Trends and policy implications of the location selection of electric and electronic firms in Malaysia: A case study of the Penang and Kulim High-Tech Parks

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Abstract

Space has great impact on an economy organisation as it influences many other significant matters including the location selection aspect. Hence, it is crucial to observe the location aspect in order to look into the industrial activities as well as the development in a geography space. Clearly, not only the location aspect will affect the manufacturing industry operation ineffectiveness, but will also disturb the production process and similarly affect the competency among the firms. Furthermore, the location problem will appear to be a threat to location attraction force in order to attract the foreign investors who will eventually develop the manufacturing industry sectors. This study examined the criteria considered by the electric and electronic industrial firms in Penang and Kulim Hi-Tech Park industrial areas. Primary data were gathered from surveys and interviews of firms chief executives, manufacturing department director, R&D department manager, engineer, human resource department manager and other relevant officers directly involved in the decision making process of 30 electric and electronic industrial firms in Penang and another 10 in Kulim Hi-Tech Park. Findings from the survey showed that government policies, education infrastructure, research, and the environment were among the main criteria influencing the location decision of the firms studied. These criteria proved to be no different from those employed by industrial firms in developed countries.

Keywords: location, location criteria, neo-classical theory, electric and electronic firms, Kulim Hi-Tech Park, Penang Industrial Areas

Introduction

Even *neo classical* theory (see Weber, 1929; Losch, 1954; Isard, 1956) exists since long time ago as the reference in the location selection process in the industrial sector; however, there is still a doubt among the electric and electronic industrial firms while choosing the location to run their manufacturing operation especially for the medium and small scale firms (see Bradford & Kent, 1981; Scott, 1989; Hayter, 1997). It triggers the location problem among the electric and electronic industrial firms (Hayter, 1997; Fauziah, 2005). There are a few studies that have attempted to answer the question of location criteria in the industrial sector in Malaysia (see Rajaghantham, 1991; Morshidi, 1989, 1990). Hayter (1997), states that the location is an important principle in production process and this explains how firms choose and decide to operate their economic activities in particular area. Even so, there are many factors to be considered in the process of selecting a suitable location for such an economic activity in terms of resources and labor costs, infrastructure, technology, land, incentives, political stability, market etc. (see Weber, 1929; Losch, 1954; Isard, 1956; Hayter, 1997). These factors can be summarized into four major factors namely accessibility factors, production factors, situational factors and institutional factors.

However, the real factors affecting the choice of location for a highly complex industry and not difficult studied because it is dependent on the type of activity, spatial and demographic factors. Studies regarding the factors affecting the choice of location can be made using different approaches depending on the interests that need to be shown. Thus, the discussion which is related to the factors that affect the location selection for electric and electronic industrial industries should be seen in detail as it will determine the response and adaptation strategy as well as the implication faced by the firms involved in the future especially in enduring the new challenge globally.

Research areas and methodology of the study

This research was conducted in Penang Industrial Areas and Kulim Hi-Tech Park, Kedah. Penang is situated in the mainland on the south west of Peninsular Malaysia and is the second smallest state in Malaysia. It consists of two physical entities which are Penang and Seberang Prai (refer to Figure 1). Penang industrial area can be divided into industrial estates, tecnoplex area and Free Industrial Zone (FIZ). More specifically, it is represented by FIZ and technoplex area in Bayan Lepas as well as Mak Mandin, Prai, Seberang Jaya, Bukit Minyak and Bukit Tengah industrial areas. The Penang Industrial Area especially the Free Industrial Zones (FIZ) in Bayan Lepas as well as the technoplex area which is situated in metropolitan area and near the Bayan Lepas International Airport, gives these areas the privilege to develop rapidly. Indirectly, the opening of the free industrial zones indicates the starting of Penang economy exposure to the ups and down patterns of global economy.
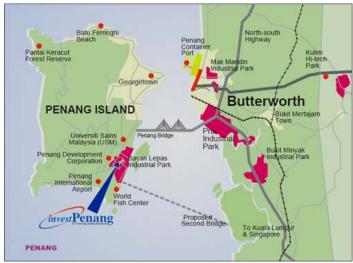
   Penang Industrial Areas have developed in accordance with the First Penang Strategic Development Plan 1 (PSDP1) and the Second (PSDP2) which concluded by Penang State Government with the R&D in mind. This is because in the 21 Century, Penang State Government has highlighted a few objectives to be achieved, specifically the effort in nurturing the developed industrial society through the manufacturing industsy sector. From the manufacturing industsy sector, Penang State Government encourages the firms to move to automation and develop the high-technology in their manufacturing activities. This causes the manufacturing industsy sector in Penang to experience the new phase in industrialization era when the firms started to encourage the added values, capital auccess and technology content with higher better skills and indeed more advanced compared to other states in Malaysia (Penang State Government, 1992). While other states are trying very hard to enable the manufacturing industsy sector as the main economy contributor, Penang has been comfortable with its position, and therefore, has emerged as the earliest state proving that this sector has successfully initiated the domestic economy.

   Most of the states in Malaysia especially under the developing states such as Kelantan, Terengganu, Pahang have put in their efforts to enable industrial sectors to become the domestic economy drive by multiplying the effort to attract foreign direct investment (FDI). This is due to the awareness in industrialization and manufacturing industry capable in addressing the socio-economy problems among the society (Mountjoy, 1984 in Morshidi, Abdul Fatah & Nooriah, 2001). Penang Industrial Areas specifically Free Industrial Zone (FIZ) Bayan Lepas and the technoplex areas are located in metropolitan area and situated close to the Bayan Lepas International Airport which benefits the areas to develop more rapidly. Metropolitan areas refer to a big city which combine overall city function (Kuala Lumpur Council, 1999: 1).
   In industrial areas in Penang have their own advantages and uniqueness. There are;
1) Considered as established industrial areas in manufacturing electric and electronic products in northern Peninsular Malaysia and the location are in metropolitan areas.
2) The operating firms which are specifically in Bayan Lepas FIZ and in technoplex areas practise the production of manufacturing-based compared to product assemble activity.

It suits the maturity level achieved in product manufacturing which enormously rely on the service component role. R&D and IT in manufacturing products production especially at production pre and while level are mostly applied by the firms which mostly focus on the product manufacturing activity.

Source: PDC, 2004

Figure 1. *Free Industrial Zones in Penang and Kulim Hi-Tech Park*

Penang State Government specifically through PDC; suggest to create the Muiti-media Super Corridor zone (MSC) which is the first and only at Bayan Lepas Industrial areas and technoplex. The existing of MSC zone indicates the level of the operating firms in both areas have successfully achieved the level that make the nation to be proud of.

Figure 1 also shows that until today the earliest built electronic giant firms in Penang still run their manufacturing operation. These firms dominated the high-technology based with the added values manufacturing product. Apart from that, there are also new areas that have been developed which suit the trend changes and meet requirement of the high tech firms that crucially considered the areas image as one of the corporate strategies. Mak Mandin Industrial Areas are more dominant as electric and electronic non-based industrial areas which are mostly Small Medium Industry level. Seberang Jaya, Bukit Minyak dan Bukit Tengah industrial areas are from the excessively rapid flow of industrialization boom in Bayan Lepas. However, from the map shown in Figure 1, it is found that there is no supplier firm that specializes in service component bargain operating in the area of the study that had been carried out. It differs from the empirical study evidence that had been carried out in other countries which show industry location operating near to service network resource. In short, it can be said that Penang has the unique strength as manufacturing operation centre compared to as product assembles activity even when the number of the firms that fulfill the stated features is limited. Industrial areas in Penang are outstanding in utilising the R&D and IT service component which eventually will be able to support the electric and electronic industrial production activity. This is in line with the government aspiration to increase the integration of both sectors in their effort to move towards the high-tech industry which is skill and information intensified.

In these recent decades, the science and technology element are widely highlighted in order to have more competent economy system and later become a boost for national and divisional development aspiration to come true. Even so, Malaysia's the science and technology development effort only embarks once the Fifth Malaysia Plan is introduced which aims to nurture scientific, innovative, progressive and a looking forward society (Malaysia, 1986). In line with the wish, Kedah State Government had launched the 2010 Developed Kedah Tactical Plan. It was an aim for Kedah to emerge as a developed state in the year 2010 which is ten years earlier from the 2020 Vision and with the higher aim for industrial sector. This is because the agriculture sector contribution to Kedah economy has decreased and is taken over by

the manufacturing sector. Conversely, the plan was unsuccessful in triggering Kedah as one of the well-developed states in Malaysia.

Meanwhile, Kulim Hi-Tech Park is located in semi-urban areas in Kedah state. Kedah is the second poorest state in Malaysia but yet has a high population. Basically, the poverty in this state is due to the human resource usage in a sector which has low production such as in agriculture sector. However, Kulim district location which is near to Penang has a great potential to support the vast industrial development especially through the win-win situation concept. Chosen industrial distribution concept is encouraged among the private sectors to establish their production operation in less developed areas. Thus, the industrial sector development in Kulim especially at Hi-Tech Park is believed related to the industrial development in Penang which is experiencing excessive load infrastructure problem, escalating operational cost and a shortage in labour resource (Kulim Municipal Council, 1996). Obviously, this development pattern will affect the socio-economy development in Kulim district area and will provide job vacancy and boost the support industries as well.

Kulim Hi-Tech Park is the largest industrial area in Kedah state and has emerged as the first hi-tech park as such in Malaysia which officiated in 1996. It is said that this hi-tech park is the second best in Asia which covers an area of 290 hectres and is divided into two main phases; phase 1 and phase II. Up to today, it becomes the centre for high technology firm chains with more than RM 16 million investment value. By adopting the   *'Science City of the Future'* concept, this hi-tech park has attracted high technology based local and foreign multinational companies to invest in variety of fields in six main zones. The zones include industrial zone, research and development zone (R&D), business zone, housing zone, institution zone and facilities zone. Kulim Hi-Tech Park is unique because of its location in a semi countryside area. Normally, the location trends for indusrial activities especially for high technology industries tend to be in metropolitan areas. Equally, the chosen Kulim Hi-Tech Park enables to portray the relation in space perception and the willingness to start off the manufacturing activities importantly the high technology based in semi urban area. It agrees with Hirschman's opinion (1958 in Morshidi, 1990) that it has the first hi-tech park image in Malaysia. How far, this advantage as the technology park is stressed on the possibility of perception factor influence in divisional development process. Empirical study by Morshidi (1989) shows that there is a relation between perception factor and the entrepreneurs'shallow and imperfect knowledge with investment opportunity in outskirt areas. As a result, the decision made in relation with the industry location is based on inaccurate knowledge and information specifically, on the divisional encouragement (refer to Morshidi, 1989, 1990). This situation and the unsureness influence had forced the entrepreneurs to minimize the benefit and opportunity in outskirt areas which indeliberately highlighted obstacles and problems. Penang's role as the second centre within the national economy space while Kulim Hi-Tech Park is the outskirt area which has been developed as a new township and operating in semi urban area. Whether these would be able to become an attraction to the firms especially on the hi-tech based is still doubtful. Hence, the next explanation will portray the location criteria position according to the study on firms perception as the background and the current empirical evidence in relation with location selection trend.

This research utilizes premier data from survey form and interview in both study areas which has been carried out by the researcher. In order to succeed in this particular research, the researcher has requested to interview the firms chief executive officer especially those who are directly involved in decision making process pertaining to manufacturing planning and executing process. This includes manufacturing department director, R&D department manager, engineer, human resource department manager and other relevant officer. This step is done in order to acquire detailed information from those individuals who work directly and have deeper understanding towards factors behind the decision making process among the firms.

Verification on location selection criteria

Table 1 depicted the factors which can be considered by the firms in Penang Industrial Areas in verifying the location decision for operating. The table shows that government policy factor appears as the main factor with 46.6% followed by education and research infrastructure attributes as the second criteria chosen by 33.3% firms. Other attributes   collected are almost with similar percentage. In order to acquire reliable result, every selection is given a weightage. The analysis is based on teorem tendency medium formula (centralized tendency measurement) conducted to recognize the criterion which has the most important role in affecting electric and electronic firms decision making in selecting the manufacturing location. Thus, the attribute position and its importance become the verification for the location selections among the firms are clearly shown. The importance of location criteria to be highlighted in this study is sufficiently as the background for the latest trend in industrial location selection criteria which should be known since it gives the guidelines either for the planned development or rectification development. Table 2 has shown this finding by putting government policy as the main criterion, education and research infrastructure as the second main criterion, surroundings the third main while decentralisation factor and technology demand by the public are in the twelveth criteria respectively. According to the former Prime Minister Datuk Seri Abdullah Ahmad Badawi, the second phase of The Multimedia Super Corridor (MSC) will be expanded to Penang and Kulim. Both of these new areas are significant for the foundation in supplying balanced ICT knowledge between urban and rural residences (The Star, 29 June 2004). Meanwhile, surrounding factor and technology factor are at the same position as being chosen by the two firms. Other attributes acquired are almost with the same percentage. To illustrate clearer result for every selection is given a weightage. Table 3 shows the verification finding by putting government policy as the main criterion, tehnology development policy as the second criterion and surroundings as the third. Other factors which were unable to be verified in the past, are now able to be clearly shown as a result of utilizing the average centralized formula.

Trend and policy implication

Location incentive has different influence on the firm to operate since it relies on type of ownership and corporate control, the firm features as well as basic main manufacturing which normally is determined by the sole headquarters. For instance, in initial stage of the product cycle, the firm will focus on innovation creation process and come up with product variation in order to compete. In the meantime, incentives such as subsidy and tax deduction are among the main motivations at the product development stage and undergo its maturity. Therefore, location incentive should be done only after they have understood and considered all other aspects and likewise the investor's trend. This is because the location which is being developed has responsive nature in meeting the market demand or current demands. These things should be done in order to avoid manufacturing firm location from become over-concentrated merely at certain areas while failing to get response at a few areas. In short, location consideration in Penang industrial areas is difficult to be recognized because it was done in 1970s while Kulim Hi-Tech Park started in 1996 and the executives who are involved as the decision makers are still leading the firms in the study areas.

Table 1. Location selection factor based on the firms perception study in Penang Industrial Areas

Factor	Selection Percentage (By Respondent Number)														Total
	U_1	U_2	U_3	U_4	U_5	U_6	U_7	U_8	U_9	U_{10}	U_{11}	U_{12}	U_{13}	U_{14}	
Government Policy	14	4	2	3	1	5	1	-	-	-	-	-	-	-	30
Education and research infrastructure	5	10	7	1	2	2	1	1	1	-	-	-	-	-	30
Surroundings	3	6	4	3	5	1	2	1	-	1	2	2	-	-	30
Technology Policy	1	3	1	2	6	8	5	3	1	-	-	-	-	-	30
Close to customers	1	1	-	-	1	-	-	-	-	-	-	-	-	27	30
Individual Role	1	1	2	3	1	2	3	1	6	6	2	1	1	-	30
Technologiy demand by private sector	2	-	2	4	5	1	8	2	2	1	1	2	-	-	30
Accessiblity to giant firms	2	2	6	6	2	2	2	1	1	3	1	-	2	-	30
Decentralisation	1	-	1	-	1	1	1	-	3	3	3	3	12	1	30
Technology demand by the civil	-	-	1	2	-	-	-	2	2	3	3	11	6	-	30
R&D Assistance	-	1	3	2	3	6	5	5	1	1	3	-	-	-	30
Innovation centre	-	-	-	2	2	-	1	2	2	3	5	5	8	-	30
Capital inaccessibility	-	1	-	1	-	3	1	1	4	6	7	3	3	-	30
Creation location	-	1	1	2	2	-	-	11	8	1	3	1	-	-	30

Legend:

U_1	= Main		U_{11}	= Eleventh Main
U_2	= Second Main		U_{12}	= Twelveth Main
U_3	= Third Main		U_{13}	= Thirteenth Main
U_4	= Fourth Main		U_{14}	= Fourteenth Main
U_5	= Fifth Main			
U_6	= Sixth Main			
U_7	= Seventh Main			
U_8	= Eighth Main			
U_9	= Ninth Main			
U_{10}	= Tenth Main			

Survey Source, Field Work.

Table 2. Location selection determiner factor based on the priority in Penang Industrial Areas

Selection Factor	A		B		C		D		E		F		G	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
U$_1$ (14)	14	196	5	70	3	42	1	14	1	14	1	14	2	28
U$_2$ (13)	4	52	10	130	6	78	3	39	1	13	1	13	-	-
U$_3$ (12)	2	24	7	84	4	48	1	12	-	-	2	24	2	24
U$_4$ (11)	3	33	1	11	3	33	2	22	1	-	3	33	4	44
U$_5$ (10)	1	10	2	20	5	50	6	60	1	10	1	10	5	50
U$_6$ (9)	5	45	2	18	1	9	8	72	-	-	2	18	1	9
U$_7$ (8)	1	8	1	8	2	16	5	40	-	-	3	24	8	64
U$_8$ (7)	-	-	1	7	1	7	3	21	-	-	1	7	2	14
U$_9$ (6)	-	-	1	6	-	-	1	6	-	-	6	36	2	12
U$_{10}$(5)	-	-	-	-	1	5	-	-	-	-	6	30	1	5
U$_{11}$(4)	-	-	-	-	2	8	-	-	-	-	2	8	1	4
U$_{12}$(3)	-	-	-	-	2	6	-	-	-	-	1	3	2	6
U$_{13}$(2)	-	-	-	-	-	-	-	-	-	-	1	2	-	-
U$_{14}$(1)	-	-	-	-	-	-	-	-	27	27	-	-	-	-
Total	30	368	30	346	30	302	30	286	30	64	30	222	30	260
(F)	12.3		11.5		10.1		9.5		2.1		7.4		8.7	
Selection Priority	**1**		**2**		**3**		**4**		**13**		**8**		**6**	

Table 2, continuation

Selection Factor	H		I		J		K		L		M		N	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
U₁ (14)	2	28	1	14	-	-	-	-	-	-	-	-	-	-
U₂ (13)	2	26	-	-	1	-	-	13	1	-	1	13	1	13
U₃ (12)	6	72	1	12	3	12	-	36	-	-	-	-	1	12
U₄ (11)	6	66	-	-	2	22	2	22	2	22	1	11	2	22
U₅ (10)	2	20	1	10	3	-	2	30	2	20	-	-	2	20
U₆ (9)	2	18	1	9	6	-	1	54	3	-	3	27	-	-
U₇ (8)	2	16	1	8	5	-	2	40	1	8	1	8	-	-
U₈ (7)	1	7	-	-	5	14	2	35	1	14	1	7	11	77
U₉ (6)	1	6	3	18	1	12	2	6	4	12	4	24	8	48
U₁₀ (5)	3	15	3	15	1	15	3	5	6	15	6	30	1	5
U₁₁ (4)	1	4	3	12	3	12	5	12	7	20	7	28	3	12
U₁₂ (3)	-	-	3	9	-	33	5	-	3	15	3	9	1	3
U₁₃ (2)	2	4	12	24	-	12	8	-	3	16	3	6	-	-
U₁₄ (1)	-	-	1	1	-	-	-	-	-	-	-	-	-	-
Jumlah	30	282	30	132	30	132	30	253	30	142	30	163	30	212
(F)		9.4		4.4		4.4		8.4		4.7		5.4		7.1
Priority Selection		**5**		**12**		**12**		**7**		**11**		**10**		**9**

Legend:

Selection arrangement:

U₁ = Main	U₆ = Sixth Main	U₁₁ = Eleventh Main
U₂ = Second Main	U₇ = Seventh Main	U₁₂ = Twelveth Main
U₃ = Third Main	U₈ = Eighth Main	U₁₃ = Thirteenth Main
U₄ = Fourth Main	U₉ = Ninth Main	U₁₄ = Fourteenth Main
U₅ = Fifth Main	U₁₀ = Tenth Main	

Location criteria:

A = Government Policy	B = Education and research infrastructure	C = Surroundings
D = Technology Policy	E = Close to customers	F = Individual Role
G = Technology demand by private sector	H = Accessiblity to giant firms	I = Decentralisation
J = Technology demand by the civil	K = R&D Assistance	L = Innovation centre
M = Capital inaccessibility	N = Creation location	

(*) = Total weightage for every legend selection (n+1)
X = Number of respondent
Y = Weightage multiple with number of respondent
F = Average Y

Survey Source, Field Work.

Table 3. Location selection factor based on the firms perception study in Kulim Hi-Tech Park

Factor	Selection Percentage (By Respondent Number)														Total
	U_1	U_2	U_3	U_4	U_5	U_6	U_7	U_8	U_9	U_{10}	U_{11}	U_{12}	U_{13}	U_{14}	
Government Policy	4	4	2	-	-	-	-	-	-	-	-	-	-	-	10
Education and research infrastructure	-	1	-	2	3	-	1	2	1	-	-	-	-	-	10
Surroundings	2	1	-	2	1	2	-	1	-	-	1	-	-	-	10
Technology Policy	2	-	3	1	1	1	-	1	-	-	1	-	-	-	10
Close to customers	1	-	-	-	-	-	-	-	-	-	-	-	1	8	10
Individual Role	1	1	1	1	1	-	-	-	1	2	1	-	2	-	10
Technology demand by private sector	-	1	1	1	-	3	-	1	-	-	-	3	-	-	10
Accessiblity to giant firms	-	-	1	-	1	-	3	3	1	1	-	-	-	-	10
Decentralisation	-	-	-	-	1	1	3	-	1	-	1	3	-	-	10
Technology demand by the civil	-	-	-	1	2	-	-	-	1	1	-	-	3	2	10
R&D Assistance	-	1	2	3	-	-	3	-	1	-	-	-	-	-	10
Innovation centre	-	-	-	-	-	2	-	1	2	2	1	-	2	-	10
Capital inaccessibility	-	-	-	-	-	1	-	-	-	1	3	3	2	-	10
Creation location	-	1	-	-	-	-	-	1	2	3	2	1	-	-	10

Legend:

U_1 = Main	U_6 = Sixth Main	U_{11} = Eleventh Main	
U_2 = Second Main	U_7 = Seventh Main	U_{12} = Twelveth Main	
U_3 = Third Main	U_8 = Eighth Main	U_{13} = Thirteenth Main	
U_4 = Fourth Main	U_9 = Ninth Main	U_{14} = Fourteenth Main	
U_5 = Fifth Main	U_{10} = Tenth Main		

Survey Source, Field Work.

current demands.   These things should be done in order to avoid manufacturing firm location from become over-concentrated merely at certain areas while failing to get response at a few areas.   In short, location consideration in Penang industrial areas is difficult to be recognized because it was done in 1970s while Kulim Hi-Tech Park started in 1996 and the executives who are involved as the decision makers are still leading the firms in the study areas. Briefly, there are a number of main issues discovered in this particular study. They include:

a. Studied location standard

Generally, an industry location can be recognized through location criteria which normally are based on infrastructure attraction and incentive offered. However, differences sometimes appear in term of location selection trend as a result of the diversity in the type of industries.

b. The priority factor for location selection

The finding from the study shows that for both locations, government policy has been recognized as the main factor that is considered by the studied firms.   Meanwhile, education and research infrastructure factor becomes the second main factor for the firms that are operating in Penang industrial areas but in Kulim Hi-Tech Park it is the fifth main factor. Nevertheless, it should be noted that infrastructure and policy are planned from time to time and are closely related with government policy that has been practised.   In order to know the most dominant location criteria for both locations, all of selected criteria have been combined as shown in Table 4.   Meanwhile, Table 5 depicts the summary of combination for all location selection criteria based on actual value of detailed calculation outcomes for both locations.
Planner or developer are responsible in upgrading the industry location and they have to pay more attention and stess to the location criteria that have been considered by the firms during the decision making for location selection to run their manufacturing operation.   This study shows that the following factors should be addressed by priority:
1) Government Policy
2) Education and research infrastructure
3) Surroundings
4) Technology Policy
5) Close to customers
6) Individual Role
7) Technologiy demand by private sector
8) Accessiblity to giant firms 9) Decentralisation
10) Technology demand by the civil
11) R&D Assistance
12) Innovation centre
13) Capital inaccessibility
14) Creation location

Table 4. Location selection determiner based on the priority in both study location

SELECTION FACTOR	A		B		C		D		E		F		G	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
U_1 (14)	9	126	2.5	35	2.5	35	1.5	21	1	14	1	14	1	14
U_2 (13)	4	52	5.5	71.5	3.5	45.5	1.5	19.5	0.5	6.5	1	13	0.5	6.5
U_3 (12)	2	24	3.5	42	2	24	2	24	-	-	1.5	18	1.5	18
U_4 (11)	1.5	16.5	1.5	16.5	2.5	27.5	1.5	16.5	-	-	1.5	16.5	2.5	27.5
U_5 (10)	0.5	5	2.5	25	3	30	3.5	35	0.5	5	1	10	2.5	25
U_6 (9)	2.5	22.5	1	9	1.5	13.5	4.5	40.5	-	-	1	9	2	18
U_7 (8)	0.5	4	1	8	1	8	2.5	20	-	-	1.5	12	4	32
U_8 (7)	-	-	1.5	10.5	1	7	2	14	-	-	0.5	3.5	1.5	10.5
U_9 (6)	-	-	1	6	-	-	0.5	3	-	-	3.5	21	1	6
U_{10} (5)	-	-	-	-	0.5	2.5	-	-	-	-	4	20	0.5	2.5
U_{11} (4)	-	-	-	-	1.5	6	0.5	10	-	-	1.5	6	0.5	2
U_{12} (3)	-	-	-	-	1	3	-	-	-	-	0.5	1.5	2.5	7.5
U_{13} (2)	-	-	-	-	-	-	-	-	0.5	1	1.5	3	-	-
U_{14} (1)	-	-	-	-	-	-	-	-	17.5	17.5	-	-	-	-
Total	20	250	20	223.5	20	202	20	203.5	20	44	20	147.5	20	169.5
(F)		12.5		11.2		10.1		10.2		2.2		7.4		8.5
Selection Priority		1		2		4		3		14		8		7

Table 4, continuation

SELECTION FACTOR	H		I		J		K		L		M		N	
	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y	X	Y
U_1 (14)	1	14	0.5	7	-	-	-	-	-	-	-	-	-	-
U_2 (13)	1	13	-	-	-	-	1	13	-	-	1	6.5	1	13
U_3 (12)	3.5	42	0.5	6	2.5	6	2.5	30	-	-	0.5	-	0.5	6
U_4 (11)	3	33	-	-	1.5	16.5	2.5	27.5	1	11	0.5	5.5	1	11
U_5 (10)	1.5	15	1	10	1	10	1.5	15	1	10	-	-	1	10
U_6 (9)	1	9	1	9	-	-	3	27	1	9	2	18	-	-
U_7 (8)	2.5	20	2	16	-	-	4	32	0.5	4	0.5	4	-	-
U_8 (7)	2	14	-	-	1	7	2.5	17.5	1.5	10.5	0.5	3.5	6	42
U_9 (6)	1	6	2	12	1.5	9	1	6	2	12	2	12	5	30
U_{10} (5)	2	10	1.5	7.5	2	10	0.5	3	2.5	12.5	3.5	17.5	2	10
U_{11} (4)	0.5	2	3	12	1.5	6	1.5	6	3	12	5	20	2.5	10
U_{12} (3)	-	-	3	9	5.5	16.5	-	-	2.5	7.5	3	9	1	3
U_{13} (2)	1	2	6	12	4.5	9	-	-	5	10	2.5	5	-	-
U_{14} (1)	-	-	0.5	0.5	1	1	-	-	-	-	-	-	-	-
Jumlah	20	180	20	93	20	91	20	177	20	98.5	20	101	20	135
(F)		9		4.7		4.6		8.9		4.9		5.05		6.75
Selection Priority		5		12		13		6		11		10		9

Legend:

Selection Arrangement:
U_1 = Main
U_2 = Second Main
U_3 = Third Main
U_4 = Fourth Main
U_5 = Fifth Main
U_6 = Sixth Main
U_7 = Seventh Main
U_8 = Eighth Main
U_9 = Ninth Main
U_{10} = Tenth Main
U_{11} = Eleventh Main
U_{12} = Twelveth Main
U_{13} = Thirteenth Main
U_{14} = Fourteenth Main

Location Criteria:
A = Government Policy
D = Technology Policy
G = Technology demand by private sector
J = Technology demand by the civil
M = Capital inaccessibility

B = Education and research infrastructure
E = Close to customers
H = Accessiblity to giant firms
K = R&D Assistance
N = Creation location

C = Surroundings
F = Individual Role
I = Decentralisation
L = Innovation centre

(*) = Total weightage for every legend selection (n÷1)
X = Number of respondent
Y = Weightage multiple with number of respondent
F = Average Y

Table 5. Location criteria combination based on actual value

Location Criteria	Penang Industrial Areas	Kulim Hi-Tech Park	(*) Overall
A	1	1	**1** (12.5)
B	2	5	**2** (11.2)
C	3	3	**4** (10.1)
D	4	2	**3** (10.2)
E	13	14	**14** (2.2)
F	8	8	**8** (7.4)
G	6	6	**7** (8.5)
H	5	7	**5** (9)
I	12	9	**12** (4.7)
J	12	12	**13** (4.6)
K	7	4	**6** (8.9)
L	11	11	**11** (4.9)
M	10	13	**10** (5.05)
N	9	10	**9** (6.75)

(*) Strength level for every criteria

Location Criteria:
A = Government Policy   B = Education and research infrastructure   C = Surroundings
D = Technology Policy   E = Close to customers   F =   Individual Role
G = Technology demand by private sector H = Accessiblity to giant firms   I =
Decentralisation
J = Technology demand by the civil   K = R&D Assistance   L = Innovation centre
M = Capital inaccessibility N = Creation location

(*) = Total weightage for every legend selection (n+1)
X   = Number of respondent
Y   = Weightage multiple with number of respondent
F   = Average Y

Survey Source, Field Work.

Conclusion

In conclusion, location selection criteria that have been considered in this study of electric and electronic firms in Penang and Kulim Hi-Tech Park prove to be little different from those found for foreign countries. The only difference was in terms of firm priority. However, location criterion is not given any initial prestigious weightage. The very interactions of location factors inadvertently transform an area to be more attractive and ideal and hence appeared to be the choice for the firms to run their operation. Nevertheless, the location incentive has a lot to do with the demands from multinational corporations (MNCs). This is due to the fact that China has veritably become a strong competitor to Malaysia's electrical and electronic industrial sector.

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