

CHAPTER 3

3.0 THE ELECTRONICS INDUSTRY IN MALAYSIA

3.1 Introduction

In examining the supply chain management practices of the electronics industry in Malaysia and its performance, an understanding of the nature of the industry is vital. Hence, this chapter is purported to discuss several essential issues such as the nature and background of the electronics industry, government role and policies pertaining to the development of the electronics sector and the contribution of this sector in terms of multi aspect. Discussion is also focused on the level of importance and collaboration linkages among electronics firms and its contribution towards economic growth of the nation in total.

3.2 The History of Malaysia's Electronics Industry

Malaysia is a developing economy which is geographically dispersed and prosperous in natural resources. The country consists of a total land area of 329.8 square kilometers and including a peninsular area (East Malaysia) and Sabah and Sarawak (West Malaysia) on the island of Borneo. To date, Malaysia is popularly known among the Asian nations for its multilingual culture with many languages. The major languages are Bahasa Malaysia's and English (the official business language), with Chinese, Tamil, and Hindi which are also spoken by many of its residents. Though with huge multi-cultural, religious and racial diversity, Malaysia has succeeded in balancing religious fundamentalism with pragmatism in application of its laws and business environment. Since its independence in 1957, the Malaysian government practices parliamentary democracy and has been stable politically, economically and socially till to date.

Currently, Malaysia is progressing in the journey of becoming the fifth so-called NIE [Newly Industrialized Economy], of East Asia, along with Taiwan, Korea, Hong Kong, and Singapore. Malaysia successfully averaged a real 9.6% growth in GDP [Gross Domestic Product] over the past eight years. In addition, its target is to increase trade at an average annual rate of 8.5%. The country has a population of 25 million people with an adjusted GDP of \$171 billion. Further, Malaysia is a free market economy with an 8-9% growth each year (GDP growth for 1995 was 9.6%). At the time of the WTEC [World Technology Evaluation Center] team's visit, the country had an inflation rate of 3.4-4% and an unemployment rate of 2.5% for its labour force of 9 million (Ministry of Finance, various years).

In the perspective of domestic and international trade capacity, undoubtedly Malaysia enjoys a distinctive situation throughout its development history. It currently enjoys trade benefits through GATT's Generalized System of Preferences (GSP), unilateral trade agreements and trade liberalization such as AFTA [Asian Free Trade Agreement] and ASEAN [Association of South-East Asian Nation]. Furthermore, it has world class infrastructure, technological expertise, and manufacturing diversity to meet the demands for high quality of its global business customers and to meet the stringent requirements of the international trade agreements. Also, Malaysia is seriously collaborating with neighbouring countries like, Singapore and Indonesia to further develop and refine supplies of water and power for the region. Moreover, the country has enough petroleum reserves to fulfill domestic demand and export requirement. The confluence of these events supports capital investment from a variety of sources (the United States, Japan, and Europe, as well as other Asian countries such as Taiwan).

Malaysia had started to lure FDI [Foreign Direct Investment] primarily in the electronics industry long before 1970. The government's New Economic Policy [NEP] has been the motivation in 1970 to focus the attraction of export-oriented FDI for the purpose of employment creation and economic growth. The inception and enforcement of Investment Incentives Act of 1968 encouraged Perlis, Kedah, and Johor Tenggara to join the earlier Free Trade Zones [FTZ] such as Ulu Klang and Sungei Way as location for industrial estate. (Ministry of International Trade and Industry, 1993). The first and the most important electronics export-oriented investment was from the USA to capitalize in the low cost labour for their semiconductor assembly and testing operations. Later, Japanese parts makers began to invest in Malaysia with the similar intention of utilizing the low labour cost.

Over the last 40 years the Malaysia's electronics industry has diversified greatly. In year 2010, almost every major Japanese and U.S electronics firms have manufacturing facilities in Malaysia. Subsequently, electronics industry in Malaysia relatively has the largest work force among manufacturing sector and this is a significantly due to the increasing growth of a Malaysia's electronics industry as a result of heavy foreign investment from Multinational Corporation headquartered in Japan, USA, Europe, Singapore, Taiwan and Korea (Tanaka & Kenny, 1995). There are basically two main reasons for such influx of foreign investment in the electronics industry in Malaysia in the early 1970s. First, the exodus of the US-based companies secures inexpensive labour and receives significant tax holidays. Subsequently, Malaysia is viewed as a production centre for sophisticated operations of producing high quality goods for the world market. Secondly, the Japanese firms

established operations initially to participate in import substitution industrialization and later shift to exportation (Ministry of International Trade and Industry, 1993).

Malaysia's victory in securing foreign investment to the electronics manufacturing and other manufacturing industry is to some extent due to a division of labour with Singapore, the South-east Asian headquarters for many multinational firms. Malaysia, especially the state of Penang, becomes more attractive to foreign firms that found Singapore becoming too expensive. Eventually, this rapid growth of investment has implicated labour supply and wage increase, making Malaysia's labour market less cost competitive globally. Nevertheless, to remain competitive globally as the world class manufacturing centre in the region, Malaysia counter reacted by upgrading their factories with better investment in automation and producing higher added-value item rather than leaving Malaysia to a much inexpensive labour economies.

3.3 Malaysia's Manufacturing Sector Development

Malaysia is propelling into a new stage of development with the motive and inspiration of becoming a developed nation by 2020. This next 10 years will be very crucial in achieving the above goals. This journey of excellence will be strongly guided by the National Mission, a policy and implementation framework aimed at obtaining greater performance and impact from the country's collective development initiatives (Malaysia, 2006a). In view of the National Mission and of its heavy responsibility, collaboration effort is expected from every Malaysian firms that have stake in the national development process, of which the private sector as the engine of growth and the public sector as facilitator cum regulator (Malaysia, 2006a).

Table 3.1:
Value Added of Resource-Based Manufacturing
[2000-2010]

INDUSTRY	RM million in 1987 Prices			Average Annual Growth Rate (%)	
	2000	2005	2010	8MP	9MP
Resource-Based	28,210	35,990	48,152	5.0	6.0
Vegetable, Animal Oils & Fats	2,526	3,636	5,614	7.6	9.1
Other Food Processing, Beverages & Tobacco	4,010	4,790	6,333	3.6	5.7
Wood Products including Furniture	2,934	2,972	3,761	0.3	4.8
Paper Products & Printing	2,293	2,640	3,275	2.9	4.4
Chemical & Chemical Products	6,763	10,082	14,304	8.3	7.2
Petroleum Products & Coal	4,521	5,254	7,501	3.1	7.4
Rubber Products	1,821	2,887	3,238	9.7	2.3
Non-Metallic Mineral Products	3,342	3,726	4,126	2.2	2.1

Source: Economic Planning Unit, 2005

One of the main trusts of the National Mission towards being an industrialized nation is to move the economy up the value chain by increasing the value added of manufacturing. Malaysia's manufacturing industry will be embedded with high technology applications and production of higher value added products as an effort to move the electronics industry towards higher value added activities (Malaysia, 2006a). As for this purpose, the development of new and current electronics industrial cluster will be focused in Pulau Pinang and Kulim High Technology Park, Kedah. The dynamic of economic activity of

Malaysia is primarily dependent on the transformation of the manufacturing sector and its sustainable competitiveness. For many years, the manufacturing sector has continued to contribute substantially to output growth, export and employment creation despite economic slowdown.

Table 3.2:
Value Added of Non-Resource-Based Manufacturing
[2000-2010]

INDUSTRY	RM million in 1987 Prices			Average Annual Growth Rate (%)	
	2000	2005	2010	8MP	9MP
Non-Resource-Based	33,878	44,662	63,035	3.3	7.1
Textiles, Clothing & Footwear	2,324	1,818	2,010	-4.1	2.0
Basic Metal Industry	594	675	852	2.6	4.8
Metal Products	2,879	4,060	6,589	7.1	10.2
Manufacture of Machinery	3,063	3,447	3,480	2.4	0.2
Electronics	19,863	23,043	33,399	3.0	7.7
Electrical Machinery	1,738	952	1,161	-11.3	4.1
Transport Equipment	7,417	10,667	15,544	7.5	7.8

Source: Economic Planning Unit

The above Tables 3.1 and 3.2 are to depict the value added contribution of the manufacturing sector in Malaysia. This sector in general is divided into resource-based and non resource-based industry. The resource-based industries marked an average annual

growth of 5.0 per cent compared with 3.3 per cent for the non-resource-based industries. The growth in the resource-based industries was contributed by rubber processing and products which grew at an average annual rate of 9.7 per cent, followed by industry chemicals including fertilizer and plastics products at 8.3 per cent and vegetables, animal oils and fats at 7.6 per cent. In the non-resource-based industries, the main contributors to growth were transport equipment, which grew at an average annual rate of 7.5 per cent, followed by metal products at 7.1 per cent. In terms of share to total manufacturing value added, the non-resource-based industries maintained the larger share at 54.2 per cent, with the electronics industry contributed 28.0 per cent. Despite a negative growth of 24.8 per cent in 2001, the electronics industry recorded an average growth of 3.0 per cent per annum during the period of 2001-2005. This positive growth was contributed mainly by the continuous demand for semiconductors and other electronics components, especially from the United States of America (USA) and the Asia Pacific countries (Malaysia, 2006a).

3.4 Malaysia's Electronics Industry

The electronics sector or industry in Malaysia has proved a leading role and a steady progress in the past fifty years. It has a pivotal role in the country revolution from a natural resource-based economy to an economy based on modern industry (Best & Rasiah, 2003). Henceforth, this phenomenon has turned Malaysia from an agricultural exporter into an industrial exporter. The electronics sector in Malaysia grew rapidly within a short span of time, for example in 1970 there were approximately only 600 workers and output of RM 25 million, and later the industry grew to be the major contributor in terms of manufacturing output, employment opportunity and exports in the recent years (Best, 2007; Jomo, 2007). Presently, the number of electronics industry grew more than 1,500 firms and contributed

huge employment opportunity of approximately a total of 600,000 employments. This amounted to approximately 40 per cent of the total employment in the manufacturing sector and a total output value of more than RM 200 billion (MIDA, 2007b). In the effort of adopting such export-oriented strategy to enhance development in the electronic manufacturing industry, a structural change in the production network has taken place. As a result, during this period, there was a massive effort in strategically relocating the manufacturing operations of MNCs firms in Malaysia (Gustafsson, 2007).

The development and growth of electronics industry in Malaysia was further initiated through the development of industrial estates from FDI (Foreign Direct Investment) initiatives (MIDA, 2007a). In order to attract influx of FDI to Malaysia, particularly to boost the manufacturing sector, huge effort has been taken to improve basic infrastructure such as communication system, transport network, public administration and basic amenities. As a result, the electronics industry is able to prosper and develop progressively. Consequently, the cluster approach was adopted to enhance the growth of electronics manufacturing sectors and this, in turn, gaining attention from local and foreign investors from all corners of business interest.

Through the Second Industrial Master Plan the formal clustering strategy was adopted in Malaysia (Malaysia, 1996) This formal clustering strategy was intended to create industrial linkages and networking for the local industries with the objectives of uplifting the firms capabilities to leap to a higher value added activities (Malaysia, 2006b). The value added activities is focused on advance manufacturing activities such as, Original Equipment Manufacturer [OEM], Original Design Manufacturer [ODM] and Original Brand

Manufacturer [OBM]. One of the main supply management practices applied in this clustering strategy under the Second Industrial Master Plan is to intensify the network of suppliers. Firms under this advance manufacturing practices will outsource their sub-assemblies and services to encourage specialization of work within the clusters (Hobday, 1999).

However, in general, the focus and initiative of IMP2 was primary in the area of assembling and testing. Only very few local firms are involved in the designing, development and high-end assembling activities. This is due to the fact, that local firms only function to develop capabilities on providing the support services at the end of the product completion cycle, such as, packaging, tooling and light assembly. Furthermore, the MNCs which are the main player in the electronics industry have dominated the designing, development and high-end assembling activities.

Therefore, it is a great challenge to achieve the ultimate purpose of formal clustering and to establish supply management networks. This, in turn, limits the supply chain upstream integration or the collaboration of upstream activities by the local firms. Subsequently, this leaves the MNCs with no option but to heavily depend on imported sub-component and indirectly such action will create weaker supply chain (Li & Imm, 2007). In line with the above challenges, Third Industrial Master Plan (IMP3) - (2006-2020) was started with an aim to foster strong integration and collaboration between local firms and foreign firms in the manufacturing sector in order to enhance their core competencies and built stronger supply chain network regionally and globally.

3.5 Contributions of National Electronics Sector

Malaysia's economy is expected to grow at an average of 6.3 percent a year during the Third Industrial Master Plan (IMP3), covering year 2006 to 2020 against an average of 3.5 percent annual growth in the world's gross domestic product (GDP) during the period. The target growth is hinged on the country's manufacturing sector sustaining its growth momentum, the services sector becoming a major source of growth, and greater focus given to developing the agriculture sector.

Table 3.3:
Export of Resource-Based Manufactured Goods
[2000-2010]

INDUSTRY	RM million in 1987 Prices			Average Annual Growth Rate (%)	
	2000	2005	2010	8MP	9MP
Resource-Based	44,322	77,280	122,625	11.8	9.7
Food	4,509	8,488	14,627	13.5	11.5
Beverage & Tobacco	1,207	1,701	2,406	7.1	7.2
Wood Products	6,801	8,860	12,503	5.4	7.1
Paper & Paper Products	1,397	2,073	2,913	8.2	7.0
Petroleum Products	8,131	16,729	26,342	15.5	9.5
Chemical & Chemical Products	15,011	29,718	48,678	14.6	10.4
Rubber Products	4,695	6,777	11,261	7.6	10.7
Non-Metallic Mineral Products	2,571	2,934	3,895	2.7	5.8

Source: Economic Planning Unit, 2005

3.5.1 Export Growth Contribution

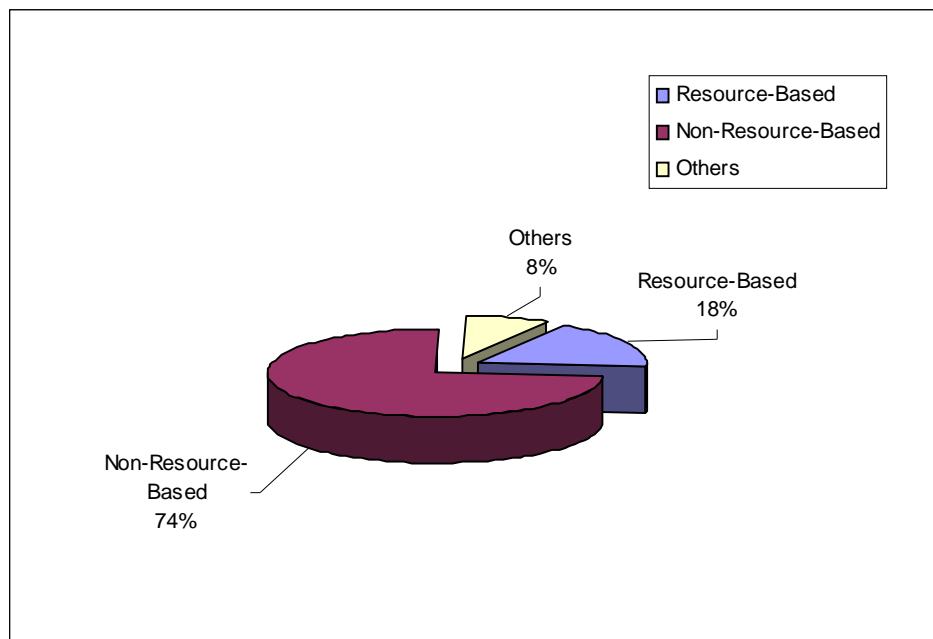
Exports of manufactured goods grew at an average of 6.2 per cent per annum despite the downturn in the electronics industry. Its share to total gross exports was sustained at more than 80.0 per cent. In terms of growth, the export of resource-based products grew at a much higher rate of 11.8 per cent per annum compared with the non-resource-based exports which grew at an average 4.7 per cent, as shown in Table 3.4. The higher growth in exports of resource-based products indicated the further diversification and expansion of the country's export base as well as growing external demand. In terms of share, the electronic and electrical [E&E] products maintained their position as the largest contributor to total exports.

Table 3.4:
Export of Non-Resource-Based and Other Manufactured Goods
[2000-2010]

INDUSTRY	RM million in 1987 Prices			Average Annual Growth Rate (%)	
	2000	2005	2010	8MP	9MP
Non-Resource-Based	252,383	317,449	491,515	4.7	9.1
Textiles, Clothing & Footwear	10,433	10,520	13,715	0.1	5.4
Manufacturers of Metal	8,618	17,157	27,678	14.8	10.0
Electrical & Electronics Products	230,429	282,779	439,626	4.2	9.2
Transport Equipment	2,903	6,993	10,496	19.2	8.5
Others	21,205	35,144	56,627	10.6	10.0
% Total Gross Exports	85.2	80.5	83.4		

Source: Economic Planning Unit, 2005

For better illustration, Chart 3.1 illuminates the distinctive contribution of non-resource based export towards the total export of manufacturing product which is about 74 per cent of the total export value of manufactured product for year 2005(Economic Planning Unit, 2006). The growth of the manufacturing sector will continue to be export-led, with the export of manufactured goods expected to expand by 9.3 per cent per annum during the period of 2001-2005 (Malaysia, 2006b). The share of manufacturing exports to total exports is expected to expand from 80.5 per cent in 2005 to 83.4 per cent in 2010. The non-resource-based products will continue to lead overall manufacturing exports, especially electrical and electronics products.



Source: Economic Planning Unit, 2006

Chart 3.1:
Exports of Manufactured Goods for Resource-Based,
Non-Resource-Based and Other Industries for 2005

3.5.2 Investment Growth Contribution

The manufacturing sector has been the major point of attraction for inflow of huge investment in Malaysia for almost three decades continuously. In the period of 2001 till 2005, 4,812 manufacturing projects amounting to RM 132.6 billion was approved in the period of 2001 till 2005 (Malaysia, 2006a). The huge amount of investment was driven by the non-resource-based sector, particularly attracted by the electrical and electronics industry. The main sources of investment were the USA, Germany and Japan.

In view of boosting the growth of electronics manufacturing and others, manufacturing related services [MRS] were also introduced to facilitate the development of essential support services. These MRS support activities will be able to synergise the growth of manufacturing sectors in total and eventually attract more inflow of foreign direct investment [FDI] to Malaysia.

3.5.3 Employment Growth Contribution

The manufacturing sector accounted for about one third of total employment and 27.6 per cent of total jobs created during the period of 2001 till 2005 (Economic Planning Unit, 2006). Total employment grew at an average annual rate of 4.1 per cent increasing from 2.6 million in 2000 to 3.1 million in 2005, as shown in Table 4-5. The employment in non-resource-based industries grew at 4.3 per cent per annum, creating 308,900 new jobs compared to resource-based industries at 3.7 per cent, accounting for 237,100 new jobs. Employment creation in the non-resources-based industries was mainly attributed to the expansion in the electrical and electronics sector, transport equipment and basic metal and metal product.

3.6 Potential source of electronics industrial growth

In the future, the electronics industry, mainly the manufacturing sector will continue its domination toward the nation's industrial growth, and significantly contributing to the economic growth. Together with these industrial and innovation growth, the electronics industry with its value added expected to grow at an average of 7.7 per cent for the period of 2006 – 2010 (see Tables 3.3 and 3.4).

Table 3.5:
Employment in the Resources-Based Manufacturing Sector
[2000-2010]

INDUSTRY	RM million in 1987 Prices			Average Annual Growth Rate (%)	
	2000	2005	2010	8MP	9MP
Resource-Based	1,186.6	1,423.7	1,703.4	3.7	3.7
Food Processing & Beverages	237.7	298.9	346.5	4.7	3.0
Wood Products including Furniture	352.7	373.8	405.8	1.2	1.7
Paper & Paper Products	121.6	137.7	156.3	2.5	2.6
Chemicals, Fertilizers, Plastics	238.1	327.0	477.6	6.5	7.9
Rubber Processing & Products	132.0	171.5	201.6	5.4	3.3
Non-Metallic Mineral Products	104.5	114.9	115.6	1.9	0.1

Source: Economic Planning Unit, 2006

This potential source of aggressive growth in the electronics industry in Malaysia is primarily due to globalization and its extensive application of electronics across all industries and services. In addition, this phenomenon is further aggravated especially with new developments in the Information, Communication and Technology [ICT] industries. Having discovered this potential in the electronics industry, the Malaysian government will continue to facilitate in the development of human capital, technology and research efforts to further move the nation electronics industry up the value chain (Kaur & Rashid, 2008).

**Table 3.6:
Employment in the Non-Resources-Based Manufacturing Sector
[2000-2010]**

INDUSTRY	RM million in 1987 Prices			Average Annual Growth Rate (%)	
	2000	2005	2010	8MP	9MP
Non-Resource-Based	1,319.4	1,628.3	1,798.3	4.3	2.0
Textiles, Clothing & Footwear	215.8	214.8	192.3	-0.1	-2.2
Basic Metal & Metal Products	193.8	282.8	340.0	7.9	3.8
Machinery & Equipment	161.4	162.6	178.1	0.1	1.8
Electrical & Electronics Products	647.1	840.8	943.6	5.4	2.3
Transport Equipment	101.3	127.4	144.3	4.7	2.5

Source: Economic Planning Unit, 2006

3.7 The Policy and Support Framework

The Malaysian government has taken all the necessary competitive actions through its various industrial policy design, structure and implementation in order to boost the manufacturing sector, primarily the electronics industry. Industrial policy has played an important role in transforming Malaysia's economy from one dependent on the primary sector to one driven by the manufacturing sector (Ministry of Industry and Trade, 2006). One of the most prominent industrial action plans is the National Industrial Master Plan, comprising, (1) First Industrial Master Plan 1986-1995, (2) Second Industrial Master Plan 1996-2005 and (3) Third Industrial Master Plan 2006-2015.

3.7.1 First Industrial Master Plan

The First Industrial Master Plan 1986-95 (IMP) developed by the Ministry of International Trade and Industry (MITI) had three broad objectives (Ministry of International Trade and Industry, 1986). These are to ensure continuous economic growth through an exponential growth of the manufacturing sector, to promote effective and efficient use of the nation's natural resources through value added manufacturing and to establish fundamental foundation for the enhancement of indigenous technological capabilities.

The initial effort taken through this IMP1 is the Fiscal Incentives [FI], which is created in the 1960s and 1970s as a move to attract labour intensive investments by large foreign firms. This is known to be one of the key instrument tools to realize the objectives of Industrial Master Plan. In addition, to further boost the inflow of foreign investment, the Malaysian government initiated two prominent incentives, which are Pioneer Status (PS) and Investment Tax Allowance (ITA) (Malaysia, 1986). Both these incentives are mooted

under the project of 'promoted product' or 'promoted activity' categories. In contrary, in the late 1980s the investment direction and objective of the Malaysian government changed to strategic and high tech industries rather than volume of investment and jobs created. Foreign firms which are approved under Pioneer Status will enjoy tax exemption up to 70 per cent of its statutory income for a period of five years, commencing from the date of production. In a similar way, under Investment Tax Allowance, investors will obtain tax allowance of 60 per cent, for a period of five years (Malaysia, 1996). Presently, most industries are still found in Penang, Kedah, Selangor, Negeri Sembilan and Melaka, in the western corridor of Peninsular Malaysia. As such, in order to achieve a fair spatial and location dispersal, firms located in the states of Kelantan, Pahang, Terengganu, Sabah and Sarawak will be able to enjoy better higher rates apply for similar periods (MIDA, 2007a).

In addition, the Reinvestment Allowance (RA) is also rewarded to firms in the manufacturing companies involved in the production expansion, upgrading of capital items (plant and machinery) and product diversification. These firms will enjoy a tax allowance of 60 per cent of capital expenditure and in the case of significant investment full exemption is imminent (Malaysia, 1996). This incentive is found to be very significant in ensuring a continuous growth in the electronic industry in Malaysia and to be able to withstand tremendous challenges from growing global competition, rapidly technological change and ever changing customer demand which eventually shortens the product cycles.

Research and Development [R&D] is an initiative engaged under the Industrial Master Plan to support the growth of indigenous technology and facilitate the technology transfer process. Such grants can be awarded to contract R&D companies, R&D companies

providing R&D services in Malaysia to other companies and in-house R&D. Presently, only the in-house R&D is found to be common in Malaysia. At present, the government, as an established institutional infrastructure has to facilitate the technology transfer process and there are some state development agencies carrying the responsibilities in technology promotion. The examples of institutional infrastructure established by the Malaysian government is as such (Malaysia, 1986):

1] Bukit Jalil Technology Parks - is established under the flagship of Multimedia Super Corridor (MSC) to promote technology related to information technology and to attract knowledge-based IT companies.

2] Kulim Technology Parks – is established to promote R&D activities related to electronics among corporate, academic and government bodies. In addition, this project has received great benefit from the spill over effect from Penang electronics industry.

3] Technology Transfer Unit (TTU), which is under the purview of Ministry of Trade and Industry (MITI) is established to facilitate the technology transfer (TT) processes mainly on the investment screening and formulating TT agreements.

4] Technology Councils, consist of both the public and private sectors representation, is created to assist firms in achieving technological frontier. One of the great successes of this establishment is the set-up of Penang Industrial Coordinating Council (PICC).

5] Malaysia's Industry-Government High Technology (MIGHT) is purported to establish significant partnering networks among local industries, foreign industries, government bodies and institution.

6] Malaysia's Institute of Microelectronics System (MIMOS) is aimed to supports start-ups in the electronics industry in Malaysia. MIMOS is assisted by Malaysia Technology Development Corporation (MTDC) through financial support. MIMOS is regarded as a promising effort to further determine the future direction of the electronics industry in Malaysia.

Training and Development is viewed under the Industrial Master Plan to improve the quality of human capital in Malaysia. Moreover, this quality in human capital could capture the attention and attract foreign investors mainly in the high-tech industry of electronics industry. Therefore, the Malaysian government has created Human Resource Development Fund (HRDF), coordinated by the Human Resource Development Council (HRDC) to elevate skills [know-how] and knowledge [know-what] among employees in the industry. There are also other training incentives provided which includes (Malaysia, 1986); (1) Double deduction of expenses incurred for approved training (for firms with less than 50 employees); (2) Deduction of contributions in cash to a non-profit technical or vocational training institution; (3) Exemption from import duties, sales tax and excise duties for imported machinery, equipment and materials used for training personnel and (4) ITA for new investment to upgrade training equipment or expansion of training capacities.

The Malaysian government also provides substantial incentives to vendors through vendor development programs. This is to promote collaborative linkages among large foreign, domestic firms and local SMEs. Specifically, tax deductions are given on all the expenditure pertaining to employee training, product development, testing and factory auditing. Moreover, vendors too enjoy pioneer status for five to ten years. This is regarded as part of the incentive scheme to assist vendors in achieving world-class standards in terms of price, quality and capacity. Further, all costs incurred in this time frame are subjected to exemption.

Effort in creating Malaysia as a major distribution centre by the Malaysian government has been quite encouraging and successful by the establishment of international procurement centres (IPCs). In Malaysia, IPC could be in various forms of establishment, either locally incorporated companies of local or foreign owners, whose activity is business-business trade. In order to obtain the privileges of IPC, the locally incorporated companies under the Companies Act 1965, should fulfill several requirements. These are, (1) a minimum paid-up capital of RM 0.5 million, (2) minimum total business spending of RM 1.5 million per annum, (3) minimum annual business turnover of RM 100 million and (4) goods must be handled directly through Malaysia's ports and airports. Upon adhering these requirements, firms could obtain several incentives which include (Malaysia, 1986), (1) approval of expatriate posts needed for the IPCs, (2) one or more foreign currency accounts with any licensed commercial bank to retain export proceeds without any limit, (3) entering into foreign exchange forward contracts with any licensed commercial bank to sell forward export proceeds based on projected sales, (4) exemption from the requirements of the Ministry of Domestic Trade and Consumer Affairs guidelines on foreign equity ownership

on wholesale and retail trade, (5) duty-free imports of raw materials, components, or finished products into Free Industrial Zones (FIZs) or Licensed Manufacturing Warehouses (LMW) for repackaging, cargo consolidation and integration before distribution.

3.7.2 Second Industrial Master Plan

The primary objective of the Industrial Master Plan 2 (IMP2) is to bring Malaysia to a higher platform of advanced industrialized nation by the year 2020. IMP2 builds on the successes of the IMP. The master plan of IMP2 holds to the synergy concept of the “Manufacturing ++ Strategy”. Subsequently, this master plan of IMP2 makes a two-fold contribution: (1) moving along the value chain and (2) emphasizing on productivity-driven growth through human capital advancement (Ministry of International Trade and Industry, 1996). As such, in order to achieve these objectives, IMP2 identified the following strategic directions for the electronics industry:

1] Strategy Direction 1 - *Developing the value chain.* The IMP2 strategy direction 1 is to develop the value chain of industries in Malaysia mainly to encourage the MNCs to increase higher value added activities in Malaysia through: (i) formulation and establishment of integrated manufacturing centers, (ii) review of the laws and regulations pertaining to Free Zones (FZs) and Licensed Manufacturing Warehouses (LMWs) and (iii) formulation and establishment of International Procurement Centers [IPC] in terms of operational headquarters, world headquarters and international procurement offices in Malaysia.

2] Strategy Direction 2 - *Deepening the supply chain.* The IMP2 strategy direction 2 is to deepen the supply chain of industries in Malaysia in order to enhance development of capacities in indigenous firms through: (i) vertical and horizontal strengthening of supply chains, (2) encouraging cluster building and (3) reviewing equity and export conditions.

3] Strategy Direction 3 - *Moving to a higher technology plane.* The IMP2 strategy direction 3 is to move industries in Malaysia to a higher technology platform through requisition of essential new technologies in order to achieve R&D competency, new product development and subsequently to boost productivity. Specifically these can be made possible by: (i) acquiring capabilities to design and produce wafers, (ii) development of local technological capabilities and (iii) providing specialized technology parks for high-tech industries.

4] Strategy Direction 4 - *Developing the information technology (IT) and multimedia industry.* The IMP2 strategy direction 4 is to develop the information technology and multimedia industry under the flagship of Multimedia Super Corridor [MSC]. This strategy direction is expected to drive the nation's productivity and growth. Hence, several significant applications for the development of indigenous electronics producers, such as Electronics Government, Telemedicine, R&D, Remote Manufacturing, Borderless Marketing Centers, Multi-purpose Smart Cards; and Smart Schools are implemented.

5] Strategy Direction 5 - *Developing world-class Malaysia - owned companies.* The IMP2 strategy direction 5 is to develop world-class Malaysian owned companies. Since most of

the Malaysian firms have successfully met international quality standards, it is time to formulate strategy to capture the world class standard in the production aspect and vendor development. Hence, this could be achieved by: (i) providing support to indigenous subcontracting firms to become original equipment manufacturers (OEMs) and original brand manufacturers (OBMs), (ii) providing incentives to indigenous firms in terms of human capital enhancement to be able to produce high value added activities, (iii) promoting more lenient admission policies for skill expatriates and (iv) export promotion programmes to promote Malaysia brand name products.

3.7.3 Third Industrial Master Plan

The Third Industrial Master Plan [IMP3] is purported to provide the overall development framework for the manufacturing sector and detailed sub-sector plans for the period 2006-2020. The policies designed under the IMP3 is to accelerate industrial grading and to achieve sustainable competitiveness which includes, (i) strengthening strategic integration with the global economy, particularly through international collaborations in high value added and high-technology industries, (ii) promoting new sources of industrial growth and wealth creation, (iii) building up an efficient and competitive related services industry to enhance the performance of the manufacturing sector, (iv) providing more focused incentives for high value added industries; (v) enhancing Bumiputera participation in manufacturing, (vi) developing innovation-driven SMEs to compete in global market, (vii) promoting cross border investment to benefit from increasing global deployment of production and marketing activities enhancing the supply and quality of skilled human resources required for technology and industrial upgrading.

3.8 Supply Chain Management in Electronics Industry in Malaysia

Specialization in electronics manufacturing industry in Malaysia is higher than in most OECD countries, which gives the country a strong foundation for the future in the most innovative sectors of manufacturing and related services. Nevertheless, a common thread throughout analyses of the electronics industry is the need for deeper linkages, both vertically throughout the supply chain and horizontally between firms in particular markets. Collaboration and supply chain management, of a kind that goes beyond management of the supply network to support deep integration and collaboration, are crucial. Therefore, such there is a strong need to establish a more significant supply chain management practices in Malaysia.

3.8.1 An overview of SCM at Electronics Industry in Malaysia

In general, a gross domestic product (GDP) of over RM 700 billions and of which Malaysia spends 14 percent of its GDP on logistics. Considering the following scenario, there is indeed a great need to study the supply chain practices being followed by Malaysia's industry mainly the electronics industry and to suggest areas for improving the same. This scenario is also similar to other developing economies and many has realized the importance of supply chain practices (Sahay & Mohan, 2003).

Generally, the main SCM activities which are commonly and widely practised in Malaysia's electronics industry are purchasing, outsourcing and distribution activities. The major goals of these activities of SCM are to capture low cost, improved quality and finally reliable delivery to the customers. Eventually, such objective goals are expected to create competitive advantage in the electronics industry in Malaysia. As such, this respective

industry will strive to increase their competitiveness via product customization, high quality, costs reduction, and speed to market in order to satisfy the market needs and competitive advantages with other electronics manufacturers around the world.

3.8.2 Supply Chain Management Practices in Electronics Industry in Malaysia

Faced with huge challenges in the current world class manufacturing and unlimited customer requirement in the competitive environment, electronics manufacturing firms in Malaysia now find that it is no longer enough to manage their business but also the total supply chain organization. They must be involved in managing the network of all upstream firms that provide input (direct or indirect), as well as the network of downstream firms responsible for delivery and after-market service of the product to the customer (Abdullah & Hashim, 2010). In this context, supply chain management practices includes strategic supplier partnering, customer relationship, information sharing, information quality, postponement, internal lean practices and logistics transportation.

3.8.2.1 Strategic Supplier Partnering

Strategic supplier partnering is a form of strategic SCM that makes the suppliers in the electronics industry in Malaysia satisfy an ever-changing marketplace through its competitive advantage on close-long term strategic relationship with few suppliers. This relationship ensures the supplier support the strategy. Such supplier should have the ability to design low-cost products that meet the functional requirements, minimize inventory, and drive down lead times. With these capabilities, the firms in the electronics industry in Malaysia can achieve the integration of selected strategies and find the best supplier to

supply the product without any difficulty in the long term period due to the need of marketplace for electronics product (Rajagopal, Suhaiza, & Mohamed, 2009).

Example: Hitachi Electronics Products (M) Sdn. Bhd. is a leading manufacturer of DVD drives and digital media products. Established in 1989, the company employs about 1,600 people and has an ongoing technology transfer programme with Hitachi Limited of Japan. Hitachi Electronics Products Malaysia (HEPM) involvement leads to transferring data files and documents related to its transactions with its parts vendors. The manufacturer has about 200 vendors from around the world in its Web-based e-procurement system. Approximately 80 of these vendors have their inventories managed on a Vendor Managed Inventory (VMI) modelled by HEPM.

3.8.2.2 Customer Relationship

The key to supply chain sustainability is to obtain lasting customer relationship (CR) through creation of superior value and satisfaction. Customer relationship management (CRM) emphasizes the development profitable customer relationships by dealing with all aspects of acquiring, keeping and growing customers (Kotler & Armstrong, 2010). One of the most crucial elements of customer relationship management is the after-sales service. Specifically, all activities organized by business organisations after the purchasing stage, is a part of customer relationship management (CRM). In addition, customers require products and services to be delivered at the right place, at the right time, at the right quantity cum quality and at the given right price. Unfortunately, businesses often pay no serious attention to their distribution channels, sometimes with damaging results (Shaharudin, Yusof, Elias, & Mansor, 2009).

Example: KALTECH is a fully Malaysian-owned Electronics and Electro Mechanical Solutions Company, providing comprehensive electronics production and production management services to global companies. Kaltech has remarkable and extraordinary customer relationship management track record. Kaltech's significant achievement entails excellent delivery system, flawlessness of the installation process, damage reduction to the product as well as assurance for the product quality and reliability.

3.8.2.3 Information Management

The implementation of information technology and system in to the day-to-day management and operational activities of the manufacturing sector will have a great impact in the effectiveness of information management across and within the manufacturing supply chain (Alam, Khatibi, Ismail, & Ahmad, 2005). This, in turn, promotes the integration and collaboration among firms in the electronics manufacturing supply chain and enhances the productivity of the electronics industry in Malaysia. The usage of information technology and system mainly among the electronics firms are for the purpose of information exchange and sharing among trading partners of the supply chain (Nath & Standing, 2010; Tan, et al., 2008).

Example: RosettaNet is a self-funded, non-profit consortium of more than 400 of the world's leading Electronics Components (EC), Information Technology (IT) and Semiconductor Manufacturing (SM) companies dedicated to creating, implementing and promoting open e-business standards. These standards form a common e-business language, aligning processes between trading partners on a global basis (RosettaNet, 2002). The

RosettaNet initiative in Malaysia was announced by the Prime Minister in the 2002 Budget is an Internet-based common messaging standard for global supply chain management (RosettaNet, 2002). Currently, developed for Malaysia's electronics sector, it enables companies in the supply chain to communicate and conduct business electronically through common codes for sourcing of parts and components. Penang, Kedah and Perak, being the states with highest concentration of electrical and electronics industries, they will be the early beneficiaries of this financial assistance. Electrical and electronics companies from other states interested in implementing RosettaNet in their supply chain can also avail themselves to the grant. The grant will be administered by MITI through the Small Medium Industry Development Corporation (SMIDEC) (RosettaNet, 2007).

3.8.2.4 Internal Lean Practices

The concept and practicality of lean thinking has been widely accepted by many manufacturing operations in the electronics manufacturing industry in Malaysia. This lean thinking is the impetus for the forceful implementation of internal lean practices in the manufacturing sector in Malaysia in total (Azman & Suhaiza, 2011). Furthermore, these internal lean practices are gaining more popularity in recent years successfully in the electrical and electronics industry (Y. C. Wong, Wong, & Ali, 2009). The reason for such fast proliferation of these internal lean practices is due to the fact of its association with the elimination of seven important wastes to ameliorate the effects of variability in supply, processing time or demand (Shah & Ward, 2007). Internal lean practices require emphasis in reducing waste along the value chain, improved lead time, continuous quality production and customer oriented production.

Example: Toshiba Electronics Malaysia, implemented internal lean practices for more than 10 years and the tools implemented most of them were implementing 5S, Poka-yoke, PDCA, TPM, Kaizen, JIT, and Standardized work. The organisation focuses widely on TPM to prevent the breakdowns of equipment or facilities. Nevertheless, Toshiba Electronics Malaysia believes strongly on embracing more lean practices tools at any one time as it provides more holistic approach to total productivity and reduced cost.

3.8.2.5 Postponement

The concept of postponement is a manufacturing context. It focuses on delayed manufacturing as close to customer demand as possible. As a result, this enables inventory reduction, enhances customer service, eliminates obsolescence and eventually creates total cost reduction (Pagh & Cooper, 1998). Moreover, a remarkable customer satisfaction is achieved through the delivery of the right product, at the right place and at the right time. Within supply chain management practices, postponement deliberately eliminates, if not reduces the possibility of wrong manufacturing or incorrect inventory deployment (Hoek, Voss, & Commandeur, 1999). Hence, postponement strategies in supply chain management practices of the electronics manufacturing industry provides a leveraging platform to yield substantial benefits by adopting firms in different sustainable competitive environments.

Example: Agilent Technologies Malaysia is one of the major configured electronic system manufacturers implementing a global supply chain. Its core business in Malaysia is Test & Measurement and Semi-conductors. The supply chain management practices in Agilent is designed to address total planning across procurement, production manufacturing, order fulfillment, customer service, and business logistics processes. It enables inventory

postponement strategies which allow inventory optimization. The key objectives of this Inventory Optimization are to drive inventory out of their supply chain, to reduce costs, and to quickly respond to changes in custom configuration. Retrospectively, this is a result of the most effective inventory postponement strategy while taking into account demand, supply and lead-time uncertainty, and customer service levels.

3.8.2.6 Logistics and Transportation Sector

Logistics and transportation is a vital component in supply chain management. Henceforth, the logistics industry serves as a catalyst to enhance the development of industrialization in Malaysia (Ali, Jaafar, & Mohamad, 2008). The logistics sector in Malaysia comprises transportation as the core subset or element and is complemented by various related services, such as inventory management, warehousing management, customs and forwarding, distribution services and other value added services. The transportation element covers sub-sector such as ports, airports, roads, railways and inland haulage services.

Nevertheless, with various spectrum of transportation sub-sectors, 90 per cent of the international trade is through maritime seaport. Owing to this, the ports in Malaysia provide important inter link between shipping and land transport. The integration of port is further compounded when the above-mentioned inter link between hinterland and marketplace is heavily inter-connected by roads, railway and inland water ways and to certain extent, through airport. Nevertheless, the strong integration of port as a logistics hub is also due to the number of integrated logistics services provided by the third party (3PL) and fourth party logistics (4PL) to support the domestic and export oriented suppliers and manufacturers in the electronics industry of the country (Malaysia, 2006b).

3.9 Summary

Manufacturing exports have experienced a declining trend in the past several years; however, this has not pushed the sector out of the five most important foreign exchange earners. Hence, it is the industrial sector that provides a reliable field to practice invention, innovation and the nurturing of modern technologies for production and service provision.

In addition, the importance of the sector to the country's economy is of no doubt, as the sector is the major provider of employment to urban residents and employs about half of the country's wage earners. Through the sector's contribution, in terms of import duty, corporate and income taxes, it remains to be the most reliable source of government revenue accounting for over half of the government's annual revenue collection.

The electronics industry, however, has reached a point where major changes are needed. Low-wage competition from other countries is threatening the still predominantly labour-intensive industry. If Malaysia is to remain competitive in global markets and to continue on its growth path, the character of the electronics industry must change. From being dominated by assembly operations for large multinational firms, with a heavy dependence on imported components, it must transform itself into a knowledge intensive industry with strong roots in domestic enterprise networks (Best & Rasiah, 2003).