INDUSTRIALIZATION IN SARAWAK:
THE PERFORMANCE OF THE ELECTRICAL AND ELECTRONIC INDUSTRY IN RELATION TO THE MANUFACTURING SECTOR

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DEDICATION

I would like to dedicate this piece of work to my husband, Sii Chung Huei and my children, Stephanie, Samantha and Samuel for their understanding, love and support throughout my study.
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Any inadequacies of the work are, however, entirely my own responsibility.
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
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<td>SMIs</td>
<td>Small and Medium Industries</td>
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<td>MNCs</td>
<td>Multinational Corporation</td>
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<td>TFP</td>
<td>Total Factor Productivity</td>
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<td>HRD</td>
<td>Human Resource Development</td>
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<td>OEMs</td>
<td>Original Equipment Manufacturers</td>
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<td>ODMs</td>
<td>Original Design Manufacturers</td>
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ABSTRACT

This study presents the findings on the current status and performance of the E & E (Electrical and Electronic) industry in relation to the overall manufacturing sector of Sarawak. The performance of the manufacturing sector is assessed using the empirical data from 1970 to 1996 obtained from the Department of Statistics while the analysis of the E & E sector is based on a recently completed survey. Between 1970 to 1996, the manufacturing sector has achieved rapid growth in terms of its share of GDP, contribution to export earnings and employment creation. Despite its creditable performance, it is observed that the manufacturing sector is characterised by a weak industrial structure. Its major industries namely the timber related and petrochemical are low value added resource based industries. Negative Total Factor Productivity(TFP) growth were registered during this period which indicates a deterioration in technical efficiency in the state.

The research findings indicate that the E & E sector is characterised by a low technological capacity, a high reliance on a small number of Multinational Corporations(MNCs) and a weak production structure. The main production capabilities of the electronic firms are in assembly activities and in the manufacture of low value added parts and components for export. The electrical firms produce low value added cables, wires and battery water for local market. In 1998, the contribution of the E & E firms in terms of total output valued at Rm733.5M, total employment figure numbered 5762 and total value added at RM219.6M is low in relation to the state manufacturing sector. However, total electronic export valued at RM719.8M constituted a significant proportion of 23.4% to the state total manufactured exports. This study also identifies the main constraints that inhibit the growth of this sector such as shortages of skilled labour, managers and professional and lack of supporting industries. With appropriate government polices and measures, the development of the E & E sector can be a viable alternative industrial strategy for the state.
ABSTRAK


xi
1.0 BACKGROUND OF THE STUDY

Sarawak has achieved rapid economic growth since her incorporation into Malaysia in 1963. This is reflected in the remarkable expansion of real Gross Domestic Product (GDP) from RM3028.2 M in the year 1978 to RM11296.5 M in year 1997 at a compounded average annual growth rate of about 7.2%. In addition, the living standard for all sections of the population has improved. This is indicated by the upwards rising trend of per capita GDP of the state. Between 1991-1995, GDP per capita rose from RM3892 to RM4656 with an average growth rate of 3.7% and is projected to reach RM5950 by year 2020. The state economy is projected to grow at 10 per cent per annum\(^1\) between 1996 to 2000.\(^2\)

Traditionally, Sarawak economy has been largely dependent on the primary sector, with agriculture and forestry as the biggest contributor to GDP, followed by mining and quarrying. Growth during the sixties and seventies was fuelled largely by exports of the state's primary commodities especially crude petroleum, natural gas, sawn logs and major agricultural products such as rubber, pepper, palm oil, cocoa and sago.

The manufacturing sector played a rather insignificant role in the state economy. The emphasis on manufacturing was predominantly on processing of local raw materials for domestic market by small industrial concerns and on import substitution. Such an economy is likely to be vulnerable to fluctuations of the prices of primary commodities. This prompted the government to intensify its diversification programmes since the late 70's.

The efforts to diversify and modernize the economy proved some success. Industrial progress during the 80's has been impressive. The last 10 to 20 years saw the structural transformation of the economy from one heavily dependent on natural resources to one diversifying into manufacturing. In 1970, the agriculture, forestry and fishing contributed 37% to GDP. However, its share in GDP declined to 24% in 1990, and further dropped to 14.2% in 1996.\(^3\) In line with government efforts to diversify the economy, it is expected that the share of primary sector to GDP would continue to decline to 14.8% in 2006 and 12.3% in 2020 while the percentage contribution of Manufacturing sector, on the contrary is expected to rise from 20.5% in 1996 to 35.6% in 2006 and further to 52.4% in the year 2020.\(^4\)
Manufacturing has increasingly become the major driving force in Sarawak's economic growth and job creation since the late seventies. During the 1970-1980, the sector grew at an average rate of 10% per annum. The performance of the sector improved during 1980-1990 with an average growth rate of 16.4%. Today, it is the second most important sector after mining. Not only has the manufacturing sector expanded rapidly in terms of its share in GDP and manufacturing value added, but has also contributed significantly towards employment and export earnings of the state. In 1997 the share of manufacturing in total GDP was 22.2%, gross export 15.9% and employment 14.8%.

Manufacturing is expected to be the main pillar for Sarawak economy in the coming future. By the year 2020, this sector is projected to contribute over 50% of GDP in the state, with total foreign direct investment expected to total 45 billion ringgit, out of which more than 80% would be invested in manufacturing. It is also expected that more than 80% of manufacturing would be export oriented. Though the performance of the state has been commendable in most Asian standards, its contribution to GDP at 22.2% in 1997 is well below the 35.7% at national average. This gap needs to be narrowed if it were to move ahead in tandem with the other states in Malaysia to achieve the economic goals of vision 2020.

Sarawak manufacturing sector is characterised by a narrow industrial base with majority of its industries within the primary sector, namely timber related and petrochemical industries. Since the early 1980's, the state's emphasis on industrialization has been on the development of resource based industries which largely depend on the availability of timber, oil, gas and land resource. Heavy reliance on resource based primary sector would be vulnerable for economic growth in the long run. Given this scenario, what course of industrialization should the state pursue in order to move towards a higher value added economy?

Sarawak should therefore transform its economy from the current low value added resource intensive industries to industries that would generate higher value added. Currently, increasing attention and concern has been accorded by the state government on the development of capital intensive hi-tech industries especially on electronic and electrical industries. With the establishment of an estate, the Sama Jaya Free Industrial Zone (SJFIZ), the government hopes to attract more multinational corporation (MNCs) to invest in this industry. The future for this industry is bright as four industries have started production while another three have plans to start production in SJFIZ soon. Sarawak with its rich natural resources and relatively cheap labour force has the potential to be the hub of electronic and telecommunication industry in the country. This sector has the potential to serve as a springboard to spearhead industrial development in the state. Moreover, the development of the Multimedia Super corridor (MSC) in Kuala Lumpur creates vast
opportunities for Sarawak to participate in this hi-tech industry. In view of this, it is imperative that the state should take the correct steps to speed up its pace of development. Thus, a study is needed to assess its current performance in the state manufacturing sector and to examine factors that may enhance future growth of this industry.

1.1 SITE OF THE STUDY

1.1.1 Geographical Location

Sama Jaya Free Industrial Zone (SJFIZ), situated in a prime location, is eight kilometer (km) from Kuching City Centre, two km from Kuching City International Airport and four km from Kuching Port Authority (see Map 1). It was implemented in 1992 by the state government with the aim of attracting high-tech MNCs especially electrical and electronic industry to Sarawak. It covers approximately 926 acres and will be developed in 7 phases. Foundation work from phase I to phase III covering an area of about 290 acres have been completed. Phase I is fully operational and is equipped with a toxic waste treatment plant, central sewerage system, basic utilities like water, electricity and telecommunication services. In addition, a new deep water port at Kampung Senari has been constructed and the Kuching International Airport cargo facilities upgraded to facilitate export facilities for SJFIZ companies. Currently, two companies from Japan, two from the United States and four local firms have sited their industries in this industrial estate manufacturing mainly electronics, telecommunications and information technology (IT) products.
Map 1: Location of Sama Jaya Free Industrial Zone

KUCHING CITY

Sama Jaya Free Industrial Zone

Tanah Puteh Terminal

Ponding Port

Airport
Recently, First Silicon Sdn. Bhd., (formerly known as Interconnect Technology Sdn. Bhd.), Malaysia's first wafer manufacturing plant has decided to invest RM3 billion in a wafer fabrication plant in SJFIZ producing silicon wafer with Sharp Corporation as the technology supplier. It is expected to be in full operation by July 2000 with a production capacity of 30,000 units monthly (New Reality; 1999 p51). Nelcon Industries Sdn. Bhd., a wholly Singaporean owned company has also confirmed its decision to invest in SJFIZ, producing laminated copper clads and prepreg products. Construction of its factory building is under progress and is scheduled to commence production by the end of the year 1999. According to reliable sources, another company, Wangimas Sdn. Bhd., a joint venture between Malaysia and United States, is to start operation by the end of the year 2000.

In addition to the E & E establishments, which are located in SJFIZ, there are some other establishments particularly the electrical and supporting industries which are sited outside SJFIZ. These include, two electrical establishments in Pending Industrial estate and ten supporting industries in Siburan, Demak Laut Industrial estate and Muara Tabuan industrial estate (see Map 3).

1.1.2 Justification for Selecting the Research Problem

The focus on E & E Industry is justified on the following grounds. Firstly, there appears to be a noticeable absence of the lack of a comprehensive analysis on the performance of the E & E Industry especially in the state of Sarawak. In Malaysia, the E & E Industry is playing an increasingly important role in the economic development of the nation. The E & E industry has experienced rapid growth since the early 1970s and is now the largest and most important industrial sector in the Malaysian economy not only in terms of its contribution to GDP and value added but in employment and export earnings as well. In 1996, its contribution to manufacturing in terms of total output was 41.9%, value added 37.2%, employment 35.8% and export earnings 62.6%(Year book of Statistics, Malaysia, 1998). The E & E products manufactured in Malaysia are exported world wide to countries such as the USA, Japan, United Kingdom, Germany, Hongkong, Singapore, Taiwan and others. Today, Malaysia is the world's largest exporter of room air conditioners. Obviously, this industry has the potential to be a major source of growth in the country. It should therefore be designated as a strategic industry whose development would enable the country to accelerate its economic growth and position itself as a world class technological leader.
Secondly, a majority of the E & E firms are foreign MNCs that are hitech and capital intensive. As such there is huge potential in their contributions to local indigenous industries and vast opportunities in the creation of inter industry linkages. In this respect, meaningful linkages and complementations could be developed between these MNCs and local indigenous industries especially for the parts and components subsector, the provision of machining services and the downstream activities of the E & E industries. This development is crucial to encourage indigenous entrepreneurship development, upgrade indigenous technological capabilities and R & D initiative, and in deepening the structural base of the manufacturing sector.

Thirdly, the E & E industry serves as an excellent venue for practical learning effects which could upgrade the skills and technical know how of the labour force in the state. In this respect, the E & E firms can provide industrial training for students from institutions of higher learning such as the University of Malaysia, Sarawak (UNIMAS) and colleges as well. Such training not only makes the students' education more practical but also serves as a temporary source of manpower for the industry. In addition, it can help to develop a broad class and multi skilled workers that the industry can draw upon when need arises.

Fourthly, the current emphasis of the state government is on the development of high technology, capital intensive and skills oriented industries particularly the E & E industry. This is clearly evident in the strong promotion drive to attract foreign Multinational Corporations (MNCs) to the state, to take advantage of the capital inflow, technology and marketing expertise. To this end, an estate, the SJFIZ has been created for the development of hi-tech industries especially the E & E industry. Facilities and infrastructure have been especially designed to foster the growth of this industry. With the increasing importance accorded to this sector, a study is needed to guide the state in its efforts to develop this sector.

Fifth, Sarawak, with is vast natural resources provides an ideal site to promote E & E Industry. Though the industry is relatively new at present, it has the potential to be developed like the E & E industry in Penang, Johore and Selangor given the right strategies and policies adopted by the state government.
1.2 OBJECTIVES OF THE STUDY

The main objectives of this study are to examine the performance of the E & E Industry in relation to the manufacturing sector in Sarawak.

The Specific Objectives of This Study Are:-

1. To study the structure of the electrical and electronic industries.

2. To evaluate the performance of the electrical and electronic industries in terms of their contributions to total export, employment, value added, information technology and productivity.

3. To study the labour characteristics of the E & E Industry.

4. To identify the factors and problems that may hinder or promote the growth of electrical and electronic industries in Sarawak.

5. To obtain general opinions and comments regarding the effectiveness of the policies, strategies and programmes adopted by the various government agencies for this industry.

6. To suggest improvements to the present strategies and programmes to enhance development in this industry.

1.3 SCOPE AND COVERAGE

1. This study covers all the E & E establishments located in Sama Jaya and Pending Industrial Estate. In addition, it also includes all the supporting industries situated in Demak Laut Industrial Estate, Siburan and Muara Tabuan Industrial Estate.

2. Existing data and information obtained from the various government publications were thoroughly reviewed, analysed and examined.

3. In areas where existing data and information is inadequate to achieve the objectives of the study, primary data are collected through field surveys, interviews and observation, and analysed using various statistical tools.
4. The study includes the analysis of issues in the following areas:

(a) Effectiveness of present state and federal government policies and programmes in promoting the growth of this sector.

(b) Industrial technology and technology transfer

(c) Productivity and capital intensity

(d) Infrastructure and supporting utilities

(e) Labour performance and characteristics

1.4 LIMITATIONS OF THE STUDY

Two main types of difficulties are encountered in this study. Firstly, the electrical and electronic industry is relatively new in Sarawak as compared with its counterparts (like Penang, Johore and Selangor) in Peninsular Malaysia. At present, the E & E Industry in Sarawak consists of seven electronic firms (three under implementation) three electrical and ten supporting industries. With a small database this may not be representative of the manufacturing sector and may give rise to a biased view of industrialization in the state.

Secondly, this study is also handicapped by the lack of data, which are either not available or present in incomplete records. Examples are unavailability of up-to-date statistics on information technology and productivity growth in the state.

1.5 ORGANISATION OF CHAPTERS

Chapter one provides the background scenario, objectives of the study, scope and coverage of the study.

Chapter two reviews the existing literature on the subject of industrialization with respect to the aspects of FDI, employment and productivity performance at the national level and all existing studies that could be traced on this subject both at the national and state levels.
Chapter three discusses the state's economic structure, industrial development, investment incentive programmes, profile of manufacturing industries and the role of FDI in the state.

Chapter four discusses the research methodology used in the study.

Chapter five assesses the performance of the manufacturing industries in terms of its contributions to value added, GDP, export earnings, employment and productivity performance.

Chapter six discusses the main findings from survey and interviews.

Chapter seven presents the summary, conclusion and policy recommendations.

NOTES:

1. In the midst of present economic problem, the actual rate achieved may be lower than the projected rate.
CHAPTER 2: LITERATURE REVIEW

2.0 INTRODUCTION

This chapter will discuss existing studies on industrialization both at the national and state levels. The role of industrialization in economic development would be discussed. This is followed by the discussion of empirical studies in Malaysia encompassing four aspects: industrialization and employment, foreign direct investment (FDI) and industrialization, productivity performance, and studies related to the E&E sector. Lastly, empirical studies in Sarawak, though rather limited in number would also be examined.

2.1 INDUSTRIALIZATION AND ECONOMIC DEVELOPMENT

Economists have attempted to relate economic development to industrialization either directly or indirectly in economic literature since the 16th century. The earliest few pieces of work that could be traced were perhaps that of classical economists such as Adam Smith, Ricardo and Malthus who believed that growth resulted from capital accumulation. Smith (1776) focused his attention on the importance of economics of scale and division of labour in creating wealth, which was necessary for growth. According to him, division of labour increases productivity which raises national income and enables further innovation to develop thus creating more division of labour and more opportunities for growth. David Ricardo was concerned more on income distribution and foreign trade. He argued that unless more land could be discovered and cultivated and more food imported from abroad, growth and income would quickly diminish (Kindleberger C 1958).

Lim C Y (1991) summarized the work of these classical economists in the subsistence theory of wages. According to this theory, workers are paid wages based on the level of subsistence and any surplus will be accumulated for further production. This would increase the demand for labour and if total population remained constant, wages would tend to rise. With higher wages, population would grow at a faster rate and produce more labour which would bring down wages again to the subsistence level. At this level, a surplus would emerge again to encourage accumulation and demand for labour and the process would continue until the law of diminishing returns sets in.
Although the classical economists highlighted some basic relationship between capital accumulation and growth, their works have been criticized on three main grounds. First, they failed to provide for the effects of technological change. Second, the complex factors which influence growth in developing countries are not accounted for. Third, the assumption that wages cannot be above or below the level of subsistence is unrealistic.

The role of capital accumulation in industrialization and economic development have been expounded further by the works of W.A Lewis and Harrod. Harrod (1948) in his Harrod-Domar model emphasized on the importance of investment made possible through saving, for growth to take place in an economy. He recognized that capital formation in one period is the source of output in the next period. In other words, investment in one period creates the capacity for increased production in the future which in turn affect equilibrium output and income.

Harrod-Domar model is aggregative in nature and as such has been criticized for its limitation in providing the basis for a detailed quantitative study.

The most notable work on capital formation and development was perhaps that done by W. A Lewis (1954). In his model of surplus labour, the underdeveloped economy is categorized into two sectors; a traditional rural subsistence sector characterized by abundant labour supply with zero marginal productivity and a modern urban industrial sector composed of wage earners in formal employment. He explained that wages in a high-productivity-modern sector were based on the average product of labour in the traditional rural sector and were usually about 50 percent above the income of subsistence farmers. The higher wages were to compensate for higher cost of living and any other disadvantages associated with rural-urban migration. He believed that the modern sector could attract as much labour as it wanted, and entrepreneurs could increase production without causing wages to rise or profits to fall. The higher profit fueled higher levels of investment and production which in turn spurred new growth. The economy would progress in proportion to the rise of the capitalist sector.
Lewis's labour-surplus model can be illustrated in graph form. In figure 2.0, OA represents subsistence earnings, OW the real wage rate in the capitalistic sector, WS the perfectly elastic supply of labor and N1 D1, N2 D2, N3 D3 show different levels of the marginal revenue product of labor (MRPL). Given the initial level of capital, the demand for labor is represented by the marginal productivity curve of labor, N1 D1. Assuming profit maximization, the capitalist will hire labor up to the point P where \( W = \text{MRPL} \). At this point the amount of labor employed is OL. Total product \( N_1 \) PLO in the capitalist sector consists of two portions; the amount of wages paid to labor, OWPL and the capitalist's surplus or profit, WPN. The capitalist would invest part of these returns, labor thus has more capital to work with and the MRPL shifts from \( N_1 \) D1 to \( N_3 \) D3. The capitalist surplus increases and prompts further investment. As the industrial sector expands and wages remain constant, the share of profits in national income increases. As profits are the major source of savings, savings and capital formation also rise as a proportion to national income. This process would continue until all surplus labor in the subsistence sector is utilized and exhausted. Real wages and productivity would tend to rise and self-sustaining growth would take place in the economy.