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SCIENCE PARK DEVELOPMENT IN MALAYSIA

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Abstract. *Some aspects of science park development in Malaysia are described: the rationale, locational factors and issues. If the development is to contribute to the local and regional economy of the country, issues relating to the relationship of the development with indigenous industries, research institutions and other facilities should be investigated further.*

I. INTRODUCTION

Science park development is becoming an international phenomenon. Its development is associated with the development of high technology industries which are the dynamic elements of industrial growth in advanced countries. In order to accommodate the technology-based growth, the traditional industrial location determinants are no longer significant. Instead, a regional innovation infrastructure is needed for this type of industries (Rothwell, 1982).

There has been a change in the trend of industrial growth over the last decade. The "supply" side of the regional growth has become increasingly important. The nature and response of the local labour market and the quality of the regional environment are seen to be the key determinants in locational decision of industries (Glasson, 1992). As such, the technology-led developments are given a sharper focus in the formulation of regional policy in the developed countries, such as Japan (Masser, 1990).

Malaysia, like any other newly industrialised countries, is gearing herself to follow the footsteps of the developed nations. Based on the Industrial Master Plan formulated in the early eighties, a more aggressive strategy to promote industrial development has shown positive results. With the launching of the Second Outline Perspective Plan covering the period of 1991-2000, Malaysia has gone one step nearer towards achieving her objective of becoming an industrialised nation. In fact, she has set the target year of 2020 for Malaysia to be an industrialised nation, popularly known here as Vision 2020. Several strategies have been formulated to accelerate the industrial growth in the country. Manufacturing sector, particularly the production of high value-added products in hi-tech industries, has been identified as the potential catalyst for industrial growth in the country of which the development of science parks forms an essential part of this effort (Malaysia, 1991b).

The present paper reviews the development of science parks in Malaysia in three parts. The first of these describes the rationale on which the science parks have been developed. The second outlines the locational factors in siting the science parks in general and followed by a specific case based on an example of Kulim Hi-Tech Industrial Park. The last part of the paper discusses some of the key issues involved in the planning and development of science parks.

II. THE RATIONALE

In terms of urban and agricultural development, Malaysia has undergone rapid urbanisation since the beginning of the colonial period at the turn of the century. This has resulted in the concentration of economic activities and population in the west coast of Peninsular Malaysia. A number of attempts have been made to promote the development of the east coast region, the lagging part of the country. The best known of these measures is the establishment of Regional Development Authorities in early 1980s with the responsibility of transforming sparsely inhabited rural areas into viable urban centres in rural settings (see Ghani and Choguill, 1992 for an evaluation of one of these Regional Development Authorities). At the same time, the Government is promoting the development of industries in the less developed parts of the country to reduce the regional disparities. However, the main focus of the industrial development is to reinforce the development of manufacturing sector through research and development (R&D).

Malaysia has adopted long term development plans known as the Outline Perspective Plans. There are two of such plans covering the periods of 1971-2000, known as the First Outline Perspective Plan 1971-1990 (OPP1) and the Second Outline Perspective Plan (OPP2). Under OPP1, the Government has implemented four development plans from the Second Malaysia Plan (1971-75) to the Fifth Malaysia Plan (1986-90). The development plans have been implemented within the framework of the New Economic Policy which was introduced after the race riots of 1969 to promote growth with equity with the objective of fostering national unity among various races.

The OPP2 has been formulated based on the National Development Policy (NDP) which is built on the achievements of the OPP1 to reinforce further the promotion of social and political stability and sustain development.

The role of science and technology as an important tool of economic development has been repeatedly stressed in previous development plans. Again it forms one of the main thrusts of the NDP which will steer the country into hi-tech era of the twenty first century:

> "....making science and technology an integral component of the socio-economic planning and development, which entails building competence in startegic and knowledge-based technologies, and promoting science and technology culture in the process of building a modern industrial sector,.." (Malaysia, 1991b, p.5)

In this connection, high technology is expected to expand industrial capacity and develop a strong industrial foundation.

The increased role of private sector in national economic development has been frequently emphasised. It is believed that the private sector is the best place to develop new ventures and improve technology and skills to meet the challenges of hi-tech industrial development. Despite the Government efforts to foster the private and public efforts in industrial development, an intimate linkage between them has not been fully developed. Therefore, a science park concept would be an ideal environment for such cooperation.

The National Development Plan has identified manufacturing sector to be the engine of growth of the economy and is targeting to grow at 10.5 % during OPP2 period. The thrust for the sector's development will be to widen and strengthen its base in order to lessen the dependence on the traditional growth sectors, primarily textile, electrical and electronics (Malaysia, 1991b). At the same time, emphasis is also given to the development of new products based on continued research and development. To complement these efforts, infrastructural support facilities will be developed.

Efforts have been made by the Government to disperse industries to the lesser developed areas of the country in order to achieve a balanced distribution of industries and to locate

industries closer to sources of labour and materials. An integrated approach to development of industrial estates with a consideration of industrial specialisation will take into account of comparative resource endowment. This is done by "opening up of new industrial zones and upgrading existing ones, as well as the development of a few selected high technology industrial estates" (ibid., p.134).

The structure of Malaysian economy has recorded some remarkable changes from predominantly agricultural-based to that of industrial-based. The composition of gross domestic product (GDP) by sector has revealed substantial "take-off" by the industrial sector. In 1970, the agricultural sector accounted for 30.8% of the GDP while the industrial sector accounted for 13.3%. However, in 1990 this proportions have changed drastically with the agricultural sector declined to 18.7 % while the industrial sector increased to 27.0% (Table 1).

Similar changes have taken place in the employment structure of the country. In 1970, the agricultural sector provided 50.5% of the total job opportunities while the manufacturing sector provided 11.4%. The employment structure has changed considerably with the agricultural sector provided only 27.8% while the manufacturing sector provided 19.5% of the job opportunities (Table 2).

Table 1 – Composition of Gross Domestic Product of Malaysia by Sector (Percentage)

Sector/Year	1970	1975	1980	1985	1990
Primary (Agriculture & Forestry)	37.1 (30.8)	32.3 (27.7)	33.9 (22.9)	31.4 (20.8)	28.1 (18.7)
Secondary (Manufacturing)	17.3 (13.3)	20.2 (16.4)	24.9 (19.6)	24.7 (19.7)	30.2 (27.0)
Tertiary	45.6	47.5	41.2	43.9	41.7

Source : Fourth Malaysia Plan 1981 - 1985
Sixth Malaysia Plan 1991 - 1995
The Second Outline Perspective Plan 1991 - 2000

Table 2 – Employment Structure of Malaysia

Sector/Year	1970	1975	1980	1985	1990
Primary (Agriculture & Forestry)	53.1 (50.5)	47.4 (45.3)	42.3 (40.6)	32.1 (31.3)	28.4 (27.8)
Secondary (Manufacturing)	15.4 (11.4)	17.9 (13.5)	21.0 (15.8)	22.8 (15.2)	25.9 (19.5)
Tertiary	31.5	34.7	36.7	45.1	45.7

Source : Fourth Malaysia Plan 1981 - 1985
Sixth Malaysia Plan 1991 - 1995
The Second Outline Perspective Plan 1991 - 2000

Another feature of the economy is that the country has been traditionally dependent on exports for its growth. The structure of Malaysian exports has changed drastically from traditional commodity exports to the export of manufacturing products. In 1960s, tin and rubber were the major exports which accounted for than 70% of the total exports. In 1970s, palm oil, timber and petroleum became more important exports which accounted for nearly 80.0% of the total exports. In 1980s, manufacturing exports became more dominant activities which accounted for 43.5% of the total exports. The proportion increased further to 60.0% in 1990. The upward trend in the export performance is largely due to its comparative position. The export of manufactures is expected to remain as a significant contributor to the total export earnings (Malaysia, 1991c).

The industrial sector grew rapidly at 13.7% surpassed the 6.4% target of Fifth Malaysia Plan (1986-1990). This dynamic growth was due to contribution by the exports of electrical, electronics and textile industries. It is targeted in the Sixth Malaysia Plan it would sustain a growth rate of 11.6% per annum.

Structural adjustments in the manufacturing sector have been positive with an inclination towards greater automation and production of high value-added products. Currently, Malaysia is the world's major exporter of semi-conductors, air-conditioners and television sets. However, these products are mainly being manufactured by the multinational corporations from countries like USA and Japan.

There has been an increase in the Government allocation for R&D in the industrial sector. In the Sixth Malaysia Plan, RM177.7 million was allocated for industrial R&D compared to RM138.1 million allocated for the sector in the Fifth Malaysia Plan. Given the Government commitment to achieving greater competition in the export of industrial products, it is imperative that R&D institutions, universities and industries be linked to form a kind of partnership which is best developed through science park concept.

The above discussions on the changing structure of Malaysian economy point to the fact that the country is steadily heading towards becoming an industrial nation in the near future. Therefore, it is logical for her to make an early start to develop a more integrated industrial development based on science park concept. It will enhance her competitiveness in the world market and will boost growth potential in the industrial sector.

III. THE LOCATIONAL FACTORS

As far as industrial location is concerned, the west coast of Peninsular Malaysia continues to remain as an attractive and fast growing industrial corridor in the country. The popular industrial locations are Selangor, Johor, Penang, and all west coast States.

At present there are six science parks in Peninsular Malaysia and one in Sarawak which are being planned or in the process of construction. The location of these parks is shown in Figure 1. In the peninsula, all of them are located in already established industrial belts in the west coast States. This is not surprising as most of high quality urban facilities and institutions of higher learning are located in this region (Table 3).

Within the context of science park location in mind, the experience of one of the science parks is examined at a greater detail. Some of the relevant features of Kulim Hi-Tech Industrial Park (KHTIP) are examined in the following paragraphs.

The decision to locate a science park in Kulim, Kedah is mainly based on the strategic location of Kulim to the already established industrial zones of Penang. Kulim is a small town of about 40,000 population and is situated about 30 km. from Penang port and about 45 km. from Penang International Airport. It is about 15km. away from the Butterworth-Bukit Mertajam Industrial Corridor which is fast developing.

Table 3 – Some Key Locational Features of Science Parks in Peninsular Malaysia

Science Park	Main Town (Population in million)	University (Distance in km)
Science Park Penang	Georgetown (0.3)	Universiti Sains Malaysia (5)
Kulim Hi-Tech Industrial Park	Bukit Mertajam (0.1)	Universiti Sains Malaysia (40)
Perak Science Park	Ipoh (0.4)	Universiti Sains Malaysia, Branch Campus (30)
Shah Alam Technology Park	Shah Alam (0.2)	Universiti Malaya Universiti Kebangsaan Malaysia Universiti Pertanian Malaysia (within 30 km radius)
Technology Park Malaysia	Kuala Lumpur (1.8)	Universiti Malaya Universiti Kebangsaan Malaysia Universiti Pertanian Malaysia (within 30 km radius)
Johore Science Park	Johor Baharu (0.3)	Universiti Teknologi Malaysia (20)

The proposed KHTIP site lies within Greater Kulim District Council, 3 km. from Kulim town centre. It is linked to the proposed East-West highway that connects Penang on the west and Kota Bharu, Kelantan on the east. The designated site is presently occupied by oil palm and rubber plantations without urban infrastructure. The site is a valley drained by a stream meandering between hill peaks and slopes. Hill slope forms the backdrop to the valleys creating a splendid view towards the lowest point.

KHTIP consists of four main components as follows:

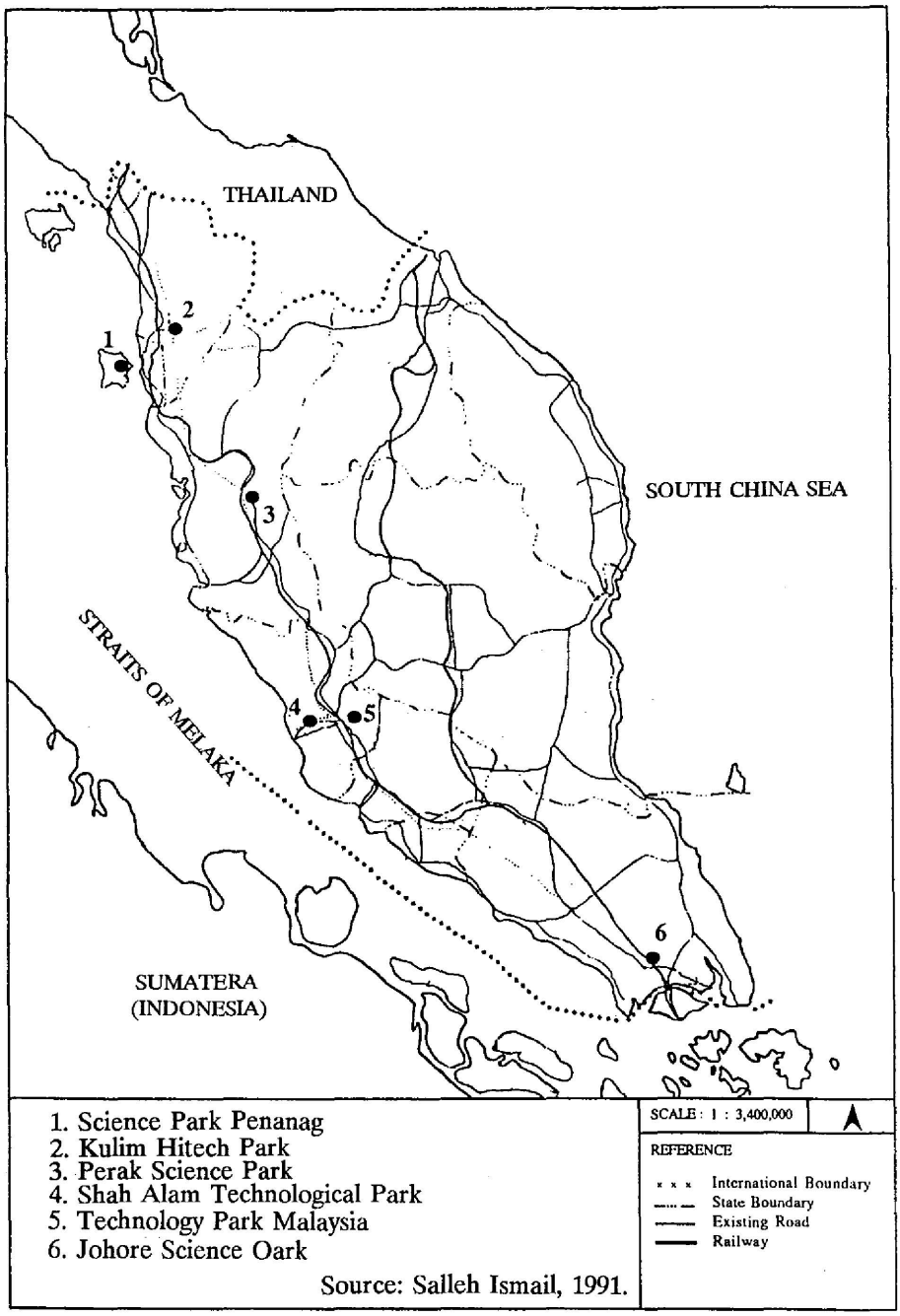
Hi-Tech Industrial Complex

Production base for electronics
Related Industries

R&D Complex

Incubation Centre
R&D Centre
Academic Centre

Figure 1 – Location of Science Parks in Peninsular Malaysia



Urban Amenity Complex

Commercial Facilities
Education Facilities
Medical Facilities
Leisure and Cultural Facilities

Habitation Complex

Housing
Parks

The location of these components are shown in Figure 2. The topography of the site and the functional linkages of the components are the main consideration in the choice of the site for the land uses.

It can be concluded from the above discussions that accessibility to readily available high quality labour supply, high quality road, air and sea transport and high quality urban infrastructure and environment is seen to be the major factors in the location of the science parks.

IV. ISSUES

The development of science parks in Malaysia is at infant stage. As such, lessons learnt from the experience of other countries would be relevant in the planning and development of more integrated science parks. Some of the main issues that need to be tackled first are local and regional impact of the science parks, manpower development policy and planning and implementation strategies.

To what the extent do the local linkages have developed? What impact do science parks have on the local and regional economy? What kind of spin-off effects does new technology have on the economy? Answers to these questions need to considered seriously in formulating regional policy for an integrated hi-tech industrial development. At present it is too early to make such evaluation of science park development in Malaysia.

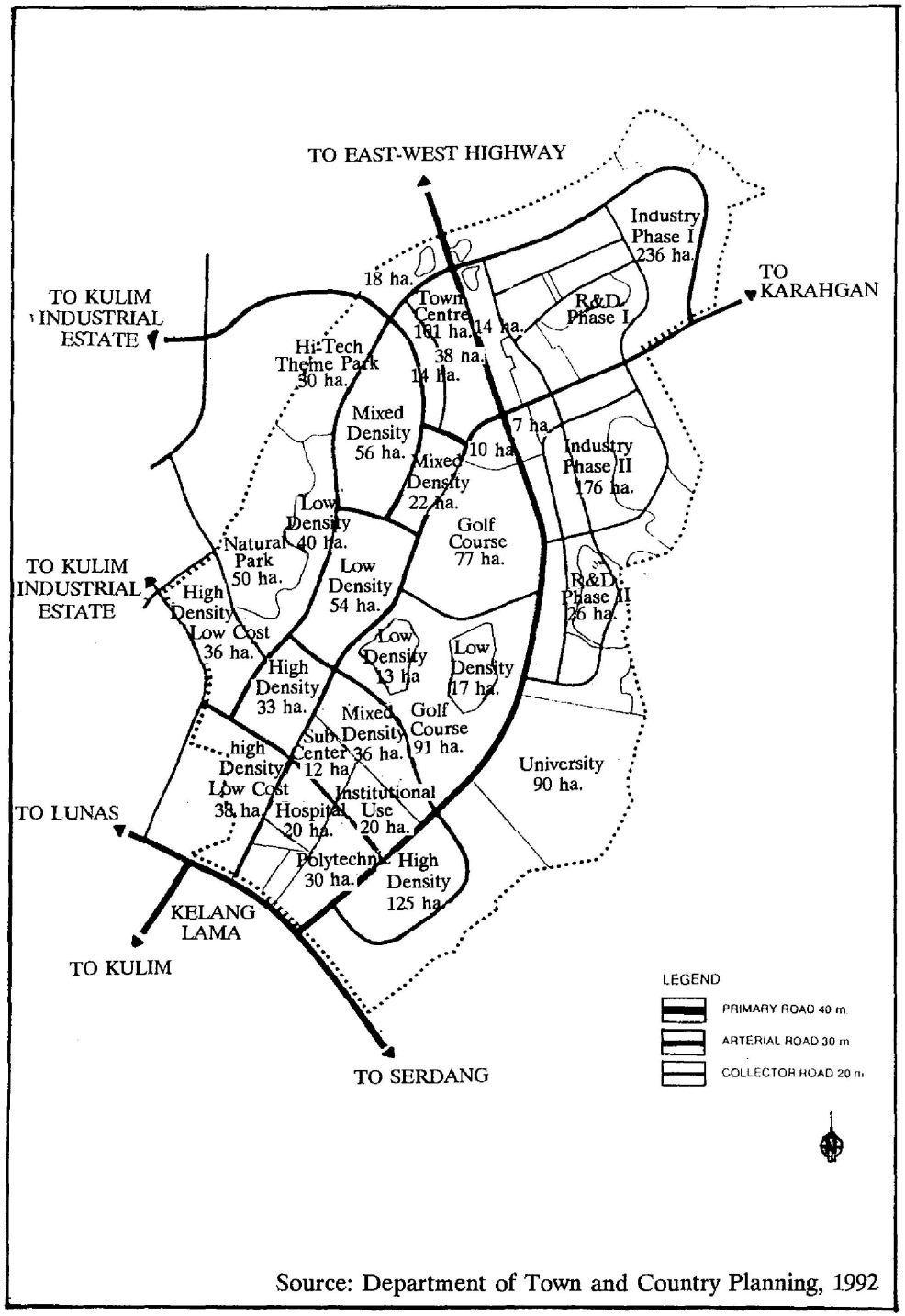
The development of science park would not achieve it objective unless efforts are made to enhance the quality and productivity of its labour force. The manpower policy of the country should reflect this kind of development to meet the changing skill requirements of the economy. Training institutes should be encouraged to interact with industries so that they can understand each other's problems and needs better.

A plan for science park development which looks perfect on paper may turn into a disastrous investment if priority and implementation policies are not properly worked out. For instance, infrastructural development should keep pace with the needs of various phases of development. Since most the ventures are undertaken by the private sector, high income generating facilities should be first developed and proper incentives be worked out.

V. CONCLUSION

In this paper, some aspects of science park development in Malaysia have been explored. It became obvious that the country possessed the prerequisites for the development of hi-tech industries. Nevertheless, the manner in which the development would take place and its

Figure 2 – Land Use Plan for Kulim Hi-Tech Industrial Park



Source: Department of Town and Country Planning, 1992

relationship with indigenous industries, research institutions and other facilities to promote local and regional development are some of the issues to be investigated further.

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