THE IMPORTANCE OF MANUFACTURING SECTOR TO THE ECONOMIC GROWTH OF MALAYSIA: AN INPUT-OUTPUT APPROACH

LOO SZE YING

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LOO SZE YING

812 357

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Graduate School of Business

Universiti Utara Malaysia

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ABSTRACT

The main purpose of the study is to examine the importance of manufacturing sector to Malaysia economic growth by using input-output analysis. A comprehensive comparative study is performed by using three years Malaysia Input-Output Tables of 1991, 2000 and 2005. The manufacturing sector is assumed as an exogenous variable in examining the inter-industry relationship and also the impact of it on Gross Domestic Product (GDP) and import. In the study, backward and forward linkages and impact analysis are used as primary analytical tool in achieving the objective of the study. Based on the findings, the manufacturing sector is a key driver for economic growth with the strong backward and forward linkages throughout the period under study. In addition, the expansion of manufacturing sector would give a significance impact on output and there is highest proportion of import commodities use in the production for manufacturing sector.

Key Words: Manufacturing sector, economic growth, input-output analysis, backward and forward linkages, impact analysis.

ABSTRAK

Tujuan utama kertas kerja ini adalah untuk mengkaji kepentingan sektor perindustrian terhadap pertumbuhan ekonomi dalam Malaysia dengan menggunakan kaedah analisis input-output. Data Jadual Input Output bagi tahun 1991, 2000 dan 2005 telah digunakan untuk tujuan perbandingan keputusan bagi tiga tahun. Persalingan antara industry dianalisis bagi mengesan sektor utama dalam menbangun ekonomi negara. Di samping itu, sektor perindustrian diandaikan sebagai pemboleh ubah dalam menganalisis hubungan antara sektor perindustrian terhadap Keluaran Dalam Negara Kasar (KDNK) dan import. Hasil keputusan telah menunjukkan bahawa sektor perindustrian merupakan sektor utama dalam membangun ekonomi Malaysia. Oleh itu, pembanguan dalam sektor perindustrian akan membangun ekonomi Malaysia dengan menjana pembanguan industri yang lain. Seterusnya, permintaaan terhadap barang import untuk digunakan dalam aktiviti pengeluaran dalam secktor perindustrian adalah tinggi.

Kata Kunci: Sektor perindustrian, Pembangunan ekonomi dalam Malaysia, Input-output, Pengganda dan Kesalingan antara industri.

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LIST OF ABBREVIATION

ARDL	Autoregressive Distributed Lag
EPU	Economic Planning Unit
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
KDNK	Keluaran Dalam Negara Kasar
MCPA	Malaysian Classification of Products by Activities, 2009
NEP	New Economic Model, 2010
NEP	New Economic Policy, 1970
NDP	National Development Policy, 1990
OECD	Organization for Economic Co-operation and Development
SAM	Social Accounting Matrix

CHAPTER 1

OVERVIEW OF THE STUDY

1.1 INTRODUCTION

In Malaysia, the development of manufacturing sector in 1990s has transformed our economy from primary-sector dependency into manufactured-sector dependency in respective to the imposition of National Policy Development (NPD). Manufacturers use raw materials from suppliers to produce finished commodities, which in turn may be demand directly by consumers or use as input production in other sectors. Thus, when there is an expansion of manufactured production, it would results an increase of production for whole economic system.

First of all, background of research is presented to make more understanding about the importance of manufacturing sector statistically. Manufacturing sector contributes highest proportions of domestic production among good sectors. In addition, large scale of production for manufacturing sector could generate large amount of labors from the workplace. This is because there is lots of labor-intensive products rather than capital-intensive products produce by manufacturing sector in Malaysia. Thus, the development of manufacturing

sector could reduces the unemployment rate significantly especially for unskilled-workers.

Furthermore, there is been fewer concerns about production structure of economic sector in Malaysia. Input-output analysis is a useful analytical tool in analyzing the production structure of economic sector. It gives us an illustration of the circular flows of goods and services in an economy. Accordingly, the question of how much of intermediated input an industry requires in order to produce one unit of its output and how much of intermediated input it could utilize to other sectors with one unit of production can be examined.

Next, there are few specified objectives are set in order to answer the question of the research as mentioned in the chapter. As a result, our main objective can be achieved. However, limitations are existed due to the existence of controllable situations. Thus, the study can be extended far for future research. In addition, the study can also be served as guidelines or extra information to any related parties in making it more useful in the latter days. Lastly, the flow study is presenting by the organization of study clearly.

1.2 BACKGROUND OF THE STUDY

The development of manufacturing sector is very important in driving up the economic growth of our Malaysia. There was a boom expansion happening in the industry of manufacturing especially after the imposition of export-oriented policy. According to the Annual Report of Bank Negara, the export of manufactured goods was accounted for 80% of the total export in the late of 1990's. The rapid development on manufacturing sector was followed by an increasing trend of economic growth in Malaysia. As a result, there are a transition economy happened during 1990's in our country, that is, from primary-oriented economy into manufactured-oriented economy. (Rohana and Tajul ,2010)

As it shown by Table 1.1, primary sector particularly for sector of agricultural, fishery and forestry stood for the highest percentages among good sectors before year 1990. In year 1985, sector of agricultural, fishery and forestry was contributed for 23.52% of domestic production and there was 20.18% of domestic production contributed by manufacturing sector.

However, the contribution of manufacturing sector towards domestic production was high among good sectors due to the development of manufacturing sector in Malaysia. Manufacturing sector was contributed for

the highest proportion of production with the value of 23.84% as compared to the 14.98% of domestic production was contributed by the sector of agricultural, fishery and forestry. In addition, there was an increasing trend of output produced by manufacturing sector after year 1990. There was 25.8% and 29.9% of domestic output contributed by manufacturing sector in year 1995 and 2005, respectively. Even though, there was a slightly decrease of output produced by manufacturing sector in year 2005.

Table 1.1 The Share of Manufactured Output to The GDP Malaysia (in % value)

Year	Agricultural, Fishery & Forestry	Mining & Quarrying	Manufacturing	Utility	Construction	Service
1985	23.52	10.36	20.18	4.77	1.48	39.7
1990	14.98	11.66	23.84	3.84	2.18	43.49
1995	12.67	6.10	25.80	6.04	2.56	46.84
2000	8.33	10.23	29.90	3.8	2.89	44.86
2005	8.22	14.07	29.00	2.94	2.69	43.08

Source: Department of Statistic, Malaysia.

Note: The percentage value of domestic output distribution is derived by dividing the value of output in an industry with the GDP in Malaysia.

The production of manufacturing sector in Malaysia is labor-intensive commodities rather than capital-intensive commodities since our country is still a developing country. Therefore, an expansion of manufacturing sector would create a broad range of jobs especially for low-skilled workers for the country. Consequently, our national unemployment rate can be reduced. At

the same time, the problems of poverty and income inequality in the country can be solved.

Table 1.2 The Distribution of Employment by Sectoral in Malaysia (in % value)

Year	Agricultural, Fishery & Forestry	Mining & Quarrying	Manufacturing	Utility	Construction	Service
1985	30.38	0.79	15.04	0.56	7.42	45.82
1990	26.00	0.55	19.94	0.7	6.34	46.48
1995	19.97	0.43	23.29	0.63	8.00	47.69
2000	16.75	0	23.46	0.53	8.20	50.77
2005	14.64	0.36	19.8	0.56	9.00	55.63

Source: Department of Statistic, Malaysia.
Note: The percentage value of employment distribution is derived by dividing the number of employed people in an industry with the total number of employed peoples in Malaysia.

As it shown by Table 1.2 as above, there was an increasing trend of employment rate happened in manufacturing sector under the period of the study. Before year 1990, the sector of agricultural, fishery and forestry employed a highest rate of workers among good sectors to work in its sector, which is 30.38%. It was following by the manufacturing sector with 15.04%, by construction sector with 7.42% and so forth. However, in year 1991, the number of labor employed in manufacturing sector was increased from 15.04% into 19.94%. Furthermore, there was a large scale of labors employed in manufacturing sector in yea 1995 and 2000. There was 23.29% and 23.46% from overall employed workers employed in manufacturing sector,

respectively. Thus, manufacturing sector could employ large scale amount of labors to work among good sectors.

New Economic Model is served as a guideline for national development towards *Vision 2020* that is to become a high income advanced country in the year of 2020. As a result, knowledge-based economy that is driven by a high capacity for creativity, innovation has been highlighted by our government under NEM. However, manufacturing sector is still a very important sector in prompting the development of knowledge-based economy. A rapid growth of manufacturing sector is a foundation for moving towards knowledge-based economy.

In the study, a comparative quantitative study is performed in illustrating the importance of manufacturing industry to our economic growth particularly from the perspective of production structure. The interdependence between sectors is examined by using input-output analysis. Throughout the period of the study, manufacturing sectors is the main sector in developing our economic growth. An expansion of production for manufacturing sector could increase our domestic production significantly. However, manufacturing sector is still using high proportion of import commodities' input production.

1.3 PROBLEM STATEMENT

In Malaysia, input-output analysis is considered as new analytical tool for empirical studies. In addition, there is lots of empirical studies about the determinants of attract FDI towards domestic manufacturing sector by using econometric techniques such as Wong (2005). The importance of manufacturing sector towards our economic growth especially from the perspective of production is not being concerned. As we know the productivity for manufacturing sector is high than other sectors that it could be produced a large scale of commodities in the short time. Thus, when there is an expansion of manufacturing sector happens, it would brings an increase of domestic output which in turn increase GDP performance. By using input-output analysis, we can examine how much domestic output would increase due to an unit final demand for an industry increase.

By using input-output analysis, we could examine the inter-relationship between manufacturing and non-manufacturing in Malaysia that could not be examined by using econometric analysis. Manufacturing sector demand raw materials from other sectors as manufactured input production and supply manufactured output to other sectors as their source of production. It means that how much raw material demands from every economic sector in order to

produce one unit of manufactured output and how much output could be supplies to other sectors for every unit production for manufacturing sector.

Based on the modern economy currently, the input production can not only involved capital and labor but also intermediated inputs that produce by domestic economic sectors. As mentioned by Enlightment mercantilist, Charles Davenent that by exporting more manufactured products which made by using domestic raw materials, countries would earn more. Therefore, by using input-output table, we can estimate the proportion of labor, capital and intermediated inputs directly.

Since the distribution of production structure for every economic sector can be seen clearly. Thus, the proportion of input production between intermediated inputs and primary input particularly import commodities that use as input production can be estimated. Differently with the conventional econometric analysis, by using impact analysis, the import requirements of a unit of final demand for economic sectors can be estimated.

1.4 RESEARCH QUESTIONS

There are a few questions that have to answer in achieving our main purpose of the study.

a) What is the impact of the manufacturing sector to Malaysia economy?

b) How about the responsiveness of non-manufacturing sector toward manufacturing sector's activity in Malaysia?

c) What is the impact of the manufacturing sector on the output and import of Malaysia?

1.5 RESEARCH OBJECTIVE

The main objective of the present paper is to examine the importance of manufacturing industry to the economic growth of Malaysia from the aspect of production structure.

Thus, in order to achieve the main objective as mentioned above, the following specified objectives have to be taken:

a) To examine the interrelationship between manufacturing sector and non-manufacturing sector in Malaysia.

b) To examine the impact of the manufacturing sector on output of Malaysia.

c) To examine the impact of the manufacturing sector on import commodities of Malaysia

1.6 SIGNIFICANCE OF THE STUDY

The aim of the survey is to examine the economic growth of Malaysia due to the expansion of manufacturing industry by using the input-output approach. Thus, the findings of the study will benefit to policymakers, researchers and even students who are intended to know more about the manufacturing industry in Malaysia.

This study can be served as the reference for policymaker in making any decisions about policy or regulation towards manufacturing industry.

This study can be also served as the acknowledgment of an empirical study for researchers who are meant to investigate more about the manufacturing industry. In addition, this study can be serve as a comparison of the findings for future studies.

Students are also can derive benefit from this study which it can serve as an extra basic knowledge about the manufacturing industry in Malaysia.

1.7 SCOPE AND LIMITATIONS OF THE STUDY

The primary objective of the study is to examine the importance of manufacturing sector to the economic growth of Malaysia from the aspect of domestic production. Thus, input-output analysis is served as an analytical tool in our study. Furthermore, there are three Malaysian Input-Output Tables for year 1991, 2000 and 2005 used as a primary source analysis. Besides that, Malaysian input output table for year 2005 is the latest input-output table currently. The segregated economic sectors from Malaysian Input-Output Table are aggregated into six main economic sectors such as agricultural, fishery and fishery, mining and quarrying, manufacturing, utility, construction and services based on Malaysian Classification of Products by Activities (2009). Consequently, there are three highly aggregated transaction tables with six main sectors derived for year 1991, 2000 and 2005.

From the derived transaction table, it involves supply and use input-output tables simultaneously. Indeed, the contribution of final demand sector is being ignored in the study. Final demand towards intermediated inputs and primary inputs by household, government, export and even capital formation is invalid. However, the supply and use of intermediated inputs and primary inputs in the production between sectors are being focused. Thus, the situation of open-market is not existed.

In examining the relationship between economic sectors, backward and forward linkages are used in calculating the degree of economic linkage between sectors. An economic sector with high degree of backward linkage reflects there is lots of intermediated input it has to absorb in order to produce one unit of its output. Oppositely, an economic sector would utilize more intermediated inputs to other sectors as compared to other sectors for one unit output it produces if and only if it has high degree of forward linkage.

Impact analysis of input-output model is used in calculating the degree of output and import multipliers of the study. Differently with econometric analysis, output multiplier is used as the measurement of the contribution of manufacturing sector towards GDP. It is following by comparing with the values of output multiplier for other sectors such as primary, other secondary sector and tertiary sector. Country would earn more benefits if there are lots of domestic outputs are produced by using domestic raw materials. Therefore, import multiplier is applied in examining the requirement of import commodities in the domestic production. Sector with high value of import commodities is the sector uses large amount of import commodities in its production. Indeed, import commodity for final demand is ignored. Findings are presenting in Chapter 4 comparatively.

However, there are a few limitations existed in the study. First of all, the influence of price level for commodities. Generally, the economic growth would be comprised with the high level of price value in the sector. In turns, inflation is occurring. Thus, when there was economic growth together with the existence of inflation, the real GDP might reduce.

Based on Keynesian growth theory, economic growth is determined by the factor of consumption (C), investment (I), government expenditure (G), and export (X). It could represented by using the formula, that is, Y= C+ I+G+X. Unlike with the Keynesian growth theory, in the study, importance of manufacturing sector towards our economic growth is examined from the perspective of production structure based on input-output tables. Meanwhile, the final demand sector from the input-output table is ignored in the study that the contributions of household, government and export towards our economic growth are invalid. Thus, it could only reflect the GDP rather than real economic growth.

The impact of the manufacturing sector on import is measured by using the import value of the row of primary inputs. These import commodities are limited to the use as input in the production of the sector but not final demand. Therefore, the influence toward trade pattern is invalid.

1.8 ORGANIZATION OF THE STUDY

There are four main chapters involved in the study. Chapter 2 provides the theoretical reviews about the manufacturing development and economic growth. In addition, there is empirical research that published previously are discussed as follows in this chapter. In Chapter 3, the process of mathematical approach is described deeply. Chapter 4 involves the discussions of the outcomes of the survey. Chapter 5 consists of conclusion and recommendation based on findings of the study.

CHAPTER 2

LITERATURE REVIEW

2.1 INTRODUCTION

There are two sections involved in this chapter. First of all, the association between the growth of manufacturing industry and economic growth is emphasized in the perspective of theoretical. In addition, the pioneer of input-output analysis is discussed in the following.

Secondly, the previous empirical studies which are related to the study will be discussed. In addition, their limitations are discussed together as follows. Ultimately, the difference between this study with previous empirical studies are briefly discussed.

2.2 THEORETICAL PERSPECTIVE

According Ragnar Nurkse[1] (1907-1959), less developed countries should be adopted the policy of industrialization in developing their economies. Accordingly, rich countries are generally manufactured-oriented economy rather than primary-oriented. Indeed, rich countries show a high degree of income per capital rather than primary-based countries. A low-income country can develop its manufacturing industry by supplying their manufactured products to other manufactured countries through export activities. Therefore, the development of manufacturing industry can boost the economic growth for the nation.

This is because there was diminishing return existed in agriculture industry rather than manufacturing industry. According to Robert Malthus (1766-1834) and David Ricardo (1772-1823), where there is an additional unit of labor existed in agriculture industry, with the assumptions of fixed technology, there are less additional units of agriculture output produced than previously. Meanwhile, Adam Smith has proposed that an accumulation of capital to the productive labor will push the output level of an industry especially in the manufacturing industry and eventually, it would result a high level of

[1] Nurkse has gave 6 points that why rich countries with high industrialization are able to experience high income level. (The History of Economic Thought. 7th Ed. Chapter23, page 483)

economic growth to the country based on *Economic Laws of a Competitive Economy* in his publications of *the Wealth of Nations* (1776).

Manufacturing sector is a very important sector in driving the economic growth of a country. As Nicholas Kaldor (1966) used three laws in explaining the relationship between economic growth and manufacturing growth. First of all, he mentioned that manufacturing is the *engine of growth* of a country. There is a positive relationship between growth of manufacturing industry and economic growth. Secondly, he emphasized the productivity in manufacturing is related positively to the manufacturing output growth, as the term is called as the Law of Kaldor-Verdoorn. Kaldor used employment rate in explaining the productivity of manufacturing industry. Thus, it can concluded that there is an increasing return to scale existed in manufacturing industry. Third, an expansion of manufacturing industry will be rise up the productivity of other industries. (Mamgain, 1999) The three Kaldor's Law were examined by Kaldor in the case of twelve OECD countries by using econometric methods in years between 1953-54 and also between 1963-64, respectively. (Ener and Arica, 2011**)**

However, before the emergence of the Industrial Revolution, economic growth theory was more emphasized the productivity of agriculture than

manufacturing industry in promoting the economic growth. According Francois Quesnay (1694-1774), nonagricultural sector which involved manufacturing and merchants was nonproductive. In opposite, the agriculture industry is more productive which surplus of agriculture production reinvest for the agriculture industry again. Thus, Quesnay was preferred a large scale of agriculture production. Meanwhile, Turgot argued that manufacturing industry was able to create a surplus to reinvest purpose as well as the factory farm industry. (Eltis, 1984)

In order to examine the economic structure, input-output analysis is the most suitable analytical tool. Wassily Leontief was the main contributor of input-output analysis and in return he successfully won the Nobel Prize in 1973. The first input-output table was developed by Leontief for United States with 46 economic sectors involved in the year of 1919. Indeed, the interdependence between industries has been highlighted especially after the Second World War due to the stagnation of economic growth. Based on the input-output analysis, the flow of commodities and services are existed between industries either in directly or indirectly perspective. The production of an industry required output from other industries which is represented by the column in the input-output table. In opposite, an extra production of industry utilizes more inputs to other industries' use which is represented by the row in input-output table. Indeed, this Leontief input-output analysis is based on the ideas

of *Tableau Economique* which introduced by Quesnay in 1758. However, Quesnay has only used three main sectors, that is, farmer which is representing the productive class followed by the sterile class that is represented by manufacturers and last but not least merchants instead of landlords. These three main sectors are used in explaining the circular flow of economic activities.

In addition, the Leontief input-output analysis has been expanded by Hollis B. Chenery, Tsunehiko Watanabe and Poul N. Rasmussen especially in examining the economic interdependence. Chenery and Watanabe (1958) had used the backward and forward linkage in doing a comparative study of productive structures for the United States, Norway, Japan and Italy. This linkage based on Chenery and Watanabe was addressed as direct backward and forward linkage. In addition, linkage based on Ramussen (1956) was addressed as total effects of backward and forward linkage. (Andreosso and Yue, 2000)

Charles Davenant (1956-1714), an enlightened mercantilist, argued that countries could earn more with export more manufactured commodities which produced by using domestic raw materials. This was proposed by Davenant in his *"An Essay on the Probable Means of Making the People Gainers in the*

Balance of Trade (1699)". Similarly, Thomas Mun (1571-1641) was also emphasized more on the purchasement of production rather than imported goods. Even though, Mun used to propose to increase raw materials for Britain through import.

2.3 EMPIRICAL PERSPECTIVE

A panel study has been performed by Ener and Arica (2011) in examining the connection between GDP growth and the growth of manufacturing industry production in the case of high economies' countries. They performed their panel study by using data involving 23 OECD countries, that is, US, UK, Switzerland, Sweden, Spain, Portugal, Norway, New Zealand, Netherlands, Luxembourg, Korea, Japan, Italy, Ireland, Greece, Germany, France, Finland, Denmark, Canada, Belgium, Austria and Australia. These 23 OECD countries were experiencing high economies in the period of 1980-2008. Based on the findings of the study, manufacturing industry is the engine of economic growth for industrializing industries.

In the study of Kiniivilla (2007), a comparative descriptive study has been done in examining the industrial development and economic growth performed across the developing countries, that is, China, India, South Korea, Taiwan Province of China, Indonesia, Mexico and Brazil. Generally, economic growth was occurring as a consequence of the growth of manufacturing industry in the nation. Nonetheless, she has highlighted the problems of poverty and income inequality are still happening, in countries like China and India. South Korea and Taiwan are two successful countries in experiencing the sustainable economic growth together with the reduction of

national levels of poverty and income inequality. Thus, she has emphasized the importance of government interventions on poverty and income inequality problems.

Based on the findings of the study for Soliven, Villaquer and Zozobrado (2004), the Gross Domestic Product (GDP) for Philippine was continuously increased following the growth of industry during the industrialization era in 1970's and early 1980's. Indeed, the highest total output for manufacturing existed due to the high value of gross output. Hence, the existence of technological competence was happening in Philippine. The input-output analysis is applied in their study by examining the changes of technical coefficients in long-term and short term. According to their explanation, technical coefficient is most suitable in explaining the responsiveness of industry towards total output directly.

Law of Kaldor has been involved as consideration under the study of Guo (2007) to the China regional economic growth, indeed, provincial level of Macao, Taiwan and Hong Kong were not involved. According to his findings, he found that the economic growth of China from the year of 1949-2004, the boom of economic growth, was fulfilled the Kaldor's Law. There was about averagely 9.4% of GDP growth recorded during period of post-developed

Manufacturing. Indeed, the rate of productivity growth in China increased in respected to the growth of manufacturing industry. Increasing returns to scale happened in the China manufacturing sector because of the high rate of foreign direct investment (FDI) in manufacturing. In addition, the growth of manufacturing in China was also comprised the overall productivity of the economy. For instance, there was positive relationship shown between employment and the development of manufacturing.

Furthermore, Libanio and Moro (2011) were used the Kaldorian approach also in describing the manufacturing industry and economic growth in the case of Latin America between the year of 1980 and 2006. However, they were only involved the first and second laws of Kaldor growth theory in their study with the exception of interdependencies between industries. Indeed, they emphasized the growth of capital stock in examining the second law of Kaldor, that is, the Verdoorn's Law. There was a substantial expansion of exports and manufactured commodities happening in Mexico as compared with Argentina and Venezuela. Nonetheless, based on their findings, manufacturing is still the engine of growth in Latin America and there was a positive relationship of productivity growth towards the output growth in the manufacturing sector.

Andreosso and Yue (2000) used various measurements in examining the economic linkages and identified the key economic in China between year 1987 and 1997. There were four types of measurements used in their paper, that is, Chenery-Watanabe method, Rasmussen method, Pure-Linkage method and Dietzembacher method as well. The findings of these four linkage measurements toward the industry of Agriculture, Mining, Manufacturing, and Service are compared. According to the findings, there was increasing trend of economic interdependence in respective to the economic growth in China. Indeed, manufacturing industry was a key economic of China during the period under their study. However, they were determined key economic by using the indicators of linkage above the average values but not the indicators of the power of dispersion and the power of sensitivity**.**

The same method is used as Andreosso and Yue by You and Keceli (2009) in examining the intersectoral linkage for the Turkish economy. However, the sectors involved in Turkish input-output tables were classified into Ricardo Sectors, High-Technology Sectors and Heckscher-Ohlin Sectors. Ricardo Sectors are referred to natural resource intensive production such as agricultural production and food manufacturing industry. High-Technology Sectors are represented high-technology intensive production especially in the chemical manufacturing industry. Heckscher-Ohlin Sectors are represented capital-labor intensive production respectively which there is a standardized

proportion of labor and capital in production. For example, utilities, construction, publishing and so forth. From the findings, manufacturing industry from Heckscher-Ohlin Sectors has a high linkage effect, that is, the engine of growth according Kaldor's law.

The importance of involving import commodities which are used as intermediated inputs in analyzing the economic linkages of input-output analysis was highlighted in the study of Reis and Rua (2006) for the case of Portuguese. From their findings, it reflected that even though the industry of manufacturing and service are used more for intermediated inputs but manufacturing was tended to depend from the outside. It means that there was high consumption of import commodities as input for the manufacturing industry.

Unlike with other studies, Zhang (2009) focus on the acceleration of manufacturing sector accompanied by the producer services. For example, research and development (R&D), IT, transportations, consulting services, marketing and so forth, that intermediary service is provided to the activity of production are classified as producer service. There is a relationship exist between producer service and manufacturing development. Indeed, manufacturing industry tends to create high demand for producer service

rather than producer service provides supportive services to the manufacturing industry. Perhaps, the development of manufacturing industry tends to explore the development of the service sector.

In Malaysia, input-output analysis has been used by other researchers in doing their research recently. For instance, in the study of Mukaramah, Ahmad Zafarullah and Nor'Aznin (2011) that they have applied the method of *Social Accounting Method* (SAM) in examining the impact of public expenditure towards household income distribution. However, the application of input-output analysis in examining the economic linkage is still invalid temporary.

The econometric and input-output approaches are used in the study of Rohana and Tajul (2010) in examining the structural change of Malaysia manufacturing industry due to the replacement of export-oriented to import-substitution policy. Through the analysis of Autoregressive Distributed Lag (ARDL), the results show that there are long-run positive relationships for the total value added by manufacturing together with export performance. Likewise, it implies that there was a boom expansion happening in the industry of manufacturing especially after the imposition of export-oriented policy as a result of high productivity occurs in manufacturing industry.

Fauzana (2007) who was only focus palm oil of the agriculture industry in her study found that the level interdependence of agricultural industry reduces due to the focus of government in manufacturing and service sectors. This can be means that there was a high degree of economic interdependence of manufacturing industry as compared to the agricultural industry.

Hussain (2010) had used the indices of backward and forward linkages based on the Leontief model in explaining the success of government policy towards economic growth. Indeed, the coefficients of variation of backward and forward linkages are used in assisting the industrial policy. Accordingly, the economic interdependence throughout the years of study was remained weak.

From the previous empirical studied as reviewed, the manufacturing sector is indeed an engine of economic growth of a nation. The increase of manufactured end product is accompanied by an increase of other industries' production and thus economic growth occurs. As in Malaysia, due to the policy of open-market, industries are not only used intermediated inputs that supplied domestically but also import commodities especially for non-competitive import commodities. High degree of import multipliers implies there is a high level of requirement for import commodities use as input of production.

2.4 CONCLUSION

Throughout the revision of previous studies, the manufacturing industry is emphasized in growth theory to economic growth for a country especially after the period of the Industrial Revolution. In contrast, there are three laws proposed by Nicholas Kaldor (1966) in investigating the importance of manufacturing industry to the economy. First, manufacturing industry is the engine of economic growth of a country. Secondly, the productivity of the manufacturing sector increased in respective to the output growth of manufacturing industry. Third, there is a positive externalities spread out to industries by manufacturing industry. There are few amounts of empirical studies which have used Kaldor's Law in performing their study about the manufacturing industry.

Furthermore, the interindustry linkages have been used by previous studies in examining the interdependence linkage of economy towards different subjects. Indeed, the key economic of the economy is determined by indicators of backward and forward linkages as well. However, particularly in the case of Malaysia, the multiplier effect of output and import are invalid. Manufacturing sector is not only used raw materials produced domestically in its production but also import commodities. Thus, import multipliers are examined an import requisition in production for industry.

CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

The importance of manufacturing sector to the economic growth of Malaysia is examined by using input-output analysis. Thus, Malaysian Input-Output Tables are used only as a main source of analytical. Input-output analysis which developed by Wassily Leontief will be only examined the production structure of whole economic system of the country. By using technical coefficient, the direct effect of manufacturing industry to the economic growth can be seen clearly. (Soliven, Villaquer and Zozobrado, 2004) Through the backward and forward linkages, we can look for economic interdependence between sectors clearly. Sector with strong backward linkage and also strong effect of forward is a key driver for economic growth. In the study, the multiplier effect is used in examining the effect of one unit increase of final demand for manufacturing sector to our domestic output and import.

3.2 RESEARCH FRAMEWORK

Malaysia has had a high rate of economic growth and became an upper-middle income country during the 1990's with the manufactured - oriented economic system. During that period, the expansion of manufacturing industry was welcomed by our state government in respective to the impositions of New Economic Policy (NEP) and National Development Policy (NDP). In addition, NDP is introduced by our government in 1990 and it was replaced by NEP in the objective of eliminating for national poverty and income inequality. Thus, the period between 1991 and 2005 is considered as the most suitable period in fulfilling our objective of the study

Meanwhile, in the study, the Impact Analysis of Input-Output is used as an analytical tool in analyzing the growth impact of manufacturing industry to our economic growth from the perspective of production structure. Furthermore, in the study, output of production from economic sectors is a proxy of economic growth. Thus, the change of our economic growth due to an expansion of the production for manufacturing sector could be examined. Input-output analysis, also called as *Inter-Industry Analysis* was developed by Wassily Leontief (1936) is based on the concept of *Tableau Economique* by Francois Quesnay (1694-1774). Quesnay had examined how the agriculture

industry contributes to the economic growth through the re-investment of surpluses of agricultural production.

Nowadays, this analysis has been widely used in different economic area research. This is because input-output table is a powerful tool in explaining the circular flows of goods and services in an economy. Good is purchased from suppliers for production use and the output that produced is sold to the demands. Therefore, input-output tables can fully described the production structure of industries existed.

A highly aggregated transaction table should be prepared and understand firstly before doing a comprehensive comparison of the results. Accordingly, the highly aggregated transaction tables under the study are derived from the supply and use Malaysia input-output tables for year 1991, 2000 and 2005. Thus, there are three transaction tables existed.

As we can see from Table 3.1, the highly aggregated transaction table is a square matrix based on the assumptions of economic equilibrium. There is supply and use input-output tables existed from the transaction table. Furthermore, the supply and use input-output table is distributed into two parts;

the left-hand side is reflected the internal flows of productive commodities and services within an economy, meanwhile, the left-hand side reflects the final demand for productive commodities and services within the economy. It can be illustrated by the following 4-quadrant diagram as shown by Table 3.1.

Table 3.1 Feature of Supply and Use Input-Ouput Table

	1 … … n	*1 … … m*	
1 ⋮ n	**I** *(n xn)*	**II** *(n xm)*	1 ⋮ n
1 ⋮ p	**III** *(p x n)*	**IV** *(p x m)*	1 ⋮ p
	1 … … n	*1 … … m*	

Source: Connor and Henry, (1975), "Input-Output Analysis and Its Application". Chapter 1, page 11.

From the left-hand side part of transaction table, the *I*-quadrant of transaction table denotes the flow of intermediated outputs produced by domestic industries and the *III*-quadrant of transaction table denotes the flow of primary inputs towards domestic industries' production.

From the right-hand side part of the above transaction table, *II*-quadrant of transaction table denotes the final demand for intermediated output from household, government, export and even capital formations under the

condition of open-market and *IV*-quadrant of transaction table denotes the flow of primary inputs towards the final demand sector.

In our study, the highly aggregated transaction tables are constructed based on the above guidelines. Indeed, there is six main sectors existed in our constructed transaction tables in order to fulfill the objective of the study. Six sectors that involved in the constructed transaction tables are the aggregations of 92 sectors, 94 sectors and 120 sectors from the Malaysian Input-Output Tables for year 1991, 2000 and 2005, respectively. There are

i. Agriculture, Fishery & Forestry;

ii. Mining and Quarrying;

iii. Manufacturing;

iv. Utility which consisted of electricity, gas and water-work;

v. Construction

vi. Service

Thus, our transaction tables are 6x 6 square matrix with n=6.

In order to examine the importance of manufacturing sector to our national economic growth from the perspective of the production, the sector of final

demand purpose is ignore in the study. This can be reflected by using Table 3.1 that there is only the left-hand side of constructed transaction tables being focused. Thus, the final demand for intermediated input and primary inputs from household, government, export and even capital formations are excluded as shown by *II*-quadrant and *VI*-quadrant of illustrated transaction table above.

A sector would demand raw materials either within sector or between sectors in producing its output. At the same time, the output it produced will supply to other sectors and even its own sector as input production. Thus, an interrelationship between sectors occurs. This situation can be examined by using economic linkages. There are backward and forward linkages. In addition, through the calculation of technical (input) coefficient, an illustration of the distribution of production structure for sectors can be derived. Thus, the proportions of cost production between intermediated inputs and primary inputs can be examined precisely. Last but not least, the value of government income that is comprised from domestic tax and import tax, value added and import commodities for each unit output produced can also be examined.

The economic growth impact of manufacturing sector's expansion is examined by using multiplier effect in the aspect of input-output model. The production of manufacturing sector would change due to a unit change of final

demand of any sector's output. Furthermore, multiplier effect is used also in examining the requirement of import commodities in the production that is import multiplier. Indeed, import commodities that use for final demand sector such as household, government and even export are excluded. Thus, the figure of import commodities is gained from the row-right of import commodities from transaction table.

Finally, there are few assumptions existed under the study.

i. Homogeneous output. The substitution between outputs of industries is not existed. Same type of industries produces their output with the same input structure.

ii. Simple proportions of input production. The proportions of the industry's output are responding directly to the proportional of inputs.

iii. The total effect is derived from the sum of separated effects which are resulting from the different industry's productions.

iv. Open-market is invalid. The final demand from household, government, export and capital formations toward intermediated inputs and primary inputs are ignored. Intermediated inputs that produced domestically and primary inputs that contributed to domestic productions are focused in the study.

3.3 HYPOTHESES OF THE STUDY

The main purpose of the study is to examine the importance of the manufacturing sector in Malaysia economic growth.

Consequently, these hypotheses have to be tested in fulfilling the objective of the study.

i. The growth of the production in the manufacturing sector is followed by economic growth.

ii. The growth of manufacturing sector is beneficial to other sectors such as primary sector, secondary sector and tertiary sector.

iii. The growth of manufacturing sector gives impact on output and import.

3.4 DEFINITIONS AND MEASUREMENT OF VARIABLES

The definition of variables in the study is based on the international standard, that is, the Glossary of Statistical Terms developed by the Organization for Economic Co-operation and Development (OECD) 2007 instead of Malaysia Classification of Products by Activities (MCPA) 2009. In addition, the value of all variables which used as analytical are adapted from Malaysian 1991, 2000, and 2005 Input-Output Tables totally. Under the study, the manufacturing sector is consisted of 54 segregated industries from 1991 and 2000 Malaysian Input-Output Tables, and is involved 69 segregated industries from 2005 Malaysian Input-Output Tables.

a) Agricultural, Fishery & Forestry

It involved all related agro-products such as rubber, oil palm, coconut and tea instead of products of livestock, logging, fishes and others. It is consisted the number of sectors from 1 until 8 in year 1991 and 2000. In 2005, it involved the sector from 1 until 12.

b) Mining and Quarrying

It is involved crude oil, natural gas, metal ore mining, stone clay, and all related quarrying activities. It is consisted the number of sectors from 9 to 11 in 1991 and 2000 and from 13 to 16 in 2005.

c) Utility

It is represented of electricity, gas and water services. It is consisted the sector number of 66 and 67 in 1991 and 2000 and that of 86 and 87 in 2005.

d) Construction

It involved all related constructions such as civil engineering, residential constructions and others. There is number 68 sector from input-output table in 1991 and 2000. Furthermore, it starts with sector number 88 until 91for year 2005.

e) Service

It is represented all related services such as retailing, financial services, government service and others. In 1991, there is 24 segregated service industries, that is, from sector number 69 until 92; In 2000, there is 26

segregated service industries recorded, that is, from sector number 69 until 94; there is 29 segregated service industries involved in 2005, that is, start from number sector 92 until the last, 120.

f) Manufacturing

Manufacturing is defined as the transformations either physically or chemically of materials into new product. Thus, Manufacturing generally uses the input provided by primary sector or produced by its own industries in their industries. Consequently, the new manufactured product can be consumed directly to household (final demand) or to other industries as a factor of production (intermediated demand). Indeed, Manufacturing includes all related component assembly's activities and also recycling. (OECD, 2007)

g) Economic Growth

Under the study, economic growth is measured by the total output value produced by all the industries. Thus, economic growth is represented by the proxy of output. When there is an industry expanding followed by the increase value of total output, thus, the

country is experiencing a situation of economic growth and vice-versa. Thus, the impact of manufacturing sector to the GDP can be measured.

h) Import Commodities

The value of imports commodity from primary input is used in calculating the import multipliers. When there is a RM1 output of final demand for manufacturing increased, the amount of change for import commodities in RM measurement is determined. In this concern, import commodities are represented in those non-competitive import commodities uses in our industry. The figures of non-competitive import commodities are recorded in the row under primary input quadrant.

When the import multiplier is getting smaller, it means that the import requirements of a unit of final demand for industries are getting lower. Meanwhile, the production of an industry can able be supported by the domestic industry's production. Furthermore, the smaller value of import multiplier, the well balances of our national trade pattern, that is, positive value trade balance.

3.5 TRANSACTION TABLE

Transactions table is the basic table in input-output system. The column of transactions table shows the input use in the sector production and the row of the transactions table shows the sales of the final disposal sector. (Connor and Henry, 1975) In this study, three highly aggregated transaction tables are derived from Malaysian Input-Output Tables published by the Department of Statistic in year 1991, 2000 and 2005. In addition, there are six main sectors involved which aggregated from 92 industries, 94 industries and 120 industries, respectively. These six main sectors are Agriculture, fishery & forestry, Mining & Quarrying, Manufacturing, Utility, Constructions and Service.

Therefore, there are *6* sectors involved in our transactions table. Along the row of transactions table, it reflects output produced for these six main sectors and the input that is used in production for these six main sectors is recorded along the column of the table. The transaction table can be reflected by the Table 3.2 in symbolic terms.

The sum of each column of transactions table is the total expenditure on inputs by i^{th} industry. This can be shown by the following formula.

$$z_{i} = \sum_{i=1}^{n} x_{ij}$$

The total for each row can be represented by the following figure, that is,

$$z_{i} = \sum_{j=1}^{n} x_{ij}$$

where *i* represents the total value of *its* industry's output that is distributed among industries including itself in the production.

Table 3.2 Symbolic Form of Transaction Table

Inputs		Intermediate Demand 1	2	3	4	5	6	Final Demand	Total Output
Agricultural, Fishery & Forestry	1	x_{11}	x_{12}	x_{13}	x_{14}	x_{15}	x_{16}	Y_1	X_1
Mining and Quarrying	2	x_{21}	x_{22}	x_{23}	x_{24}	x_{25}	x_{26}	Y_2	X_2
Manufacturing	3	x_{31}	x_{32}	x_{33}	x_{34}	x_{35}	x_{36}	Y_3	X_3
Utilities	4	x_{41}	x_{42}	x_{43}	x_{44}	x_{45}	x_{46}	Y_4	X_4
Construction	5	x_{51}	x_{52}	x_{53}	x_{54}	x_{55}	x_{56}	Y_5	X_5
Services	6	x_{61}	x_{62}	x_{63}	x_{64}	x_{65}	x_{66}	Y_6	X_6
Total Primary Inputs		Z_1	Z_2	Z_3	Z_4	Z_5	Z_6		
Total Inputs		X_1	X_2	X_3	X_4	X_5	X_6		

Source: Connor, Henry. (1975). Input-Output Analysis and Its Application.Chapter 2. page 25.
Note: Economic sectors are distribted into 6 major sectors in fullfilling the objective of the study.

TECHNICAL COEFFICIENT

Technical coefficient is generally addressed as an input coefficient in input-output analysis. Through technical coefficient which derived from the input-output table, we can see clearly the direct effect between and within sectors. (Soliven, Villaquer and Zozobrado, 2004) Indeed, there is only first order of final demand change shown by the technical coefficient. (Connor, Henry, 1975)

Technical coefficient or input coefficient reflects the demand relationship between sectors within the economic system. Input coefficient is derived by calculating from the transactions table directly. When sector *i* increase its output, it will bring a demand increase on a sector that provides a product to sector *i* as input. Thus, technical coefficient illustrated how much of commodity *i* consume for every unit of commodity *j* produce.

In general, the technical coefficient can be computed by following equation:

$$a_{ij} = \frac{x_{ij}}{X_j}$$

Or $$x_{ij} = a_{ij} X_j$$

where *i* represent the row number and *j* represents the column number which a coefficient is located. The inter-industry input (technical) coefficients can be illustrated by the following Table 3.3.

Table 3.3 Symbolic Form of Inter-Industry Technical Coefficients

Sector	Intermediate Demand					
	1	2	3	4	5	6
1	a_{11}	a_{12}	a_{13}	a_{14}	a_{15}	a_{16}
2	a_{21}	a_{22}	a_{23}	a_{24}	a_{25}	a_{26}
3	a_{31}	a_{32}	a_{33}	a_{34}	a_{35}	a_{36}
4	a_{41}	a_{42}	a_{43}	a_{44}	a_{45}	a_{46}
5	a_{51}	a_{52}	a_{53}	a_{54}	a_{55}	a_{56}
6	a_{61}	a_{62}	a_{63}	a_{64}	a_{65}	a_{66}

Source: Connor, Henry. (1975). Input-Output Analysis and Its Application.Chapter 2. page 24. Note: $\boldsymbol{a_{iji}}$ ***is*** *represented the technical (input) coefficient.*

Thus, the basic relationship of inter-industry can be represented by the formula as follows:

$$\boldsymbol{x = Ax + y} \qquad \textbf{… … (1)}$$

where *A* denotes input matrix and *y* denotes vector of final demand

3.6 ECONOMIC LINKAGE

Backward and forward linkages are used in examining the interdependence relationships between sectors in the study. However, backward and forward linkages are reflected only the externalities rather than market prices. (Khayum, 1995; Husssain, 2010)

Backward linkage in input-output analysis reflects the demand relationship between sectors. (Hugo and Antoni, 2006; Hussain, 2010) When sector *i* increase its output, it will bring a demand increase on a sector that provides a product to sector *i* as input. *Backward Linkages* can be explains the induced production of manufacturing in the downstream sector. The column-down on Inverse Matrix Table shows the backward linkage. (Fauzana, 2007).

Forward linkage is measuring how much output for *i* industry affects the change of other industry's production when there is a unit change of primary input of it. Thus, *forward linkage* in input-output analysis reflects the supply relationship between sectors. (Hugo and Antoni, 2006; Hussain, 2010) When there is also an additional amounts of products *i* available as a production input to other industries due to an increase in sector *i*.

Forward linkage reflects the product of the initially stimulated manufacturing sector spread to upstream sectors. The row-right of the Inverse Matrix Table shows the forward linkage. (Fauzana, 2007)) The matrix of forward linkages can be derived by transposing the column (horizontal) view of the model to a horizontal (column). (Hussain, 2010)

Therefore, backward and forward linkages are efficiently in explaining the interdependent relationship between sectors in the economy. In this study, backward and forward linkages are examined by using traditional approaches, that is, *Chenery-Watanabe method* and *Rasmussen method.*

3.6.1 CHENERY-WATANABE METHOD

The measurement of backward and forward linkages by using Chenery-Watanabe method is addressed as direct backward (forward) linkage since there is only involved first round effect of industry's interrelationships. (Andreosso and Yue, 2000)

Direct Backward Linkage

The measurement of backward linkages according them is by using the column sums of matrix A (as mentioned previously), that is, input (technical coefficient).

$$BL^{C}_{j} = \sum_{i=1}^{n} \frac{x_{ij}}{x_{j}} = \sum_{i=1}^{n} a_{ij}$$

Where BL^{C}_{j} indicates the backward linkage of j by using Chenery-Watanabe approach, x_{ij} denotes the indices of i industry output which use as input for j industry, x_j denotes j industry's output and lastly, a_{ij} denotes the input (technical) coefficient of j industry to i industry.

Direct Forward Linkage

Direct forward linkage of *i* is measured by using the following formula:

$$FL^{C}_{J} = \sum_{j=1}^{n} \frac{x_{ij}}{x_i} = \sum_{j=1}^{n} b_{ij}$$

Where FL^{C}_{j} indicates the forward linkage of *j* by using Chenery-Watanabe approach, x_{ij} denotes the indices of *i* industry output which use as input for *j* industry, x_i denotes i industry's output and lastly, b_{ij} denotes the output coefficient of *i* industry to *j* industry.

3.6.2 RASMUSSEN METHOD

Backward linkage based on Rasmussen approach is evaluated by using the column sums of the inverse matrix. It reflects the changes of overall output for every unit change of final demand of output for *j* industry.

Total Backward Linkage

Backward linkage based on Rasmussen approach has measured the total effect such as direct and indirect effects of the inverse of one unit in the final demand for industry *j* on other industries.

Hence, the backward linkage based on Rasmussen approach can be measured by the following:

$$BL^{R}_{j} = \sum_{i=1}^{n} g_{ij}$$

where g_{ij} denotes the Leontief Inverse Matrix for ij^{th} element that we gained from $G= (I-A)^{-1}$.

Total Forward Linkage

Forward linkage based on Rasmussen approach is measured how much of my output increases whenever there is a unit change in final demand in all sectors. Jones (1976) suggested using the row sum of output inverse matrix which was introduced by Augustinovics in 1970, to measure total forward linkages rather than the origin of Rasmussen method's forward linkage. It can be efficiently in eliminating the problem of double counting of causal linkages which is the result of Chenery-Watanabe and Rasmussen's approaches. (Andreosso and Yue, 2000)

Forward linkage of sector *I* can be measured by following a formula:

$$FL^{R}_{i} = \sum_{j=1}^{n} g_{ij}$$

where it is referenced in the row sums of the Leontief inverse matrix only.

3.6.3 POWER OF DISPERSION AND POWER OF SENSITIVITY

Generally, Power of Dispersion and Power of Sensitivity is carried out in the procedure of normalization. Industry with a high indicator of *Power of Dispersion* is referred as strong backward linkages. Industry with low indicator of *Power of Dispersion* is referred as weak backward linkages. The industry is referred as strong forward linkages if there is a high level indicator of high Power of Sensitivity recorded. The industry is referred as weak forward linkages if there is a low degree indicator of *Power of Sensitivity* recorded. (Fauzana, 2007; Kula, 2008; Hussain, 2010)

Normally, Power of Dispersion and Power of Sensitivity is used in determining key sector in driving up the economic growth. The sector with the indicators above average backward and forward linkages is considered as key sector in the economy.

Index of the Power of Dispersion by sector can be calculated as follows.

$$\text{Index of The Power of Dispersion by Sector j} \equiv \frac{\text{Each Sum of Column in Inverse Matrix Coefficient Table}}{\text{Mean Value of Whole Vertical Sum in The Inverse Matrix Coefficient Table}}$$

$$\equiv \frac{\sum_{i}^{n} b_{ij}}{1/n \sum_{i}\sum_{j} b_{ij}}$$

Note: The numerator indicates the average stimulus imparted to other sectors for one unit in the final demand for industry ***j.*** *Furthermore, the denominator reflects the average stimulus for the whole economy when there is one unit increase of all final demands for all sectors.*

Furthermore, Index of the *Power of Sensitivity* by sector can be calculated as follows.

$$\text{Index of The Power of Sensitivity by Sector j} \equiv \frac{\text{Each Sum of Row in Inverse Matrix Coefficient Table}}{\text{Mean Value of Whole Horizontal Sum in The Inverse Matrix Coefficient Table}}$$

$$\equiv \frac{\sum_{i}^{n} b_{ij}}{1/n \sum_{i}\sum_{j} b_{ij}}$$

Note: b_{ij} *denotes Leontief Inverse Matrix and n denotes number of sectors.*

3.7 MULTIPLIER EFFECT

In analyzing the impact of the sector for the whole economy, the multiplier effect of the sector has to be worked out. It can be effectively examined the interdependence between initial spending and the effect generated by the spending are related. (Connor, Henry, 1975)

3.7.1 OUTPUT MULTIPLIER

Output multiplier is calculated by multiplying technical (input) coefficients of output in each industry by the interdependence coefficients of the related industry (column). Output multiplier reflects the change of total output due to a unit change of final demand for an industry. Table 3.4 shows the way to derive the values of output multiplier.

Table 3.4 Partial Multiplier for Output by Sectoral

Sector	Agriculture, Fishery & Forestry	Mining & Quarrying	Manufacturing	Utility	Construction	Service
Agriculture, Fishery & Forestry						
Mining & Quarrying						
Manufacturing						
Utility			***Interdependence Coefficients***			
Construction						
Service						
Output			***Technical Coefficients***			

Note：The formula of output multiplier is adopted from Connorand Henry (1975) of "Input-Output Analysis and Its Applications", Chapter 3, page

3.7.2 IMPORT MULTIPLIER

Import multipliers are estimated by multiplying technical (input) coefficients of input commodities which grouped as primary input in each industry by the interdependence coefficients of the related industry (column). Import multiplier is taken under our consideration, this is because it could reflect the change pattern of trade which is resulted from a change of final demand for the different industry product. In addition, it could also reflect the import requirements of industrial production for each unit of final demand. Table 3.5 shows the way to compute the values of output multiplier.

Table 3.5 Partial Multiplier for Import Commodities by Sectoral

Sector	Agriculture, Fishery & Forestry	Mining & Quarrying	Manufacturing	Utility	Construction	Service
Agriculture, Fishery & Forestry						
Mining & Quarrying						
Manufacturing						
Utility			*Interdependence Coefficients*			
Construction						
Service						
Import Commodities			*Technical Coefficients*			

Note: The formula of output multiplier is adopted from Connorand Henry (1975) of "Input-Output Analysis and Its Applications", Chapter 3, page

CHAPTER 4

RESULTS AND DISCUSSION

4.1 INTRODUCTION

A comprehensive comparative analysis is performed in discussing how the importance of manufacturing sector to the economic growth of Malaysia. Three highly aggregated transaction tables are prepared from Malaysian Input-Output Table for year 1991, 2000 and 2005 to see the trend of production structure of whole economic system, respectively. In addition, the inter-industry relationship between manufacturing sector and non-manufacturing sector are relatively high. Manufacturing sector demands raw materials from non-manufacturing sectors and also supplies its outputs to non-manufacturing sectors as their input productions. Thus, manufacturing sector is a key sector in driving up domestic economy in Malaysia. Furthermore, an increase of production for manufacturing sector would increase domestic production. However, the requirement of import commodities as input production for manufacturing sector is highest as compared to other sectors in Malaysia. Indeed, import commodity for final demand is not under consideration of the study.

4.2 MALAYSIA ECONOMIC STRUCTURE IN 1991, 2000 AND 2005

Table 4.1 shows the distributions of domestic output among sectors in Malaysia in the period of 1991, 2000 and 2005 based on the input-output tables. Malaysia was experiencing an increasing trend of total domestic output from year 1991 until 2005. In year 2000, total domestic output of Malaysia was rising sharply with an average growth rate of 19.46% per year. It rose from RM304, 429 million to RM896, 828 million, as compared to the total domestic output in year 1991.The total domestic output was continuously increased in 2000. The value of total domestic output was RM1, 603,907 million with an average growth rate of 78.84% per year.

Secondary sector is a main contributor in driving economic growth of Malaysia. In 1991, secondary sector was stood for 54.22% of overall domestic production. There was RM165, 024 million contributed by the secondary sector to overall domestic production. There was a rapid increase of the production of secondary sector with an average growth rate of 23.54% per year in 2000. Secondary sector was stood for 61.72% of total domestic output with the value of RM553, 483 million. The production of secondary sector was continually increasing in 2005 with an average increase rate of 13.31%

per annum. There was RM995, 384 million or 62.06% of output contributed by the secondary sector to domestic production.

The manufacturing sector was a main contributor for the secondary sector. As we can see from the table 4.1, in year 1991, manufacturing sector has contributed nearly 44.32% of domestic output but there were 1.79% and 8.11% only for the utility sector and construction sector led to domestic output. In addition, the manufacturing sector has contributed 54.69% of domestic output in 2000. Meanwhile, utility sector and construction sector were contributed for only 2.06% of domestic production. The proportion of domestic output for the manufacturing sector was achieved high in 2005, that is, by 56.06%. As compared to the utility sector, it was only stood for 2.19% of domestic output and construction sector contributed to 3.81%.

The contribution of primary sector was remained low as compared to secondary and tertiary sectors. Indeed, there was a decreasing change of the contribution of primary sector from 1991 to 2005. The proportion of primary sector to domestic output was very low, that is, only 9.65% as compared to 10.81% in the year 2000. However, the contribution of the primary sector to domestic output was increasing in terms of total value. There was RM155, 410 million and RM92, 171 million output produced by the primary sector in

year 1991 and 2000. Furthermore, there was 13.64% of total domestic output with the value of RM41, 538 million was contributed by primary sector.

The agriculture, fishery and forestry sector was given the lowest proportion of domestic output among primary sector. The production of agriculture, fishery and forestry sector was only 8.6% to the value of RM26, 183 million contributed to total domestic output in 1991. Nevertheless, it was experiencing a decrease trend throughout the period of study. In 2005, agriculture, fishery and forestry sector was stood for 3.7% only of total domestic output. Furthermore, there was 10.81% of total domestic output was contributed by agriculture, fishery &forestry sector.

A tertiary industry which is represented by all related services used to be contributed high to domestic output in the year 1991. However, the proportion of domestic contributed by tertiary sector was increased in year 2000 and 2005. There were 32.15% output or the value of RM97, 887 million contributed by the tertiary sector to domestic production. In addition, tertiary sector was contributed only 28.01% and 28.25% of domestic output recorded in the year 2000 and 2005. The output value of tertiary sector in 2000 and 2005 is RM251, 174 million and RM453, 112 million, respectively.

In Malaysia, the production value for the manufacturing sector was increasing rapidly within the period under study. The manufacturing sector was increased from RM134, 909 million to RM490, 477 million with an average growth rate of 26.36% per annum between year 1991 and 2000. In 2000, the production of the manufacturing sector was still rising continuously with an average growth rate of 13.89% per annum and the total value output was RM899, 165 million.

Table 4.1 Output Structures of Manufacturing and Non-Manufacturing in Malaysia in 1991, 2000, 2005

Sector	1991		2000		2005	
	RM thousand	%	RM thousand	%	RM thousand	%
Primary Sectors	**41,537,998**	**13.64**	**92,170,739**	**10.81**	**155,410,384**	**9.65**
Agricultural, Fishery & Forestry	26,183,386	8.6	45,426,693	5.6	60,000,369	3.7
Mining & Quarrying	15,354,612	5.04	46,744,046	5.21	95,410,015	5.95
Secondary Sectors	**165,024,132**	**54.22**	**553,483,089**	**61.72**	**995,384,250**	**62.06**
Manufacturing	134,908,736	44.32	490,477,465	54.69	899,165,229	56.06
Utility	5,437,080	1.79	18,467,988	2.06	35,149,126	2.19
Construction	24,678,316	8.11	44,537,636	4.97	61,069,895	3.81
Tertiary Sectors	**97,866,589**	**32.15**	**251,173,965**	**28.01**	**453,112,045**	**28.25**
Services	97,866,589	32.15	251,173,965	28.01	453,112,045	28.25
TOTAL	**304,428,719**	**100**	**896,827,793**	**100**	**1,603,906,679**	**100**

Source: It was adopted from Malaysian Input-Output Tables from Department of Statistics, Malaysia in year 1991, 2000 and 2005 by aggregated the economic sectors into six main sectors based on Malaysian Clasification of Products by Activities (MCPA) 2009.

As shown as Figure 4.1, the production for manufacturing sector is stand for highest proportion and remained stable form year 1991, 2000 and 2005, respectively. Therefore, manufacturing sector is considered as a main contribution for domestic production among good sectors.

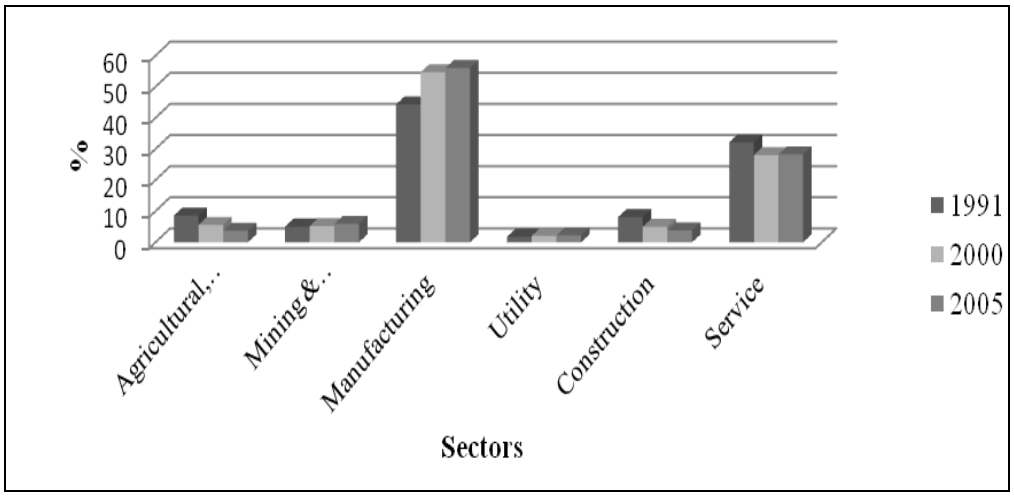

Figure 4.1 The Distribution of Output Struture in Malaysia

Note: This figure is derived according three highly aggregated transaction tables as shown previously in order to see clearly the contribution of production between manufacturing sector and non-manufacturing sector.

4.3 COMPARISON OF MALAYSIAN ECONOMIC STRUCTURE

4.3.1 UNIT COST STRUCTURES

Industries are not only used intermediated inputs in their production but also involve primary inputs. Primary inputs in the input-output table can be defined as the factors of productions such as labor, land, and capital which used in the process of productions. (Connor and Henry, 1975) Primary input under the study is involved import commodities, taxes, and also value added. Well compositions of input in the production could increase their own productivity especially in the aspect of low cost consumption. The Table 4.2, Table 4.3, and Table 4.4 have shown the unit cost structures by sectoral in the case of Malaysia in year 1991, 2000, and 2005.

The cost proportion between intermediated inputs and primary inputs in the production for the manufacturing sector was considered well balanced. As we can see in year 1991, for every RM1 manufactured output produced, it required RM0.43 of inputs for intermediated input and RM0.57 of inputs for primary input. In 2000, when there was RM1 manufactured output produced, it required RM0.35 of inputs for intermediated input and RM0.65 of inputs for primary input. However, there was an increase of the consumption of intermediated input for manufacturing sector in 2005, that is, RM0.50.

Throughout the period under the study, there was high consumption of primary inputs occurred in the primary sector. As we can see for mining & quarrying sector, for every RM1 output production, it's only used for RM0.11 of intermediated inputs but RM 0.89 primary inputs in its output production in the year 1991. In addition, the consumption of intermediated inputs for mining & quarrying was reduced to only RM0.07 in 2000 for every RM1 output of mining & quarrying sector. In 2005, for every RM1 mining & quarrying output produced, it required RM0.18 of intermediated inputs and RM0.82 primary input.

There was an improvement of proportion between intermediated input and primary input in the production for service sector in 2005. For every RM1 service output produced, it was required RM0.44 for intermediated inputs and RM0.56 for primary input. In contrast, there was RM0.27 of intermediated inputs and RM0.73 of primary input was used in producing RM1 service output. In 2000, when there was RM1 service output produced, then, RM0.24 was spent for the use of intermediated input and RM0.77 was spent to primary input.

Manufacturing uses more output that produced in its industry as compared with other industries, that is, the highest value of intra-transaction, within

industries throughout the year under study. The value of intra-industry transaction of manufacturing in 2005 was RM0.2633, meanwhile, agriculture, fishery & forestry to the value of RM0.1096, mining & quarrying to the value of RM0.0012, utility to the value of RM0.1856, construction to the value of RM0.0054, lastly service to the value of RM0.0352 for every RM1 output of their own industry produced. In contrast, in year 1991, manufacturing was generated RM0.20 of intra-industry transaction and was followed by RM0.15 for service, RM0.0344 for agriculture, fishery & forestry, RM0.0336 for utility, RM0.0127 for mining & quarrying and RM0.0043 only for construction. However, there was only RM0.19 manufactured output used by its own industry during the year of 2000. And still, the highest value for the entire industry, such as there was only RM0.15 and RM0.06 of intra-transaction for the service and agriculture, fishery & forestry, respectively.

Table 4.2 Production Structures of Malaysia in 1991

Input, ↓	Agricultural, Fishery & Forestry	Mining & Quarrying	Manufacturing	Utility	Construction	Service
Agricultural, Fishery & Forestry	0.0344	0.000061	0.0741	0	0.00009	0.0103
Mining & Quarrying	0.00025	0.0127	0.0351	0	0.0274	0.00004
Manufacturing	0.1079	0.0274	0.2024	0.1248	0.2688	0.0677
Utility	0.0027	0.0038	0.0123	0.0336	0.0021	0.0193
Construction	0.0016	0.0015	0.0017	0.029	0.0043	0.0189
Services	0.0537	0.061	0.0996	0.1152	0.1047	0.1535
TOTAL INTER-INDUSTRY	**0.2007**	**0.1065**	**0.4251**	**0.3027**	**0.4074**	**0.2697**
Primary Inputs						
Imported Commodities	0.0436	0.0466	0.3351	0.1042	0.2566	0.0778
Domestic Taxes	0.0018	0.001	0.0081	0.0289	0.0004	0.0045
Imported Taxes	0.0024	0.0015	0.0126	0.0151	0.0081	0.0047
Value Added	0.7514	0.8444	0.2191	0.5491	0.3241	0.6432
Domestic Services	-	0.00005	-	-	-	0.0001
Total Primary Inputs	**0.7993**	**0.8935**	**0.5749**	**0.6973**	**0.5926**	**0.7303**
TOTAL INPUTS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Note: The figures are reflected the input (technical) coefficients between sectors. Furthermore, the input (technical) coefficients are derived by calculating directly from transaction table by using formulae as mentioned in the previous chapter.

Table 4.3 Production Structures of Malaysia in 2000

INPUT, ↓	Agricultural, Fishery & Forestry	Mining & Quarrying	Manufacturing	Utility	Construction	Service
Agricultural, Fishery & Forestry	0.0634	0	0.0349	0.00001	0	0.0093
Mining & Quarrying	0.000005	0.0119	0.0267	0	0.0314	0.000005
Manufacturing	0.1486	0.0248	0.1858	0.1113	0.2824	0.0639
Utility	0.0019	0.0019	0.0167	0.0518	0.0039	0.0164
Construction	0.0019	0.0021	0.0029	0.0049	0.0043	0.0061
Services	0.0490	0.0383	0.0796	0.1174	0.1184	0.1478
TOTAL INTER-INDUSTRY	**0.2652**	**0.0789**	**0.3464**	**0.2854**	**0.4404**	**0.2435**
Primary Inputs						
Imported Commodities	0.00072	0.0007	0.0041	0.0038	0.0078	0.0108
Domestic Taxes	0.0013	0.0004	0.0053	0.0019	0.0020	0.0015
Imported Taxes	0.0752	0.1017	0.4381	0.0885	0.2317	0.1451
Value Added	0.6572	0.8183	0.2061	0.6204	0.3180	0.5990
Domestic Services	-	-	-	-	-	0.0000006
Total Primary Inputs	**0.7348**	**0.9211**	**0.6536**	**0.7146**	**0.5596**	**0.7565**
TOTAL INPUTS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Note: The figures are reflected the input (technical) coefficients between sectors. Furthermore, the input (technical) coefficients are derived by calculating directly from transaction table by using formulae as mentioned in the previous chapter.

Table 4.4 Production Structures of Malaysia in 2005

INPUT, ↓	Agricultural, Fishery & Forestry	Mining & Quarrying	Manufacturing	Utility	Construction	Service
Agricultural, Fishery & Forestry	0.1096	-	0.0363	-	-	0.0028
Mining & Quarrying	0.0000005	0.0012	0.0376	0.017	0.0201	0.000011
Manufacturing	0.0957	0.0477	0.2633	0.2085	0.2763	0.0449
Utility	0.0055	0.00065	0.0084	0.1856	0.0022	0.0109
Construction	0	0.0148	0.0067	0.0442	0.0054	0.0328
Services	0.0953	0.1185	0.1429	0.062	0.1806	0.0352
TOTAL INTER-INDUSTRY	**0.3062**	**0.1829**	**0.4952**	**0.5173**	**0.4846**	**0.443**
Primary Inputs						
Imported Commodities	0.0756	0.0487	0.3257	0.0836	0.2507	0.0718
Domestic Taxes	0.0021	0.0009	0.0079	0.0046	0.0034	0.0021
Imported Taxes	0.0135	0.00003	0.0026	0.00005	0.0024	0.0005
Value Added	0.6026	0.7675	0.1685	0.3945	0.00026	0.4826
Domestic Services	-	-	-	-	-	-
Total Primary Inputs	**0.6938**	**0.8171**	**0.5048**	**0.4827**	**0.5154**	**0.5570**
TOTAL INPUTS	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Note: The figures are reflected the input (technical) coefficients between sectors. Furthermore, the input (technical) coefficients are derived by calculating directly from transaction table by using formulae as mentioned in the previous chapter.

4.3.2 IMPORT COMMODITIES

As shown in the Table 4.5 as following, the consumption of import commodities in domestic production exists especially for non-competitive import commodities. Over the period of the study, the consumption of import commodities for the whole economy in Malaysia was increasing drastically. The amount of an import commodity consumed by industries was increased by 340.82%, that is, increase from RM61, 578 million in 1991 to RM271, 450,981 million in 2000. When turn to the year 2005, there was only 30% increase of import commodities in national, that is, by RM352, 890 million.

The consumption of import commodity for the manufacturing sector was higher as compared to other industries. As in 2005, there were about 83% of import commodity was used in the production of manufacturing. In contrast, there was 9.22% of import commodity was used for service and 4.34% of import commodity was used for construction. In the primary sector, agriculture, fishery & forestry and mining & quarrying were consumed about 1.29% and 1.32% of import commodities. Indeed, utility was used lowest import commodity in its production, that is, by only 0.83%.

Table 4.5 Value and Share of Import Commodities by Sectorals, 1991- 2005

Sector	1991		2000		2005	
	(RM '000)	%	(RM '000)	%	(RM '000)	%
Agricultural, Fishery & Forestry	1,142,816	1.86	3,416,693	1.26	4,535,577	1.29
Mining & Quarrying	715,272	1.16	4,751,705	1.75	4,650,893	1.32
Manufacturing	45,205,146	73.41	214,872,505	79.16	292,901,445	83.0
Utility	566,674	0.92	1,633,662	0.6	2,939,800	0.83
Construction	6,332,736	10.28	10,321,352	3.8	15,310,952	4.34
Services	7,615,623	12.37	36,455,064	13.43	32,552,081	9.22
TOTAL	**61,578,267**	**100**	**271,450,981**	**100**	**352,890,747**	**100**

Note: The distributions of Malaysian import commodities between sectors iscompiled directly from highly aggregated transaction tables for year 1991, 2000 and 2005, respectively. Import commodities are excluded import for final demand.

In conclusion, there is highest proportion of import commodities consumed by manufacturing sector in the manufactured production as compared to others sectors such as primary sector, other secondary sector and tertiary sector. In addition, there is an increasing trend of the consumption of import commodities happened in manufacturing sector. There is 73.41% of import commodities recorded in year 1991 and it is followed by 79.16% and 83% of import commodities in year 2000 and 2005, respectively. This situation happened since Malaysia is still classified as developing country. Thus, import commodities are still need particularly in producing high-technology commodities such as electrical and electronic products.

4.3.3 GOVERNMENT INCOME

Generally, government income is utilized for the purpose of controlling expenditure and also domestic development investments. In the process production, there are an indirect taxes are imposed by our government which increase indirectly the price of product for the consumer and directly increase the cost of productions. In the Malaysian Input-Output table, there are domestic taxes and import taxes toward domestic production only involved.

During the period of the study, our government has generated a rapid rise of income. As in year 2000, our government income was recorded RM 8,406 million as compared to the 1991 government income, RM 4,375 million. Indeed, it was increased again with a 44.65 % change in the year 2005, that is, RM12, 160 million as a result of an increase in both domestic taxes and also import taxes.

There are large of proportions of government income come from domestic taxes during the 20th century. In 2005, the total value of domestic taxes was recorded as RM8, 620 million and the total value of import taxes was RM3, 540 million. It means there was 70.89% and 29.11% of government income was coming from domestic taxes and import taxes. However, during the year of 1991, import taxes were given higher than domestic taxes for government

income. There was 57.8% of government income was coming from import taxes but domestic taxes only contributed to 42.2%.

Secondary sector is the sector that contributed most in government income as compared to primary sector and tertiary sector. Agriculture, fishery &forestry and mining and quarrying are grouped as primary sector. Furthermore, manufacturing sector, utility sector and construction sector are classified as secondary sector in the study. In 1991, secondary sector has contributed 75.98% of government income. In addition, secondary sector was contributed for 61.45% and 82.09% of government income in year 2000 and 2005.

Among the secondary sector, manufacturing sector is a main contributor to government income. The manufacturing sector was paid RM2, 791 million to government together with RM1, 090 million for domestic taxes and RM1, 701 million in imported taxes in the year 1991. However, the manufacturing sector was paid for higher domestic taxes in 2005. There was RM7, 111 million paid for domestic taxes but only RM2, 354 million paid for import taxes by the manufacturing sector. There was RM9, 354 million paid to government by the manufacturing sector in the year 2005.

Throughout the year of study, primary sector was contributed less for government income. There was only 3.43% of government income contributed by the primary sector in the year 1991. Besides that, primary sector was contributed for 1.71% and 8.43% of government income for the year 2000 and 2005, respectively.

In Malaysia, indirect taxes are the main source of national income. As in the study, domestic tax and import taxes are represented indirect taxes. Thus, manufacturing sector as presented previously is a main contribution to government income.

Table 4.6 The Distributions of Government Incomes in Year 1991, 2000 and 2005

Sector	1991			2000			2005		
	(RM '000)	% Output	% Industry	(RM '000)	% Output	% Industry	(RM '000)	% Output	% Industry
Agricultural, Fishery & Forestry									
Domestic Tax	47,926	1.10	43.17	32,739	0.39	36.04	124,850	1.03	13.34
Import Tax	63,093	1.44	56.83	58,110	0.69	63.96	811,275	6.67	86.67
	111,019	**2.54**	**100**	**90,849**	**1.08**	**100**	**936,125**	**7.70**	**100**
Mining & Quarrying									
Domestic Tax	15,741	0.36	40.54	34,048	0.41	63.85	85,681	0.70	96.63
Import Tax	23,084	0.53	59.46	19,279	0.22	36.15	2,989	0.03	3.37
	38,825	**0.89**	**100**	**53,327**	**0.63**	**100**	**88,670**	**0.73**	**100**
Manufacturing									
Domestic Tax	1,090,012	24.91	39.06	2,029,582	24.14	43.91	7,110,958	58.48	75.13
Import Tax	1,700,517	38.86	60.94	2,592,234	30.84	56.09	2,354,056	19.36	24.87
	2,790,529	**63.77**	**100**	**4,621,816**	**54.98**	**100**	**9,465,014**	**77.84**	**100**
Utility									
Domestic Tax	156,944	3.59	65.69	69,980	0.83	66.65	160,178	1.32	98.99
Import Tax	81,960	1.87	34.41	35,016	0.42	33.35	1,630	0.01	1.01
	238,904	**5.46**	**100**	**104,996**	**1.25**	**100**	**161,808**	**1.33**	**100**
Construction									
Domestic Tax	95,655	2.19	32.29	348,807	4.15	79.84	205,886	1.69	58.05
Import Tax	199,674	4.56	67.61	90,035	1.07	20.52	148,756	1.23	41.95
	295,329	**6.75**	**100**	**438,842**	**5.22**	**100**	**354,642**	**2.92**	**100**
Services									
Domestic Tax	440,084	10.06	48.84	2,717,331	32.32	87.75	932,612	7.67	81.17
Import Tax	460,954	10.53	51.16	379,454	4.52	12.25	221,252	1.82	18.83
	901,038	**20.59**	**100**	**3,096,785**	**36.84**	**100**	**1,153,864**	**9.49**	**100**
Total Domestic Tax	**1,846,362**	**42.20**	**-**	**5,232,485**	**62.24**	**-**	**8,620,166**	**70.89**	**-**
Total Import Tax	**2,529,282**	**57.80**	**-**	**3,174,118**	**37.76**	**-**	**3,539,958**	**29.11**	**-**
TOTAL	**4,375,644**	**100**	**-**	**8,406,603**	**100**	**-**	**12,160,124**	**100**	**-**

Note: The distributions of Malaysian government income between sectors iscompiled directly from highly aggregated transaction tables for year 1991, 2000 and 2005, respectively.

4.3.4 VALUE ADDED

Value added is consisted of the compensations of workers and the surplus of operation form input-output table. There are salaries or wages are paid to those who are contributing to the production as their return. Besides that, according to the OECD, the surplus of operating is defined as the surplus or deficit which occurring in operating the product. It is reflected how high productivity of assets are used within the production.

During the period of the study, the total value of value added contributed to the output experienced an upward trend. There were RM136, 132 million contributed to output in year 1991 and experienced a dramatic increase within 10 years, that is, RM345, 270 million with the growth rate of 153.63% in 2000. Furthermore, there was 47.5% of the growth of value added in the year 2005.

Tertiary sector is the main contributor to Malaysia value added throughout the period under study. The value added for tertiary sector that is represented by service sector was increased from RM62, 948 million in year 1991 to RM218, 673 million in the year 2005. Nevertheless, the proportion of value added contribution for tertiary sector was cut back slightly. In 1991, there were 46.24% of the value added was contributed by tertiary sector but only 42.94% of the value added was contributed by the tertiary sector in 2005.

The manufacturing sector is the highest contributor of value added than other secondary sector such as utility sector and construction sector. There was 21.72% of the value added contributed by manufacturing sector but only 2.19% and 5.87% of the value added was contributed by utility sector and construction sector in the year 1991. Indeed, the proportion of value added contributed by manufacturing sector was increasing throughout the years of study. The manufacturing sector was contributed for 29.76% of value added in 2005. Meanwhile, the construction sector was contributed the lowest proportion of value added among secondary sector, that is, only 0.0031% and utility sector was contributing 2.72% of value added.

Table 4.7 Value and Share of Value Added in Year 1991, 2000 and 2005

Sector	1991		2000		2005	
	(RM '000)	%	(RM '000)	%	(RM '000)	%
Agricultural, Fishery & Forestry	19,674,931	14.45	29,873,327	8.65	36,155,814	7.10
Mining & Quarrying	12,964,786	9.52	38,249,146	11.08	73,224,084	14.38
Manufacturing	29,561,823	21.72	101,078,388	29.28	151,544,390	29.76
Utility	2,985,519	2.19	11,457,689	3.32	13,864,938	2.72
Construction	7,997,404	5.87	14,162,040	4.1	15,810	0.0031
Services	62,948,321	46.24	150,449,519	43.57	218,672,640	42.94
TOTAL	**136,132,784**	100	**345,270,111**	100	**509,272,188**	100

Note: The valueof value added between sectors iscompiled directly from highly aggregated transaction tables for year 1991, 2000 and 2005, respectively. Share of value added is calculated by dividing value added's value with the total of yearly

4.4 MALAYSIAN ECONOMIC INTERDEPENDENCE

Backward linkage and forward linkages are used in examining the economic interdependence between sectors in the study. In addition, Chenery-Watanabe method and Rasmussen method are used in examining economic linkages. Accordingly, *backward linkage* in input-output analysis is used as a tool to examine the demand relationship between sectors. The value of backward linkage was derived from the sum of column-down of Inverse Matrix. (Fauzana, 2007). Through the value of backward linkage, we could predict how much of *i* commodity increase due to an increase demand from *j* sector when there is RM1 output of final demand increase in *j* industry.

Throughout the time period under the study, an increase of final demand for manufacturing sector could bring big total effects towards economic activities especially the year 1991. The index of backward linkage effect for the manufacturing sector was stood for highest in 1991 by the value of 1.6259. Thus, when there was a RM1 output of final demand for manufacturing sector increased, it increased RM1.63 output of all sectors that provided output to the manufacturing sector as input in 1991.

However, construction sector and utility sector stood for the highest values of a backward linkage effect as compared to the manufacturing sector in year

2000 and 2005. As we can see in the year 2000 when there was RM1 increase of final demand for construction sector, it able to increase the total output for the entire system of economy by RM1.63. However, there was only RM1.49 output for its entire system of sector increased as a result of RM1 increase of final demand manufactured output.

In addition, supply relationship is examined by the *forward linkages* in input-output analysis. The value of backward linkage was derived from the sum of row-right of Inverse Matrix. (Fauzana, 2007). Through the value of forward linkage, we could predict how much of *i* commodity increase to supply to other sectors when there is RM1 output of final demand increase in *i* sector.

As compared to other five main aggregated sectors such as construction sector and service sector, the value of forward linkages for the manufacturing sector are remained high throughout the period under study. When there was RM1 increase of final demand for manufacturing in the year 1991, manufacturing can be generated an extra value of RM2.15 manufactured output to other industries as their input production. However, there was only RM2.13 incremental output that manufacturing could be generated when there was RM1 increase of final demand for manufactured output in the year 2000.

Table 4.8 Backward and forward Linkages in Year 1991, 2000 and 2005

Sectors	Backward Linkages			Forward Linkages		
	1991	2000	2005	1991	2000	2005
Agricultural, Fishery & Forestry	1.3016	1.3802	1.4532	1.2212	1.1647	1.2317
Mining & Quarrying	1.1525	1.1075	1.2553	1.1198	1.1023	1.1412
Manufacturing	1.6259	1.4892	1.7640	2.1543	2.1272	2.5152
Utility	1.4600	1.4036	1.8941	1.1094	1.1318	1.2926
Construction	1.6250	1.6263	1.7435	1.0797	1.0316	1.1618
Services	1.3969	1.3388	1.2035	1.8776	1.7879	1.9711

Note: An indusrty with high value of backward linkage could bring big total effects toward economic activities when it isexperienced an expansion of its production. In addition, high degree of forward linkage reflects the product of the initially stimulated industry spread to upstream sector broadly.

4.4.1 KEY ECONOMIC IN MALAYSIA

Key economic in Malaysia is examined in order to know which sector is the main contributor in driving the economic growth throughout the period of study. Table 4.9 is shown the findings of Power of Dispersion and of the Sensitivity of Dispersion for year 1991, 2000, and 2005, respectively.

There is high effect of backward linkage for the manufacturing sector, utility sector and construction sector in 1991. Meanwhile, there are only two sectors stand for high effect of forward linkage, that is, manufacturing sector and service sector.

Manufacturing sector, utility sector and construction sector still stand for the high values of power of dispersion in the year 2000 and 2005. Similarly, manufacturing sector and service sector still stand for the high values of the sensitivity of dispersion.

Thus, manufacturing sector, utility sector and construction sector have strong backward linkage's effects. In oppositely, agriculture, fishery and forestry sector, mining and quarrying sector, and service sector have weak backward linkage's effects. However, there are only two sectors have strong forward

linkages, that is, manufacturing sector and service sector. Other sectors such as agriculture, fishery and forestry, mining and quarrying, utility and construction have weak forward linkages. Therefore, manufacturing industry is considered as key economic in Malaysia since there is strong backward linkage and forward linkage occurred.

Table 4.9 Power of Dispersion and Sensitivity of Dispersion in Year 1991, 2000 and 2005

Sectors	Power of Dispersion			Sensitivity of Dispersion		
	1991	2000	2005	1991	2000	2005
Agricultural, Fishery & Forestry	0.9121	0.9923	0.9362	0.8558	0.8374	0.7935
Mining & Quarrying	0.8077	0.7962	0.8087	0.7847	0.7925	0.7352
Manufacturing	1.1394	1.0707	1.1364	1.5097	1.5294	1.6203
Utility	1.0232	1.0499	1.2202	0.7775	0.8137	0.8327
Construction	1.1388	1.1692	1.1232	0.7566	0.7417	0.7484
Services	0.9787	0.8925	0.7753	1.3158	1.2854	1.2698

Note: Economic sector with high values of backward and forward linkages is the key econmic sector in driving up the economic growth.

4.5 MULTIPLIER EFFECTS

4.5.1 OUTPUT MULTIPLIERS

Output multiplier reflects the change of total production in the economy due to the change of RM1increase of final demand for an industry. Throughout the period under the study as shown by Table 4.10, manufacturing sector stands for the highest values of output multipliers as compared to other sectors such as construction sector and service sector. In 2005, when there was RM1 increase of final demand for the manufacturing sector, then, there was RM1.47 increase of total production in the economy.

In addition, there are the lowest values of output multipliers shown by the primary sector over the period of time such as agriculture, fishery and forestry sector and mining & quarrying sector.

Therefore, an expansion of production for manufacturing sector would increase domestic production as compared to other economic sectors. As a result, GDP would increase eventually.

Table 4.10 Output Multipliers in Year 1991, 2000 and 2005

Sectors	1991	2000	2005
Agricultural, Fishery & Forestry	0.2977	0.3296	0.4101
Mining & Quarrying	0.1600	0.1288	0.2460
Manufacturing	1.1434	1.1022	1.4651
Utility	0.3339	0.3210	0.7373
Construction	0.4559	0.4284	0.6536
Services	0.8071	0.7415	0.7576

Note: Output multiplier reflects the change of total output due to a unit change of final demand for an economic sector.

4.5.2 IMPORT MULTIPLIER

At 1991, manufacturing sector stands for the highest place of import multiplier. When there was RM1 increase of final demand for manufacturing sector existed, there was RM0.45 increase of import for the entire system of economy. There is a lower value of import multipliers for the sector of mining and quarrying. When there was RM1 increase of final demand for mining and quarrying sector, it would increase the total import by only RM0.07.

In 2000, the values of all sectors are decreased. At this time, the import multiplier for service sector is the highest, that is, 0.0134. When there was RM1 increase of final demand for service sector, the total value of import would increase by RM0.01. Meanwhile, RM1 increase of final demand for manufacturing sector would cause only RM0.0067 increase of the total value of import.

In overall, the values of import multipliers for all industries are increased as shown in the Table 4.11. The highest value of import multiplier is manufacturing sector. When there was RM1 increase of final demand for the manufacturing sector, the total import commodities would increase by RM0.48. Meanwhile, the sector of mining and quarrying has still stood for the lowest value of import multiplier among sectors. The import multiplier for

mining & quarrying sector is 0.09. It means that when there was RM1 increase of final demand for mining and quarrying sector, there was only RM0.09 increase for import.

The highest value of import multipliers for manufacturing sector reflects the high requirement of import commodities as input for manufactured production. However, it was decreased drastically in year 2000, that is, reduced from the value of 0.4547 to 0.0067 only. This is because there was low demand of manufactured products particularly for electrical and electronic products. This situation happened due to the occurrence of 1998 Asian Financial Crisis. Malaysia has experience an economic recession and our economic has successfully recovered after year 2000. In addition, manufacturing industry that produces electrical and electronic products is the leading sector in Malaysia's manufacturing sector.

Table 4.11 Import Multipliers in Year 1991, 2000 and 2005

Sectors	1991	2000	2005
Agricultural, Fishery & Forestry	0.1050	0.0026	0.1510
Mining & Quarrying	0.0700	0.0014	0.0920
Manufacturing	0.4547	0.0067	0.4830
Utility	0.1955	0.0065	0.2600
Construction	0.3978	0.0114	0.4090
Services	0.1429	0.0134	0.1140

Note:Import multipliers reflect import requirements of inudstrial production for each unit of final demand.This import multipliers are not reflected the change pattern of

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

5.1 INTRODUCTION

There is a comprehensive comparative study performed in this study by using input-output analysis. Thus, Malaysia 1991, 2000 and 2005 Input-Output Tables are used as a main source of analysis. By using input-output analysis, the importance of manufacturing sector in Malaysia's economy can be examined from the perspective of production structure.

There is a strong inter-relationship between manufacturing sector and non-manufacturing sector. When there is an expansion of the production for manufacturing sector, it could increase the demand of raw material from other sectors and also increase the utilization of manufactured output to other sectors. Thus, manufacturing sector is a main sector in increasing the economic growth of Malaysia.

No doubt about it that an expansion of production for manufacturing sector would increase domestic production. However, the production for manufacturing sector is still using higher proportion of import commodities in its production.

5.2 SUMMARY OF THE FINDINGS

Even though, the transition of economic from manufactured-oriented economy into knowledge-based economy should be promoted in Malaysia in order to achieve high-income advanced country. However, the contribution of manufacturing sector towards economy should not be ignored.

The production of manufactured output would not only demand only raw material within sector but also from other sectors. In addition, output from manufacturing sector is also demand from other sector as their input production. Thus, when there is an expansion of production for manufacturing sector occurs, it would increase its demanders' production. Meanwhile, manufacturing sector would supply its extra output to others sectors. Indeed, the productivity of production could be achieve due to the low input cost of intermediate manufactured output.

Throughout the period of the study, an expansion of manufacturing sector gives a significant impact to our domestic production. However, the requirement of import commodities as input production is high in manufacturing sector particularly for production of electrical and electronic products. It should be highlighted that high consumption of domestic raw material in producing manufactured output could increase country's benefit.

5.3 RECOMMENDATIONS AND FUTURE RESEARCH

Based on the findings of this study, the manufacturing sector is still a main contributor of economic growth in Malaysia. There are some considerations should be take care of in implementing any related policy.

a) The primary sector that is raw material production has to be prepared. Government should not solely focus on the development of the manufacturing sector, but also for Agro-based sector such as agriculture, fishery and forestry sector. This is because it could accelerate the sustainable growth of manufacturing sector continuously.

b) Encouraged the activity of Research and Development (R&D) in the manufacturing sector. This can increase the productivity level of manufacturing sector. Therefore, the dependence of import commodities in manufacturing sector as input production could be reduced. In addition, high productivity level of manufacturing sector can increase also other sectors through supply the outputs to them as input production.

5.4 CONCLUSION

In the study, by using the analysis of input-output is successfully determined manufacturing sector is very important to our economic growth. No doubt about it that manufacturing sector is the main sector in driving up the economic growth of Malaysia. Manufacturing sector would demand more raw materials from other sectors in producing one unit of output as compared to other sectors. Besides that, manufacturing sector would supply more outputs to other sectors as input production. Therefore, when there is an expansion of the production for manufacturing sector, it would followed by an increase of domestic output. Consequently, GDP in Malaysia would increase. However, manufacturing sector is still using lots of import commodities in producing manufactured output particularly in the production of electrical and electronic products.

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