geographically attractive in terms of being a gateway to Asia. Thailand provides easy access to the regional market. The country's many free trade agreements (FTAs) include terms that are advantageous to local auto parts producers. In particular, the agreement with ASEAN opens the door to a collective market of 585 million people in the association's member nations.

The automobile parts manufacturing sector in Thailand is considered to be the largest and the most capable in Southeast Asia. According to the Japan Automobile Manufacturers Association (JAMA), the quality of automotive parts in Thailand is rated as the best among ASEAN countries. The local part manufacturers supply approximately 80 percent of all parts being used in the assembly of pick-up trucks, approximately 55 percent for passenger cars and nearly 100 percent for motorcycles. Locally produced or assembled parts include engines, suspension control and spring, axles, hubs, propellers shaft, brakes, clutches, steering system, body parts, electronic parts, air conditioning, tires, wheels, internal and external trim components, and glass.

Since around 80 percent of the country's overall auto assembling capacity belongs to Japanese makers, most of the OEMs are mainly members of Japanese Keiretsu groups supplying to their own customer base. These companies can be categorized into three groups: a member in Japanese family companies, a joint venture with Japanese technology owners and a company having technical assistance or licensing agreements with Japanese firms. However, in recent years, the number of auto parts manufacturers for non-Japanese assemblers has increased significantly as a result of the establishment of Ford and General Motors in Thailand. The American assemblers have brought in a

number of their own first tier suppliers to the country. Although European assemblers have entered the market earlier, they tend to have fewer local parts suppliers due to their small assembling volume. The majority of the wholly Thai-owned companies are in the second and third tier suppliers business as well as REM business.

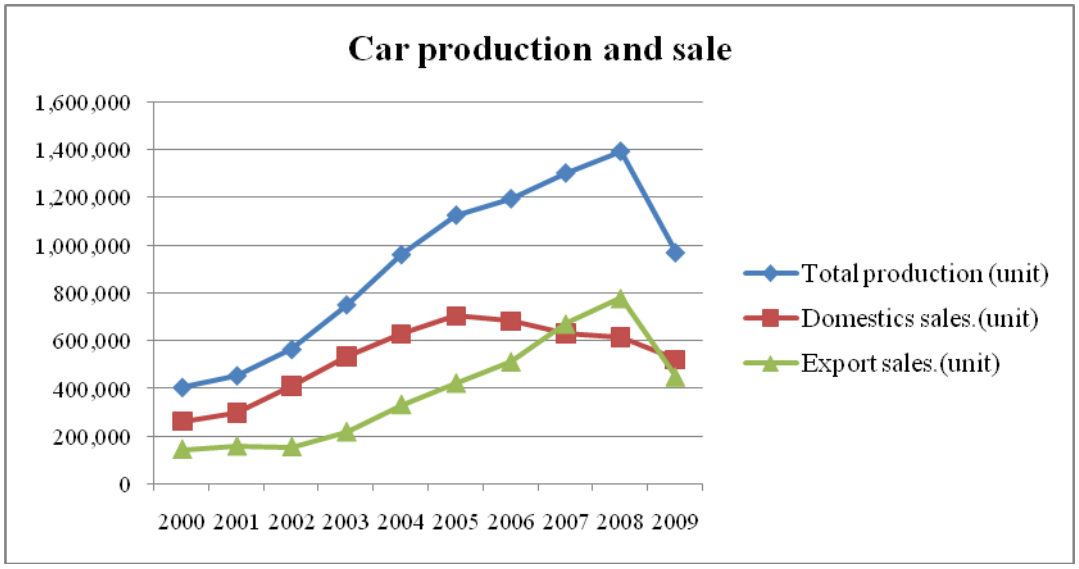
The Thai people are a plus factor as well, with many of them being skilled workers. Labor costs in Thailand are lower than in many other areas in Asia. The land and facility costs are also competitive. Moreover, the government is encouraging the development of so-called auto parts clusters, where proximity between manufacturers and suppliers will result in further cost and efficiency benefits.

1.1.3. Competitive Environment

(1) Current Export Potential

Thailand's automobile cluster has grown rapidly after the 1997 Asian financial crisis to become one of the leading exporting sectors of the country. By 2008, Thailand has become the largest production hub of automobiles in ASEAN, exporting more than 770,000 cars per year and generating over 385 billion THB (around USD 11 billion) of export revenue. Thailand is also currently the largest exporter of pick-up trucks in the world and has more model variations than any country in the world. However, during the global economic crisis in early 2009, the level of production and exports of the automotive sector dropped by around 30 percent. The level began to revive in the final quarter of 2009, with prospects for further increases in the coming years. The levels of production, exports and domestic sales of automobiles from 2000-2009 are shown in Figure 3.

Figure 3: Total Number of Production, Export, and Domestics Sale on Passenger Car

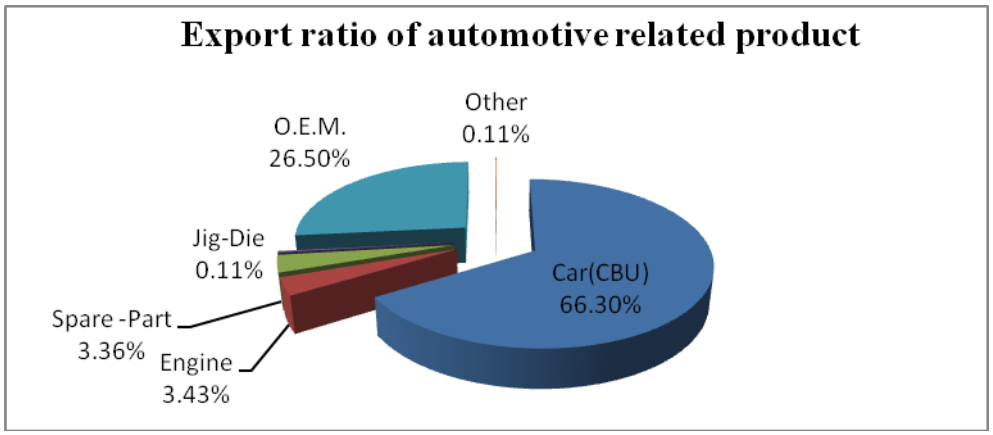


Source: Thai Automotive Industry, 2009. www.thaiauto.or.th.

Apart from automobile exports, auto parts such as engines, spare parts and OEM have also generated enormous income for the country. The export ratio of automotive-related products may be gleaned from Figure 4.

The launching of the ASEAN Free Trade Area (AFTA) scheme on January 1, 2010 could provide tremendous benefits for the automotive sector in Thailand. The five percent tax on automobiles and parts traded among the six founding ASEAN countries-Thailand, Malaysia, Singapore, Brunei, the Philippines and Indonesia - was abolished in the move toward turning the ASEAN into a single market. This could dramatically reduce the cost of purchasing parts, leading to a strengthening of manufacturing and raising the level of competitiveness for the region.

Figure 4: Export ratio of Automotive Related Products in 2009



Source: Thai Automotive Industry, 2009. www.thaiauto.or.th.

This agreement would help the ASEAN countries become more competitive against China and India. And since the markets such as the United States (US), Europe and Japan are already saturated and stagnant, any growth in the automotive industry is foreseen to take place in the ASEAN region.

Kasikorn Research Center; KResearch (2010) stated that Thailand's export of auto parts could expand by 18-22 percent this year from the AFTA. OEM (original) auto parts will be the main category benefiting from these changes, given their high export value that is nine times higher than REM (spare) items. Indonesia is expected to be the most promising market for Thai parts exports, followed by Malaysia and the Philippines. As a result, the government earns more income from increased excise, value-added and corporate taxes[3].

[3] Source: The Nation, "Thailand auto industry to benefit hugely from AFTA", January 25, 2010.

(2) Domestic market

Thailand's market has been dominated by multinational companies, especially Japanese makers. By the second quarter of 2009, Toyota, the most famous brand in Thailand, leads with 40.6 percent of the domestic market share while Isuzu and Honda had the second and third highest shares at 21.5 percent and 17.4 percent, respectively.

In 2009, the automobile market suffered a 28 percent plunge in the first half of the year, but there was a rebound in the second half and the year ended with sales of almost 550,000 units (dropping by 10.8 percent on a year-on-year basis). The fall in the passenger car market was limited to only 1.4 percent because of the increased popularity of small and fuel-efficient models. The market for commercial vehicles declined by almost 18 percent in 2009 to nearly 320,000 units. Of these, 240,000 were pick-up models, representing a fall of 20.4 percent in this segment.

The increase of auto sales in the fourth quarter of 2009 was due to the rising confidence of consumers and the auto industry. In addition, it may have resulted from several economic stimulus packages introduced by the government such as Thai Khemkhaeng projects which aimed to invest in the economic system, an increase in agricultural product prices and tax privileges under various FTAs.

Major auto-makers expect a growth of 9 percent domestic sales in 2010[4] if there are positive changes in the Thai politics. The risk factors, including increased oil prices and strengthening of the Thai Baht, are likewise being considered.

The attractive car financing in Thailand is believed to be one of the most important factors behind the speedy growth of domestic sale. Most cars sold in Thailand are sold on credit, as typical buyers are medium-income earners who need loans for

[4] Source: The Nation, "Toyota predicts 9% growth in 2010", January 20, 2010.

their purchases. Normally, automotive financing consists of hire purchase and leasing plans, with almost 80 percent of consumers choosing the hire purchase option because there is no need to pay a lump sum upfront and it is relatively less complicated than leasing. Automotive financing is provided by banks, bank-backed financial service firms, and independent leasing companies. Competition is strong, with various market strategies being offered, including extended installment duration (as long as 84 months in some cases), lower down payment and offers of lower-than-market interest rates. The hire purchase rates for a new car is around 25 percent lower than the adjusted rate for used car (approximately 3.0% and 4.0%[5] for a new car and an old car, respectively).

1.2. Thailand Electrical Appliance and Electronics Industry

1.2.1. History

Thailand's electrical appliance and electronics (E&E) industry has been experiencing a strong and steady growth for more than 25 years now, playing a significant role in the country's economy as an important export earner. The electronics industry is one of Thailand's largest in the manufacturing sector. Thailand's electrical appliance and electronics industry is forecast to have continued growth and could soon eclipse the USD50 billion mark in annual exports. The country is ASEAN's largest electrical appliance production base, with air conditioners and refrigerators leading the way. Thailand's electronics sector is also energized by shipments of hard disk drives (HDDs) and integrated circuits (ICs).

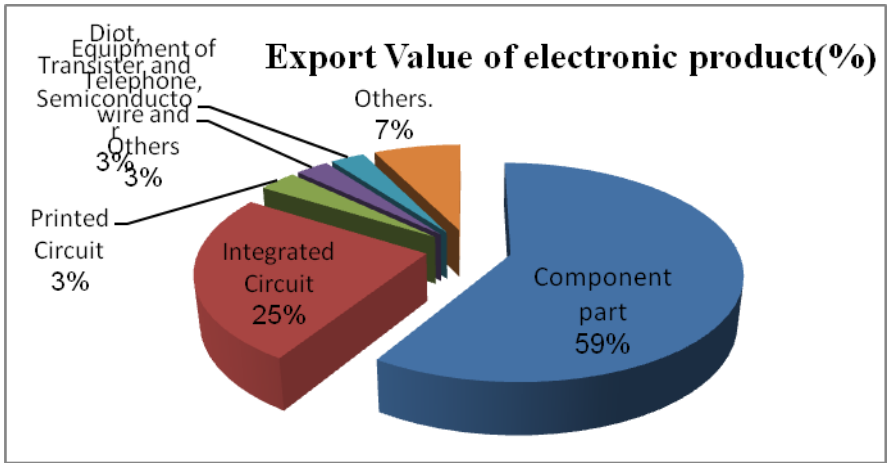
[5] Source: Ernst & Young 2008.
http://www.ey.com/Publication/vwLUAssets/Industry_Automotive_market_in_Thailand/$File/Industry_Automotive_market_in_Thailand.pdf

In the heart of the electronics sector are the HDDs and ICs, accounting for 40 percent and 23 percent of the country's total electronics exports, respectively. In fact, Thailand is the world's largest manufacturer of HDDs, overtaking Singapore's output in 2006. Thailand is also one of the biggest assembly centers for ICs and semiconductors in Southeast Asia. The proportion of export value for electronics products is shown in Figure 5.

The country's output of HDDs shot up by 20 percent in 2008. Since 2005, Thailand has supplied nearly half of the world's HDDs, and demand for the product is estimated to grow by at least 14 percent in the next couple of years. Producers are supported by the country's busy network of companies that supply the parts and subcomponents used in HDDs, from suspensions and gaskets to motors and covers.

The government-backed cluster development program fosters growth by putting HDD and component factories in proximity, reducing makers' transportation costs and

Figure 5: Proportion of Export Value for Thailand's Electronics Products



Source: Customs Department, Oct.2009, Access: 31 Jan 2010.

thereby helping to keep prices competitive through efficient supply chain management. These zones are located mainly in the central and northeast regions.

Respect is the word for Thailand's electrical appliance manufacturing sector, which is highly regarded among global buyers. The country is ASEAN's largest production base in the sector, and the world's second-biggest maker of air conditioners and fourth largest for refrigerators. Made-in-Thailand is seen as a mark of quality for such products.

By export value, Thailand's leading electrical appliances are air conditioners, refrigerators, and digital cameras and video camera recorders. Air conditioners account for 16 percent of value[6]. The strongest growth is seen in the digital camera and video camera recorder line, which in 2008 jumped by one-fifth in value compared with the previous year's exports. Electrical appliance makers in Thailand also benefit from the strong local presence of compressor, motor, and plastic and metal part suppliers, and other support industries.

More than 480,000 people are employed in the industry. Foreign direct investments (FDIs) currently dominate this large and fast-growing sector. Multinational companies, mainly from Japan, the US, Netherlands and Taiwan, generally establish their product, testing and assembling facilities in Thailand.

Feeding the country's business expansion, the electrical appliance and electronics industry is a main driver of the export sector, accounting for a large 30 percent of Thailand's outbound shipments. With the government viewing development of the industry a priority, E&E businesses are enjoying favorable policies for even further growth, an attractive environment for investors.

[6] Statistics from the Bank of Thailand, 2009.

1.2.2. Current Situation of Thai Electrical Appliance and Electronics Industry

The nature of investments of major electronics operators is to use Thailand as a production base for export to the mother company's home country or export to other countries. The electronics industry is capital intensive and requires know-how. Thailand can mainly provide low labor cost, incentives and privileges offered by its BOI for investors in this sector. Furthermore, Thailand serves as a good hub for activity in Southeast Asia, with good transportation links to the rest of the region and to China.

The government is committed to further developing this industry. Hence, the BOI has accordingly taken steps to ensure that the investment climate remains favorable and that special tax incentives are granted to investors in the industry. These incentives include:

- Maximum tax incentives for high-technology investment projects totaling more than 30 million baht that would manufacture products not yet made in Thailand;
- Exemptions for import duties on machinery, raw materials and components;
- Exemption from corporate income tax for a period of 8 years for projects in Zone 3, 7 years for projects located in an industrial estate or a promoted industrial Zone, 6 years for projects in Zone 2 and 5 years for projects in Zone 1.

Additional incentives are also available to investors who locate in Zone 3 regions of the country, in accordance with Thailand's decentralization policy.

Apart from attractive tax incentives, the BOI provides investors with comprehensive business services. It assists locators by identifying potential suppliers, allowing them to own land, permitting them to bring in foreign experts and technicians to the country, and facilitating the work permit and visa application process for foreign employees working in Thailand.

Moreover, several incentives are available to companies that invest in R&D. The BOI grants these companies a three-year extension of the corporate income tax holiday while the Revenue Code of Thailand allows for the double deduction of R&D expense from corporate income taxes.

The country also offers abundant technical training facilities, including the Thai Microelectronics Center, Hard Disk Drive Institute, Electrical and Electronics Institute and National Electronics and Computer Technology Center.

1.2.3. Competitive Environment

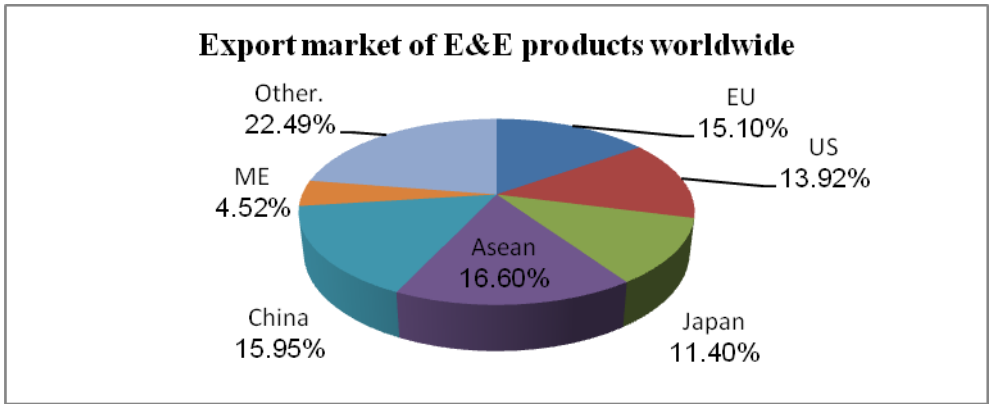
(1) Current Export Potential

In 2009, Thailand's exports of electrical appliances and electronics (E&E) hit USD38 billion, with ASEAN member nations taking in a share of the exports at 16.6 percent. Other top destinations in 2009 were the European Union (EU) with a share of 15.1 percent, China (15.95%), the US (13.92%), and Japan with an11.4 percent share. The Middle East absorbed 4.52 percent of the Thai exports of E & E. The export market of Thailand for these is shown in Figure 6.

In 2009, in terms of the global exporter ranking, Thailand was ranked as the largest out of 22 manufacturers from around the world. The ranking can be seen in Figure 7.

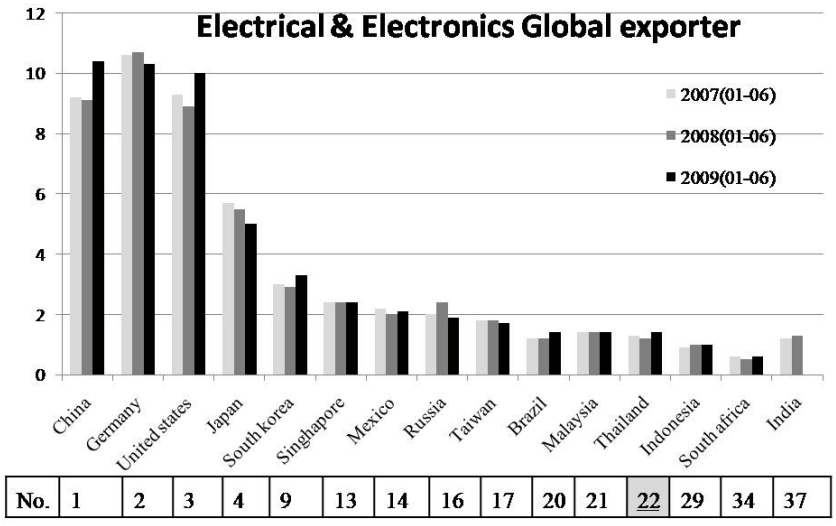
Increasing demand for LCD and Plasma TV has also been detected since the product has been proven to be more environment-friendly than the previous model with CRT type. Samsung and LG have been recognized as major players in this market, with their main manufacturing bases located in Thailand. Since Thailand is considered as a

Figure 6: Export Market of Thailand on Electrical Appliances and Electronics Products



Source: Customs Department, Oct 2009, Access: 31 Jan 2010.

Figure 7: Ranking of Electrical and Electronics Global Exporter, 2009



No.	1	2	3	4	9	13	14	16	17	20	21	22	29	34	37

Source: World Trade Atlas, November 2009, www.thaieei.com. Access: 31 Jan 2010.

gateway to Indo-China for LCD and plasma TV, the opportunity exists for the country to be the top exporter in this market sector in the future.

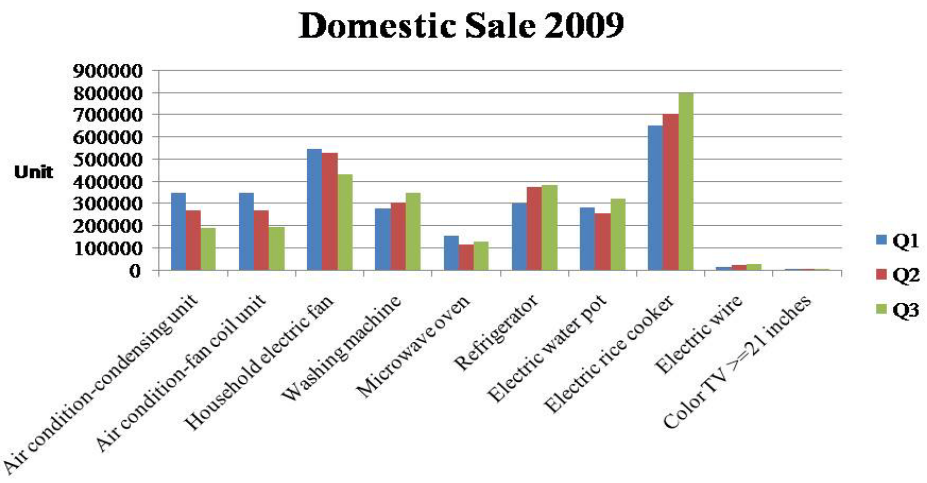
E&E companies are being encouraged to upgrade their technical capability in order to expand beyond OEM into ODM production. This is part of a greater effort to position Thailand as a center of cutting-edge technologies.

Thailand's pre-eminent position as the world's largest production base for HDDs and components offers suppliers within the HDD value chain the opportunity to develop world-scale manufacturing capacity within a dynamic and highly concentrated cluster. Almost all of the world's key HDD manufacturing players are located within a 250 km radius of Bangkok or within the AFTA, offering unparalleled opportunities for manufacturers within the HDD industry.

(2) Domestic market

Domestic sale of electrical appliances and electronics products is around 10-20 percent of overall sale value. For the electric appliance industry of Thailand, the main players are from Japan, China and South Korea. The forefront market share occupants are Japanese-owned SONY and PANASONIC, which provide fierce competition in the industry. However, the company with the highest growth in this sector is owned by South Korea's Samsung. Figure 8 shows the domestic unit sale of electrical appliances in the first three quarter of 2009. Best-selling products are electric rice cooker, household electric fan and refrigerator, respectively, for the three periods.

Figure 8: Domestic Unit Sale of Electrical Appliance in 2009



Source: The office of industrial economics, www.thaieei.com. Access: 31 Jan 2010.

2. SURVEY RESULTS

The survey in Thailand was conducted from November 2009 – January 2010 among firms in the automotive and electronics sectors. There was a total of 16 private companies interviewed, consisting of 10 electronics and 6 automobile-related producing companies. Representatives from business organizations, including policymakers from 6 main associations, were interviewed regarding the perception and possibility of fragmentation to the CLMV (Cambodia, Laos, Myanmar and Vietnam) countries. They represented Thai Automotive Institute (TAI), The Federation of Thai Industry (FTI): Automotive sector, Motorcycle and parts Cluster, Electrical and Electronics Institute,

and the Thai National Shippers' Council (TNSC) and the National Science and Technology Development Agency (NSTDA): Hard disk drive program.

2.1. General information of participating companies

Based on the company profiles gathered from the initial survey, the ownership of the participating companies can be summarized in Table 2. Over 60 percent of the respondents are Japanese investors. The rest are from the US, Korea and Switzerland, among others.

The survey was conducted in three main industrial areas of Thailand, namely, Ayutthaya, Lamphun and greater Bangkok area as can be seen in Figure 9. Most of the electronics respondents were from Ayutthaya and Lamphun. Meanwhile, the automotive respondents were located in greater Bangkok area.

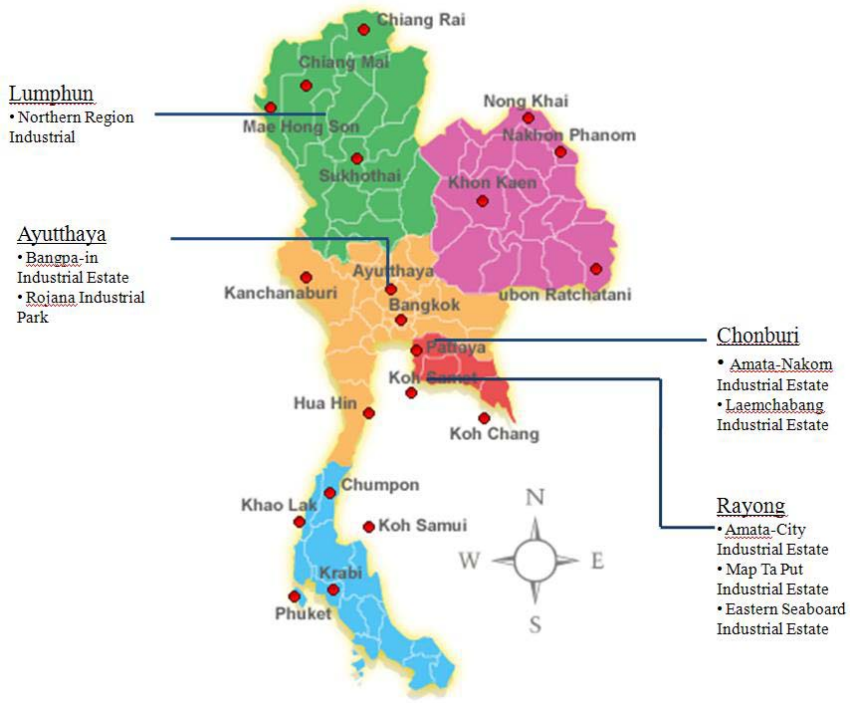
Table 3, meanwhile, presents other information about the surveyed companies which includes the annual sale, total asset, and the number of full-time employees. Said information indicate the company scale which varies from medium to large industry, with assets ranging from 90 to 9,000 million THB.

Table 2: Ownership Status of Participated Companies.

Ownership status	Number of company
Foreign Direct Investment (FDI)	9
Joint Venture (JV)	3
Thai Owned	3
Stock Market	1
Total	16

Source: Survey results.

Figure 9: Location of Participants



Source: Authors.

Table 3: Annual sales & Total Asset & No. of Full Time Employees.

	Electronics (10)			Automotive (6)		
	Max	**Min**	**Average**	**Max**	**Min**	**Average**
Annual sales (million THB)*	250,000	18	36,393	245,838	3,523	73,398
Total asset (million THB)*	9,000	90	2,263	7,520	200	2,284
Full-time employee	37,000	215	7,326	13,500	500	3,941

Source: Survey results.

2.2. Cost Structure

The cost structure of the automotive and electronics industries were broken down into unit cost structure and total cost structure. The comparative data are presented in Tables 4 and 5. For the unit cost structure, the main expense is derived from domestic and imported materials. The material cost in the automotive business captures more than 64 percent of overall cost while the electronics industry pays almost 68 percent for components alone. A balanced usage of domestic and imported materials can be found among firms in the automotive sector whereas the electronics firms tend to use more of imported parts. Recently, however, the electronics players have made an effort to replace the imported parts with local content in order to reduce their production cost.

The information on both industries further indicate that the electronics and automotive industries are not labor-intensive since the labor cost from both players is less than 12 percent of total cost. In terms of transportation cost, the automotive sector

Table 4: Unit cost structure of Automotive and Electronics Industries

Unit Cost Structure	Automotive	Electronics
a. Labor force	11.6 %	9.65 %
b. Imported parts, components & raw materials	29.8 %	40.72 %
c. Parts, components & raw materials procured from domestic market	34.4 %	26.94 %
d. Transportation	4.88 %	1.87 %
e. Electricity	5.60 %	4.83 %
f. Other energies	3.60 %	1.65 %
g. Depreciation on machinery	5.20 %	8.00 %
h. Other elements	8.13 %	4.97 %
Total	100 %	100 %

Source: Survey results.

Table 5: Unit cost structure of Automotive and Electronics Industries

Total Cost Structure	Automotive	Electronics
a. Labor force	13.8 %	10.46 %
b. Imported parts, components & raw materials	24.8 %	33.51 %
c. Parts, components & raw materials procured from domestic market	32.6 %	28.30 %
d. Transportation	4.4 %	2.65 %
e. Electricity	8.8 %	5.48 %
f. Other energies	3.6 %	2.88 %
g. Depreciation on machinery	5.2 %	7.38 %
h. Other elements	6.8 %	9.66 %
Total	100 %	100 %

Source: Survey results.

takes up 4.88 percent while the electronics industry takes only about 1.87 percent. The difference between the two industries may be attributed to differences in carrying load, number of components per shipment, transportation mode and distance involved. Other expenditures such as electricity and alternative energies do not yield any significant difference between the two industries. A similar trend in the total cost structure of these two sectors has been noted, as can be seen in Table 5.

2.3. Business Climate

2.3.1. Export Ratio

The respondents from the electronics companies are mostly located in Special Economic Zones (SEZ) or in Export Processing Zones (EPZ). Hence, one can see that they focus mainly on the export market. On the other hand, the automotive companies, especially the auto parts sector, target more on the domestic market. They are main

suppliers for several auto assembly players in the country. The export ratio of the participants as collected from the survey is presented in Table 6.

2.3.2. Lead Time

Lead time has been surveyed in two different channels: upstream and downstream. The upstream lead time is considered between the time of the respondent's order of import materials and the date/time of their delivery. It varies from 3 to 70 days for electronics' import parts and from 7 to 90 days for automotive sourcing. On average, the automotive industry respondents experience 20 days more than the electronics respondents to obtain their materials. Most of the automotive import parts are delivered by sea freight while up to 20 percent of the electronic firms' import components are delivered by air.

Meanwhile, the downstream lead time is the duration computed between the time of a customer's order and the time of delivery of the product. In this survey, the electronics sector performs better market response than the automotive sector, running almost 17 days faster. The shipment mode of outbound logistics could be one of the main reasons for this divergence since the electronics sector employs more air shipments than the automotive sector. Focusing solely on the automotive group, the lead time for the auto parts sector is a lot shorter than auto assembly because their major

Table 6: Export Ratio of Participated Companies

Export ratio	Min	Max	Average
Electronics (10)	30	100	81.89
Automotive (6)	1	100	43

Source: Survey results.

Table 7: Upstream and Downstream Lead Time of Electronics and Automotive Respondents

Industry	Upstream lead time*			Downstream lead time**		
	Max	Min	Average	Max	Min	Average
Electronics	3	70	31.6	1	30	12.4
Automotive	7	90	52.5	7	90	29.0

Source: Survey results.

customers are located domestically. Upstream lead time in both cases take longer than the downstream channel. The upstream and downstream lead time for both industries can be seen in Table 7.

2.3.3. Custom Clearance Time

Custom clearance time for the survey sample varies from 1 hour to 48 hours with the average interval of around 20 hours (Table 8). The length depends on the congestion at the custom office and the completeness of the required documents for clearance. However, the time consumed for custom clearance is still uncertain in this survey because most of the respondents have subcontracted their incoming and outgoing

Table 8: Custom Clearance Time of Electronics and Automotive Respondents

Custom Clearance time	Min (hour)	Max (hour)	Average (hour)
Electronics (10)	1	48	19.3
Automotive (6)	1	48	23.5

Source: Survey results.

custom clearance activities to third party logistics companies. Lack of information seems to be a limitation for this particular survey issue.

2.3.4. Distance to Major Harbors and Airport

Road transportation is mainly utilized for the domestic market. Appropriate means of transportation are selected for each company. Logistics service providers play important roles in distributing components to local customers.

The survey results also indicate that the outbound logistics of exporting electronics component sometimes require air shipment. The distance from major industrial estates to Suvarnabhumi (Bangkok International Airport) is presented in Table 9. These designated industrial zones are home to the electronics and automotive industries in Thailand.

Inbound logistics for both industries are mostly done via sea shipment. The distance from the Laem Cha Bang (LCB) port and Bangkok (Khlong Toey) port which are the main ports of Thailand to major industrial areas are presented in Tables 10 and 11. LCB port is located in the Southeastern direction of Klong Toey port, with a

Table 9: Access of Major Industrial Areas to Bangkok Airport (Suvarnabhumi)

Industrial Zone	Distance(Km.)	Time
Amatanakhon (Chonburi)	60.4	50 min
Laem Chabang Industrial Estate (Chonburi)	86.7	1hr 17 min
Maptaput (Rayong)	162	2hr 23 min
Eastern seaboard (Rayong)	125	1hr 50 min
Bang pa in Industrial Estate (Ayutthaya)	74.5	49min
Rojana industrial park (Ayutthaya)	79.3	59min
Lamphun Industrial Estate	677	9hr 33 min

Source: http://maps.google.co.th/.

Table 10: Access of Major Industrial Areas to Laem Cha Bang Port.

Industrial Zone	Distance(Km.)	Time
Amatanakhon (Chonburi)	27.4	24 mins
Maptaput (Rayong)	79	1hrs 19mins
Eastern seaboard (Rayong)	68.7	1hrs 5mins
Bang pa in Industrial Estate (Ayutthaya)	151	1hrs 45mins
Rojana industrial park (Ayutthaya)	164	2 hrs
Lamphun Industrial Estate	767	10hrs 44 mins

Source: http://maps.google.co.th/.

Table 11: Access of Major Industrial Areas to Klong Toey Port.

Industrial Zone	Distance(Km.)	Time
Amatanakhon (Chonburi)	83.7	1 hour
Laem Chabang Industrial Estate (Chonburi)	96.4	1hr 30 min
Maptaput (Rayong)	172	2hrs 37mins
Eastern seaboard (Rayong)	150	2hrs 4mins
Bang pa in Industrial Estate (Ayutthaya)	62.8	1 hrs
Rojana industrial park (Ayutthaya)	74.9	1 hrs 4 mins
Lamphun Industrial Estate	665	9hrs 34mins

Source: http://maps.google.co.th/.

distance of 96.4 km. From the survey results, the automotive industry is seen to utilize Laem Chabang port more frequently than the electronics industry does. Shipments of electronics commodities and parts are normally done at Klong Toey port. The distance from the industrial zone to ports is one of the most important criteria for the port service selection. The transportation networks from the industrial zone to ports are in good condition, thus making the road travel very efficient.

2.3.5. Black-out Frequency

Black-out frequency indicates the stability of electrical supply for designated industrial zones. In recent times, the black-out problem in Thailand has been more seldom since the electrical supply system has become more reliable. Preventive maintenance has been done more regularly to ensure efficient electric supply especially in the industrial zone.

Data collection regarding black-out shows that companies experienced 1-3 times of black-out every 6 months. Most of the time, the duration is between 5-30 minutes. At least 4 companies did not experience a black-out in a year (Table 12). Large scale industries invested in their own electric generators and sub-stations to avoid black-out problem. For the industrial estate, a black-out plan has always been announced in advance .

2.3.6. Wage and Educational Level

Wages and educational levels of staffs were studied to indicate the education required

Table 12: Frequency and the longest hours of black-out

Industry	Average		Min		Max	
	Freq.	Longest hours	Freq.	Longest hours	Freq.	Longest hours
Electronics	1.7	2.60	1.0	1.0	2.0	5.0
Automotive	1.8	2.67	1.0	1.0	2.0	4.0

Note: 1) "Freq." means frequency of black-out. The level indicator of frequency is:
1= have no experience in a year 2= Once or a few times in six months 3= Once or a few times in a month 4= Once or a few times in a week 5= Several times in a day.
2) "Longest hour" mean the longest hours among the cases of black-out. The level indicator of frequency is: 1= less than a few second 2= a few seconds – one minute 3= one minute – five minutes 4= five minutes – thirty minutes 5= Longer than thirty minutes.

Source: Survey results and interview with respondents.

for each position. The operators for both industries are required to graduate at least from middle high school. It is necessary for middle managers and engineers to obtain at least a bachelor's degree to qualify for these positions. However, some of the middle managers have been promoted from production line staffs because of their abundant experience. Therefore, being a college graduate is not required in this case. Unlike engineers who have to graduate with no less than a bachelor's degree to become eligible to apply for a professional engineer's license. The educational level of engineers for both industries is not much different. For operators and middle managers, the automotive employees tend to have higher educational levels than the electronics staffs.

The salary for each position is also summarized in Table 13. Operators in electronics companies receive higher salaries than automotive workers. On the other hand, middle managers and engineers in the automotive sector earn slightly more than those in the electronics sector.

Turnover ratio of staffs is considered a small number for both sectors. The ratio varies from 0.2 to 5 percent per month with an average of 1.70 percent. The highest turnover ratio is among operators, especially in the industrial zone where several

Table 13: Salary and Educational Level of Three Different Positions in Automotive and Electronics

Wages	Electronics				Automotive			
	Max (US$)	Min (US$)	Average (US$)	Education Level *	Max (US$)	Min (US$)	Average (US$)	Education Level*
Operator	300	191	232	3.50	283	183	224	3.80
Middle Manager	2,520	850	1,293	6.06	2,400	760	1,300	6.26
Engineer	2,400	460	900	6.16	2,200	400	920	6.12

Note:* Education: 1= no formal school, 2= elementary school, 3= middle high school, 4= high school, 5 = vocational school, 6= college/university, 7= graduate school

Source: Survey results.

Table 14: Summarize of turnover ratio in electronics and automotive sectors

Turnover ratio (% per month)	Min	Max	Average
Electronics (10)	0.2	5	1.74
Automotive (6)	0.2	5	1.71

Source: Survey results.

companies are located. They decide to move when better incentives are offered.

High turnover is also detected among engineers, especially from being auto parts to auto assembly players. A perception has been made that working in the auto assembly sector could provide a better career path. This could be one of the main reasons for the job hopping in the automotive sector. The turnover ratio in both industries is summarized in Table 14.

3. POSSIBILITY OF FRAGMENTATION TO CLMV COUNTRIES AND CHALLENGES FOR CLMV COUNTRIES

3.1. Investment Climate- Evaluation by Electronic and Automotive firms

This section provides a survey of the kind of investment climate that influences relocation decisions. The respondents were asked to give rankings on nine elements affecting the investment climate as shown in Table 15. Based on the rankings, access to port and market is rated as the most important factor for both the automotive and electronics clusters. Then for the electronics sector, the elements that rank second and third are the educational level of workers and incentives for investors, respectively, whereas for the automotives sector, their focus is more on GDP per capita followed by

Table 15: Priorities on Conditions for Deciding Locations of Manufacturing Factories: excluding other factors

Investment Climate	Electronics		Automotive	
	Score	Rank	Score	Rank
1. Land price	2.9	6	1.6	8
2. Wage of workers	5.9	4	5.0	5
3. Price of energy and electricity	4.8	5	3.0	6
4. Price of water	2.8	7	2.2	7
5. Access to port and market	6.7	1	6.2	1
6. Educational level of worker	6.4	2	5.4	3
7. Population and GDP per capita	2.6	8	5.8	2
8. Incentive like tax holiday	6.1	3	5.4	3

Source: Survey results.

educational level and incentives. Purchasing power appears to be drawn from the population and income, which would explain why the automotives group rated GDP per capita on a high scale. On the other hand, since the electronic respondents are mostly export-focused, the elements of population and GDP per capita are less important for them.

Educational level is found to be essential for both clusters because a high level of responsibility is necessary for the manpower in view of the clusters' work production complexity. Wage level is not a big issue for these clusters because they are not labor-intensive industries. The cost structure specifies that automotive and electronics industries spend only 11.6 percent and 9.65 percent, respectively, on labor cost. The quality of workers in these industries is more focused.

Table 16: Priorities on Conditions for Deciding Locations of Manufacturing Factories: Include Others

Investment Climate	Electronics		Automotive	
	Score	Rank	Score	Rank
1. Land price	2.9	11	1.6	13
2. Wage of workers	5.9	6	5.0	9
3. Price of energy and electricity	4.8	10	3.0	11
4. Price of water	2.8	12	2.2	12
5. Access to port and market	6.7	3	6.2	3
6. Educational level of worker	6.4	4	5.4	7
7. Population and GDP per capita	2.6	13	5.8	5
8. Incentive like tax holiday	6.1	5	5.4	7
9. Others: Political stability	8.0	1	7.8	2
10.Others: Market Volume	7.4	2	8.0	1
11.Others: Infrastructure	5.9	6	60	4
12.Others: Investment regulations	5.0	8	5.8	5
13.Others: Available of suppliers	5.0	8	4.5	10

Source: Survey results.

Land price and utility cost are, on the other hand, evaluated lowest in both sectors. This could be described by the product cost structure in section 3.2 where cost of electricity usage is less than 6 percent of total production cost.

Conditions for relocation included other factors as shown in Table 16. These other factors include political stability and market size which seem to be the most important criteria for fragmentation as gathered from the electronics respondents. Since a substantial investment is required for both industries to set up their production plant, they would like to ensure that the political issue in the place to be relocated would not delay and obstruct their business.

Market size appeared to be the most important reason for the automotive players to relocate. Most of the auto part respondents tie their decision with the relocation policy of their main customers whereas auto assemblers would decide to transfer to a new market with high purchasing power. For example, the motorcycle business has transferred to Vietnam because of its attractive market size. As a result, motorcycle parts makers have followed their customers to Vietnam.

Logistics infrastructure, availability and variety of suppliers, and investment regulations have been considered imperative by some respondents. Two electronics companies mentioned about the investment regulation which should be flexible and more investor-friendly. Availability of qualified local contents is crucial for these industries because over 60 percent of total cost is paid for material. The presence of competitive local suppliers could thus reduce the manufacturing cost of these sectors.

3.2. Possibility of Fragmentation to CLMV countries

Previous studies indicated that the primary reasons for moving manufacturing offshore are access to low labor cost, access to markets and/or access to skilled labor (Steenhuis and Bruijn, 2005). A similar result was detected in a survey of Southeast Asia by Suzuki (2009) indicating that a firm relocated from Thailand to Lao PDR because the wage in Thailand was around 4.8-8.0 times higher than that in Lao PDR. Thus, the firm could save significant labor cost from fragmentation to a low-wage country.

Several studies have looked at the motives for relocation in such a strict sense. From a sample of business relocation announcements in the US, Chan *et al.*(1995) found that the main reasons for the business relocation are cost savings and business expansion. Within a European context, Brouwer *et.al*. (2004) speculated that

restructuring and flexible responses to new market conditions for innovative products are equally, if not more, important motives. However, market access is a weak point in less developed countries, especially small countries such as Lao PDR and Cambodia (Kuroiwa, 2009). They cannot provide lucrative markets for FDIs.

Cost of relocation has been reported from the previous work of Kuroiwa (2009) indicating that it involved three kinds of additional costs when production fragmentation occurs. They are (i) business set-up cost which is incurred when the firm sets up a new factory in a new country, (ii) additional business operation costs which are incurred when a less developed country has a less favorable business environment than a developed country, and (iii) service link costs or logistics costs which are incurred when intermediate freight to another country and final products are carried back and forth between the two countries. Hence, these additional costs may be considered as one of the significant factors for fragmentation to CLMV countries.

This section presents an evaluation of the CLMV countries by the survey respondents from electronics and automotive companies in Thailand. After showing the table of basic information on investment climate in the CLMV countries, respondents were requested to answer if investing in CLMV is good, fair or bad. Pros and cons on investment in each of the CLMV countries were asked, based on the respondents' perception.

From the initial survey results, the respondents agreed to have Vietnam as the first priority among the CLMV countries if and when they would consider relocating or extending their production base. Lao PDR, Myanmar and Cambodia were then ranked/ considered in said sequence.

Automotive and electronics industries in CLMV countries have been classified as “new industries”, with the supporting infrastructures not yet put in place. For this reason, not many respondents had direct experiences in terms of relocation to CLMV. An additional survey was conducted with companies who already decided to extend their business or move to CLMV. From this additional survey, most companies agreed that access to low labor cost was the most important push factor. Then, access to market was also pointed out, especially by auto-part makers. These answers are thus similar to findings of previous research.

At present, there is still no obvious sign of fragmentation to CLMV for the automotive and electronics sectors from Thailand. However, an opportunity still exists for CLMV countries in view of some advantages enumerated by the respondents.

3.2.1. Opportunity for Vietnam

Several perceptions and comments were achieved from Thai respondents regarding the opportunity of investing in Vietnam. The advantages that were often pointed out by respondents were access to a larger market (automotive sector) and access to lower wage (electronics sector).

Opportunity clearly exists for the motorcycle assembly industry because of its sizeable market in Vietnam. Same goes for the parts makers, especially motorcycle parts and low-tech uncomplicated parts such as injection forming, metal cut, metal stamping and press. These supporting industries do not require skilled workers to operate and the investment on this sector is relatively not high. Hence, a number of Thai parts makers decided to transfer to Vietnam. Additionally, Korean and Chinese car makers are now

making efforts to penetrate the Vietnamese market, with the expectation of a market expansion to the Southeast Asian region in the near future.

Meanwhile, in terms of labor issue in Vietnam, the major survey participants expressed similar opinions that the Vietnamese are hard-working people and are eager to learn. Moreover, the proportion of the working-aged population in Vietnam is 54 percent or around 46 million people who are ready to work[7]. Labor cost, especially among unskilled labor, is much lower here than in Thailand.

More valuable perceptions on the advantages of fragmentation to Vietnam were derived from a single comment as follows:

- Investor-friendly environment, with the Vietnamese government concerned a lot on diplomacy issue,
- Promotion and investment policy of the government which is beneficial for investors, and
- English communication skill of Vietnamese is an advantage over the CLM countries.

However, some disadvantages were also discerned from the other respondents' perceptions which could impede the growth of automotive and electronics investment in Vietnam. Several respondents worried about the unavailability of supporting industries, infrastructure, and qualified skilled labor. Lack of experience in the automotive industry, including low purchasing power for passenger cars and trucks, were always mentioned by many Thai companies.

[7] Source: Board of Investment, 2010: http://www.boi.go.th/thai/clmv/2009_vietnam/2009_vietnam_d5_5-1.html (accessed February 15, 2010).

The supporting industry for the automotive and electronics industries in Vietnam was evaluated to still be immature. Thus, imports of significant parts and materials would inevitably be required. This could increase the production costs of the company. Basic infrastructure facilities and logistics network are likewise not yet fully arranged or put in place. The report from the BOI (2009) pointed out that electricity was found to be deficient in Vietnam, resulting in frequent black-out problems. However, the Vietnamese government plans to construct new power plants throughout the country, including a nuclear power plant.

Although many people in Vietnam are of working age, they are not completely prepared for the automotive and electronics-related industries. Skilled labor, including middle managers, are still not sufficient and somehow not qualified. Since the country has only 10 years of experience in the automotive industry, it was felt that the knowledge on automotive production was not yet enough.

Additional concern from automotive sectors pointed out that the passenger car makers are still unable to penetrate the domestic market because second-hand cars remain to be more popular among Vietnamese car users. The volume of car production is nowhere near its economy scale as well as truck production. Flexible motorcycle usage could limit the growth of truck sale. Second-hand or inexpensive conventional truck is very popular among users in CLMV countries. The truck is not viewed as a status symbol among users in these countries. Rather, its use is strictly for business. Therefore, sale of elegantly designed trucks is still experiencing a rough sailing in these countries.

Other drawbacks, which were considered crucial for investors, are shown below. These comments were drawn from the participants' responses that were mentioned only once:

- Disaster in Vietnam,
- High humidity which is not suitable for electronic device manufacturing,
- The population is too large which could result in insufficient resources,
- Corruption problem wherein companies have to pay hidden fees to custodians to smooth the progress of their businesses,
- Ambiguous and inconsistent investment policy and laws for investors from overseas, and
- Low purchasing power for luxury products which could be a main reason of electrical appliance manufacturers for not transferring.

The positive and negative perceptions on fragmentation to Vietnam are again summarized in Table 17

Table 17 : Summary of Perceptions Regarding Fragmentation to Vietnam

	Perception from several respondents	Perception from single respondent
Positive	1. Cheap labors 2. High quality of staff- hard working and eager to learn 3. Promising market growth	1. Investor friendly environment 2. Attractive promotion and investment policy from the government 3. Working staff is capable in English communication
Negative	1. Unavailability of supporting industries 2. Infrastructure is not fully prepared to support industry such as undersupplied electricity 3. Lack of qualified skilled labors 4. Lack of experience in automotive industry 5. Low purchasing power on new passenger cars and trucks	1. Possible natural disaster 2. High humidity which is not suitable for electronic device manufacture 3. Corruption problem 4. Ambiguous and discontinue investment policy and investment law 5. Low purchasing power on luxury product

Source: Survey results.

At the moment, some Thai automotive industries from the survey have extended their operations to Vietnam. The main push factors are high market volume and cheaper wage. When a car assembly industry decided to start up a production line in Vietnam, it is unavoidable for its main supporting industry to follow.

Further interviews were conducted with other industries to verify the push factors. A similar response was registered in the textile industry with regard to the labor issue, which included cheaper wage, hard-working workforce, and eager-to-learn employees. These factors could prove to be more advantageous than the Thai operations and will increase the competency of the Vietnamese company vis-à-vis other companies operating in Thailand. Nonetheless, bribery in facilitating business in Vietnam was seen to be a disturbing factor for Thai investors.

One valuable comment from the glass disk industry regarding the fragmentation factor is on the availability of water for production. A limited supply of water has been found to be critical in Thailand, and the glass disk company-respondent noted that water resources in Vietnam are more abundant and ready to use.

Meanwhile, a wrong perception has been detected on the ability to speak English by the Vietnamese. This skill is actually limited only to a specific group of well-educated people. The English language is not currently used as the official language in Vietnam. It is still necessary to use the Vietnamese language to make contact with government officers and domestic customers. However, studying the Vietnamese language is not too difficult for Thai investors because the language structure of the two is quite similar (BOI, 2009).

Another incorrect perception is the readiness of infrastructure in Vietnam. From the interview, Vietnam has proven that they are ready for FDIs and many multinational

companies have relocated there. Recently, a software industry has been transferred to Vietnam. These evidences could verify that the existing infrastructure in Vietnam may be enough for the electronics and automotive sectors although only in specific industrial estates.

Additionally, the investment promotion policy in Vietnam was found to be consistent, particularly for overseas investors. Comments and suggestions from the private sector have continuously been considered and adopted to revise the policy and make it more appropriate. If the new investment law has lessened privileges, investors may choose to apply former-issued laws to maintain their benefits[8]. The previously stated perception regarding the ambiguous investment law was found invalid. Vietnam's investment policy is clear and consistent although announcements may not be made in appropriate ways.

3.2.2. Opportunity for Lao PDR and Cambodia

Perception and comments obtained from survey respondents were quite similar for Lao PDR and Cambodia. Majority of the respondents agreed that the following issues are the advantages in investing in Lao PDR and Cambodia:

- Average wage for worker is considerably cheap,
- Tax advantages and some exceptions have been continually offered by the Lao PDR government, especially for the car assembly industry,
- The offer on tax holiday is very attractive in the case of Cambodia.

[8] BOI (2009), "Investment in Vietnam", : http://www.boi.go.th/thai/clmv/2009_vietnam/2009_vietnam_d5_5-1.html (accessed February 15, 2010)

However, important issues on fragmentation were derived from comments that appeared only once. Among these are:

- The identity of the people in Lao PDR is quite impressive. Investor-friendly environments are always conveyed. This could be one of the decision points, especially for Lao PDR, and
- Communication with Thai investors is made easily through a similar language. However, some communication problems may occur with non-Thai investors who basically use English and other languages.

Regarding the weak points of investing in Lao PDR and Cambodia, majority of the respondents shared similar views that the environment of both countries did not appear to be suitable for an industrial system, especially for high-tech manufacturing. Lack of skilled labor who could take in heavy responsibilities was a significant issue for the automotive and electronics sectors. Additionally, the presence of underdeveloped infrastructure was also repeatedly commented on, especially in terms of logistics infrastructure.

For several automotive makers, on the other hand, the limited market size for cars and trucks in Lao PDR and Cambodia seems to impede the investment of car manufacturing to these countries since the automotive relocation criteria are based mainly on market volume. The usage of car and truck in both countries is not popular because the utilization is restricted by the law of truck usage. Moreover, the car financing is not fully supported by the government unlike in Thailand. One off payment could delay a decision on purchasing a new car or truck for people in Lao PDR.

A significant factor why many respondents from Thailand put the lowest rating on Cambodia may be due to the present political conflict between Thailand and Cambodia.

This could tremendously reduce investment confidence in Cambodia from the view point of the Thai investor. An additional survey was conducted on tangible Thai investors in Cambodia. It was agreed that business between the two countries will be developed soon after the conflicts are resolved.

Valuable comments mentioned only once were also obtained from the survey, which include:

- Lao PDR's being a landlocked country may result in difficulties in dispatching goods outside the country,
- Unfamiliarity with industry work and system. Gathered perceptions indicated that working during night time is prohibited in Lao PDR, making flexibility for the manufacturing system limited, and
- Low marketing potentials in Lao PDR and Cambodia in view of the low GDP in these countries.

The perceptions on fragmentation to Lao PDR and Cambodia are summarized in Table 18.

In terms of wrong perceptions, the view expressed on the issue of overtime work is one. Currently, operators in Lao PDR can and are willing to work overtime; no law has prohibited them from working overtime. This fact was conveyed by one electronics part maker who relocated to Lao PDR ten years ago.

The main push factor for actual relocation to Lao PDR and Cambodia was access to cheaper wage. In Lao PDR, the labor cost is 4 times less than that in Thailand. This finding was gathered from an electronics-related company which is now expanding its business to Lao PDR. However, according to this company, the problem with regards to the availability of qualified staffs still exists. The capability of middle to high level

Table 18 : Summary of Perceptions Regarding Fragmentation to Lao PDR and Cambodia

	Perception from several respondents	Perception from single respondent
Positive	1. Cheap labors 2. Attractive privileges offered from Lao PDR and Cambodia to promote foreign investment 3. Attractive tax holiday from Cambodia	1. Investor friendly environments in Lao PDR 2. Communication with Thai investor is made easily through similar language
Negative	1. Working environment is not suitable for automotive and electronics industry 2. Lack of skilled labor for electronic and automotive sector 3. Underdeveloped infrastructure 4. Limited market size of car and truck 5. Political contradiction between Thai and Cambodia	1. Landlocked country of Lao PDR 2. Unfamiliarity with industry work and system especially on overtime work 3. Low marketing potential in term of GDP

Source; Survey results.

managers, including engineers, is indeed somewhat lower. Although the company has been relocated to Lao PDR more than ten years ago, many of its staff are still sourced from Thailand.

3.2.3. Opportunity for Myanmar

Only a slim chance for relocating to Myanmar was given by Thai respondents. Nonetheless, some benefits were mentioned by other respondents in terms of Myanmar's geographical location, labor cost, and extensive resources.

Myanmar is believed to have high potentials as a strategic gateway to South Asian and Southern Chinese markets. Products made in Myanmar could enter the Indian and Chinese markets easily from the point of view of logistics operation. In addition, the distance to port and harbor from the industry zone is not too far since the industry zones

are located around Yangon, which is only less than 30 kilometers away from Yangon port.

Cheap labor with considerable skills in the English language could be found extensively in Myanmar. This could be beneficial for the multinational companies (MNCs) and for FDIs and may attract some companies to transfer to Myanmar.

Abundant unexploited resources such as energy, land, and labor could be considered as one of the substantial benefits for Myanmar. With the presence of FDIs, approaches to utilize these resources efficiently for business may be tapped. Apart from this, it is considered that appropriate industry system could be embedded in the society's grassroots because Myanmar's social and economic systems are still unadulterated. Well-organized bases of the industry system could lead to a speedy growth of the manufacturing sector in Myanmar, something that the automotive and electronics groups have not yet discovered or realized. High population in Myanmar is also seen as a promising opportunity for the future market growth.

On the other hand, several disadvantages of Myanmar, as gathered from the survey, seem to undermine the benefits that have just been mentioned. These include:

- Political issue. Since the country has been occupied by a military government, this could bring about a high level of uncertainty for foreign investors. Business security is somehow not guaranteed.
- Unstable investment policies, supports and guidelines from Myanmar's military government. It was believed that the promised policy could be changed without logical explanation and notification.
- Corruption issue in Myanmar's government system.

- Lack of reliable basic infrastructure such as electricity. This could impede the growth of the manufacturing sector. Abundant resources have not been exploited in appropriate ways.
- Ineffectual trade relations with European countries and the US. This may cause troubles in trading such as economic sanction. Products made in Myanmar may not be allowed to export to particular countries within protocol. The country image is thus unimpressive from the foreign viewpoint.

Some comments were gathered only once but they were considered valuable to share. They are:

- Problem in the diversity of minorities, which could induce civil wars any time if suitable prevention measures are not in place,
- Low purchasing power of the population, which is realized from the fact that high tech equipment may not be considered necessary for people in Myanmar. Hence, the market size for technologically advanced electrical appliance is insignificant,
- Unavailability of qualified engineers and skilled labor, making imported working staffs necessary for plant relocation. FDIs could suffer from this overcharged set-up cost to launch their projects. The big difference in educational levels among the people was also raised as another population problem.

The perceptions of the respondents on fragmentation to Myanmar are summarized in Table 19.

At the time of the survey, no electronics and automotive company has as yet relocated from Thailand to Myanmar. Investment could be found only in some business

Table 19: Summary of Perceptions Regarding Fragmentation to Myanmar

	Perception from several respondents	Perception from single respondent
Positive	1. Promising strategic gateway to South Asian and Southern Chinese market 2. Cheap labor 3. Abundant unexploited resources 4. Opportunity for future market growth	
Negative	1. Political issue which could diminish foreign investor confidence 2. Instability investment policy from government 3. Corruption issue 4. Lacking of reliable basic infrastructure 5. Ineffectual trade relations with European members and USA	1. Variation of minority tribes 2. Low purchasing power 3. Quality and education of working staff

Source: Survey results.

sectors such as agricultural product, cosmetic, paper, plastic, consumable product, energy, and service industries. The push factor gathered from investors on fragmentation was the access market in Myanmar for consumable products. The market volume in this sector is around ten times bigger than in Cambodia[9]. Customers in Myanmar believe that the quality of products from Thailand is higher than that from China[10]. Opportunity is still available for products from Thai companies. Additionally, access to cheap labor and cheap facilities, including the grant of tax privileges, were indicated as other driving forces for Thai investors.

[9] Source: Conclusion of seminar, "Trade Opportunity in Myanmar", Department of Export Promotion, 12 January, 2009. www.depthai.go.th (access on February, 2010).

[10] Source: Conclusion of seminar, "Trade Opportunity in Myanmar", Department of Export Promotion, 12 January, 2009. www.depthai.go.th (access on February, 2010).

CONCLUSION: CHALLENGES FOR CLMV COUNTRIES AND POLICY RECOMMENDATIONS

The formulation of policy recommendations for this study is based on the interviews of related industries and business organizations. Representatives from the Thai Automotive Institute (TAI), The Federation of Thai Industry (FTI): Automotive sector, Motorcycle and parts Cluster, Electrical and Electronics Institute, and the Thai National Shippers' Council (TNSC); and the National Science and Technology Development Agency (NSTDA): Hard disk drive program, were asked to provide potential roadmaps for CLMV to attract FDIs from the electronics and automotive sectors. Among the common issues raised concerned political stability, investment security of investors, attractive privileges for investment promotion, and flexible investment regulations. On this basis, policy recommendations are drawn up for three stages, namely: short, medium and long term, as outlined in Table 20.

Political stability has been noted as the leading criterion for FDIs because investment in the automotive and electronics sectors is considerably expensive. As such, investors have to make sure that the benefits that they can gain will not face any hindrance. Moreover, socialist governments could slow down the decision on relocation because the investors believe that the regulations and benefits offered by socialist governments can change any day. Investment security seems to be uncertain. Under such circumstance, investors prefer the free enterprise system, not the socialist system, in bringing in FDIs.

Attractive privileges should be continuously offered to investors. These include tax exemptions on imported material, extended tax holidays and reduction of corporate

Table 20: Conclusion of Policy Recommendations in Three Stages

	Policy Recommendation
Short term	1. Strengthen political stability 2. Consolidate investment promotion policy- make it clear and attractive 3. Publicize investment promotion policy and privileges to the investor worldwide 4. Increase confidence in business security for investors
Medium term	1. Increase flexibility in investment regulation 2. Develop quality and awareness of operators in automotive and electronics industry 3. Endorse supporting industry to increase consumption of local contents 4. Establish different privileges for different industry zoning 5. Distinguish privileges for different industry type; labor, machine and material intensive 6. Initiate border zone industry to gradually increase knowledge and skill on electronics and automotive industry
Long term	1. Set up the linkage between education sector and industry to customize workforce to specific labor market 2. Establish industrial specific institution to support specific skill training 3. Prepare contingency plans for investors

Source: Authors.

tax ratio. Each area should provide different advantages to different industries. CLMV countries may learn from the Thai and Chinese experiences on industrial zoning system. Apart from zoning, the privileges from government may be classified into 3 main types depending on industry; labor intensive, machine intensive, and material intensive. Special offers could be provided in a different way to suit each industry type. Moreover, these privileges should be promoted and publicized to investors worldwide. In short, CLMV countries need to do certain national positioning and strategic marketing.

Investment regulation and flexibility are among the most significant challenges for CLMV countries. The investment policy and law should be transparent, traceable and flexible enough to attract investors. This may include an approval process for industry establishment that should not be too problematic and time consuming.

Corruption issues relating to the grant of permits for setting up industry and companies should be taken into consideration. Government should keep the process as simple as possible to reduce bribery behaviors of government officials.

The arrangements to attract foreign investments in electronics encompass the development of quality and awareness of operators of the working environment in the electronics industry. This industry requires heavy responsibilities from operators because they sometimes have to deal with expensive component, often much higher than their own wages. The governments of CLMV should support and pay attention to the vertical integration of the electronics industry which includes materials, manpower, know how, equipment, funding and infrastructure readiness.

Meanwhile, preparations for foreign investments in the automotive industry should focus on the upgrading of the quality of the work force. Staffs should be trained and developed to qualify with and suit the automotive industry. Development of an automotive maintenance network is also necessary to support the growth of the automotive market. This includes the training of repairmen for the automotive service industry. To advance the development of the automotive sector in CLMV, focusing on QCDEM (Quality – Cost – Delivery- Engineering – Management) is considered necessary.

In addition, since the automotive relocation criteria are based principally on market accessibility, car financing practices and mechanisms should be established to ease and facilitate automobile trade, leading to an increase in the market volumes in the CLMV countries.

Along with the major players in the automotive and electronics industries, promotion of the supporting companies should be undertaken simultaneously to increase the consumption of local contents which will result in a balance of trade.

To enhance worker qualification for both industries, the linkage between universities, vocational schools and industries should be seriously undertaken to customize the workforce to specific labor market. Industry-specific institutions such as an automotive institution or an electronics institution should be set up to support specific skills training for workers as well as to install knowledge management and information-sharing practices for both industries. These integrations could bring about the sustainable development of the electronics and automotive clusters in CLMV.

The survey on the electronics industry also indicated that one interesting reason for not transferring to the CLM countries is the difficulty of access to materials and components. Most upstream suppliers are currently located in Thailand especially in the industrial zone where these materials are at the point of use. The idea of a border zone industry seems to present a feasible stepping stone toward the development of CLM countries as electronics-based centers. The idea was pointed out by some respondents. This recommendation can be viewed as a medium term preparation for CLM countries. Initially, manufacturers of the low-tech components for electronics should be encouraged to operate in border zones so that cheap labor from CLM countries can be utilized. Training and skills development can then be given directly to the workers. In this manner, knowledge, know-how and awareness associated with the electronics industry can be transferred to these work forces gradually. Eventually, the opportunity for an electronics sector relocation to the CLM countries will become increasingly possible.

Finally, staff labor unions are one of the main social-related factors in automotive and electronics companies. They should be kept constantly in check to limit the negotiation power. Other challenges include the preparation of a contingency plan for investors in case of unexpected occurrences such as natural disasters, airport closures, protests, and others.

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