The Need for and Implications of Technology Transfer to Malaysia

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ABSTRACT

During the last 20 years, the Malaysian economy has undergone significant changes as a result of various economic strategies and policy adjustments undertaken by the government to meet the changing world economic environment. One of the most important programme was industrialization initiated in the late fifties. Basically, the industrialization programme was implemented through the mechanisms of foreign direct investments and technology transfer. The latter involves the recipient companies in Malaysia obtaining their technology from a number of technology suppliers (foreign) for the different elements of technology they require.

This paper attempts to highlight the needs and the effects of technology transfer to Malaysian entrepreneurs with the view to provide some insights to existing firms when introducing, processing and marketing of new and improved products.

The following discussions and analysis in this paper are based on the data and report obtained from several surveys made by various researchers. These were surveys on the Japanese electronic and non-electronic firms (Osman, Anuwar & Toh, 1985), a report on shortages and future requirements of professionals (Manpower Survey in Malaysian Industries 1991) and finally a comparative study of cultural values between Japanese and Malaysian managers (Jaafar & Shukry 1983).

The need for technology transfer is becoming more apparent since most of the advanced countries like the U.S., Japan, France and Germany are continuing to restructure their industries with more vigorous and stringent protectionism. The current scenario facing manufacturing industries in Malaysia is the persistent lack of highly skilled personnel to match the increasing demand in technologies sequences by new and existing industries. The government's strategy has also emphasised the need for technological advancement in order to enhance the quality and productivity levels of Malaysian enterprises. Incidentally, most of the capital equipments and machineries used by Malaysian industries are imported and this would remain to be so for several years since the engineering and new technology-based industries are yet to be fully developed.

As a result of the above-mentioned factors, the implications on domestic industries and the country as a whole are numerous. Among them are: a lot of the crucial decisions pertaining to technological processes are being made by parent companies; for example, on the choice of products, techniques of production and also on marketing and management. The bulk of the total cost of technology transfer was taken in the form of payments for the importation of new machinery and equipment through parent companies. Other expenses included for overseas training of employee usually Japan, and for royalty and technical fees. Basically, technology transfer benefited local industries because many investors (mainly Japanese) invested in Malaysia. To a certain extent, it created a little "spin-off" effects which encourage the growth of domestic firms. Based on the report of Manpower Survey of Industries (1991) with regard

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to companies assessment of the general skill and efficiency, there was a mixed opinion reported by the respondents. At the managerial level, most companies reported that there was substantial improvement compared to the situation three years before. At the level of technicians and engineers, substantial improvement was also reported and at the level of factory workers, majority of the companies reported a slight improvement.

Based on a comparative study of cultural values between Malaysian and Japanese managers, (Jaafar & Shukry, 1983), it was found that there was no significant difference between Malaysian and Japanese managers in term of cultural value. Therefore, it might be possible for Malaysian managers to learn the art of Japanese management with ease especially when they have acquired similar educational exposure while doing the same type of work.

As a conclusion, technology transfer is absolutely needed and beneficial since the trend of globalization of the world economy has increased. The world becomes more linked and integrated via increased trade, investment and capital flows as well as labour movements. As more LDC's enter the industrial age, access to abundant factors (land, labour and materials) will become less important because it will be replaced by the technology, skills and ability to process output efficiently. Finally, more industries will become global in nature such as TNCs within which most valuable and high value-added activities take place.

INTRODUCTION

One of the challenges that Malaysia has to face in order to be a fully developed country in the world is to ensure continous economic growth. In the last two decades, Malaysia has achieved a sustained growth averaging 6.7% per annum. Based on the targeted output growth rate, Malaysian GDP would increase from $115 billion from 1990 to $920 billion (in constant 1990 prices) by 2000 which is averaging 7% per annum. The economy is expected to grow progressively with the high domestic saving rate, a well developed physical, social and institutional infrastructure, political, economic and financial stability. This high growth is expected to be propelled largely by the private sector.

What will be the world scenario till the year 2000?

Based on the forecasting `megatrends' for the world, the rate of change for Malaysia economy is likely to be more rapid. The prospects of achieving better quality of growth is possible due to the importation of the latest technical know how as well as by avoiding known pitfalls from the experience of others. Table 1 shows the pattern of regional international trade which indicates a rapid growth and it is expected to continue growing in the future. However, the competitive environment to some extent will affect Malaysia. For instance, the replacement of raw materials (i.e. natural rubber) by synthetics has shifted

production towards che use of the latter given that its production cost being relatively lower.

Table 1

INTERREGIONAL TRADE AS % OF WORLD TRADE

Region	1980 US$ bil	%	1988 US$ bil	%	1980-1988 Growth (%)
North America-Asia	49.7	2.5	90.6	3.2	7.8
Western Europe-Asia	30.1	1.5	70.8	2.5	11.2
North America-Western Europe	75.3	3.8	90.1	3.2	2.3

Source: World Development Report

Table 2, shows a continuing increase in trade of manufactured products whereas the exports of raw materials, on the other hand, indicate to decline.

Table 2

RECENT TRENDS IN THE COMPOSITION OF TRADE

World Trade		
Year	1980 (%)	1988 (%)
Manufactured Goods	58	75
Agricultural Products	15	14
Petro-Chemicals	25	10
Minerals	2	2
Total Value	US$2,000 bil	US$2,829 bil

Source: World Development Report.

Based on a very brief overview of the projected pattern of world interregional trade, and also based on the Malaysian targeted output growth rate of 7 percent per annum, it is expected that the manufacturing sector of Malaysia to grow rapidly. As a whole, Malaysia is ready to meet the challenge of becoming an industrialized country as aspired in Vision 2020 by our Honourable Prime Minister, Datuk Seri Dr. Mahathir Mohamad.

Following from the above, this paper attempts to highlight the needs and the effects of technology transfer to Malaysian enterprises in order to understand the impact of rapid industrialization. Hopefully, this paper will provide some insights for existing firms especially in introducing processing

and marketing new and improved products. The term "technologies" employed in this paper is embodied in various forms such as machinery, human capital or management and written documents or information. Transfer technology is "a process in which the country is free to choose autonomously, from among different alternatives of scientific and technological knowledge, those which are suited to its natural conditions and to its development objectives, its capacity for assimilations and its pattern of living" (Anuwar Ali, 35). During the last decade in Malaysia, the concept of technology transfer has assumed considerable importance in the context of technological choice and application. Basically, there are several reasons why this concept of technology transfer are widely needed. First, it is becoming more apparent that most of the advanced countries like the United States, Japan, Germany and France are continuing to restructure their industries with increasing levels of protectionism.

This creates an environment of instability among the third world economies like Malaysia whereby the prospects for enhancing manufacturing exports would be diminished. This instability is further aggravated with the rapid development of new technologies in the field of microelectronics and biotechnology and advanced materials which are primarily intensified by the Japanese, American and EEC multinational firms (Commonwealth Secretariat, 1985 p. 32-42). As a result, many developing countries including

Malaysia, are faced with the ardous task to be in line with their standards and demands. Competing on the terms of the industrial countries would be too expensive, risky and involve large-scale operations. With the exception of a few large firms or enterprises which have substantial amount of investment or capital, most enterprises are not able to compete with new technologies and innovations (ESCAP UNTAC Publication Series B. No.3: p.4). However, despite the rapid technological development of the industrial countries, it creates an inherent advantage to the latecomer. In this respect the developing countries which can adapt or import the proven technologies in their industries are able to achieve high productivity while minimizing the development costs.

Second, in recent years, the use of technology has assumed considerable significance especially in manufacturing industries. However, the scenario facing industries is that too many jobs are chasing too few job seekers. It is not only confined to lower categories of staff but, also, includes shortages of skilled personnel, professionals and other levels of management. Based on a Survey in Malaysian Industries which was conducted by the Malaysian International Chambers of Commerce and Industry (MICCI), Federation of Malaysian Manufacturers (FMM) and Malaysian Employer Federation (MEF) among its 2600 member companies throughout West Malaysia, during the period of October 1990 January 1991, that most of the vacancies existed in the

electronics and electrical industry followed by rubber products and financial services industries (see table 3). In term of the sectoral distribution of employment, the highest number of

Table 3

MANPOWER REQUIREMENTS BY TYPES OF INDUSTRY

Types of Industry	Current No. (1991)	Vacancies (1991)	1994	1996
Rubber Products	1878	488	805	559
Wholesale	42	13	10	2
Retail	686	279	420	512
Transportation	228	60	58	81
Financial Services	3472	410	136	166
Utilities	279	195	150	103
Public Relations	20	1	2	0
Construction	986	190	434	326
Palm Oil Products	332	135	115	68
Food Processing	809	236	164	186
Wood Based	320	96	86	132
Electronic & Electric	5600	964	2131	2070
Transport Equipment	208	46	140	162
Machinery and Engineering	259	83	65	154
Iron and Steel	662	217	341	124
Textiles	567	165	195	213
Others	6269	1327	1746	1696

Source: Manpower Survey in Malaysian Industries Report.

manpower is in the manufacturing sector, followed by services (see table 4). Also, based on a report of a projected manpower requirements in the years 1994 and 1996, it shows a bouyant demand for engineering and business graduates in those industries. The shortages facing the industries would certainly

require new alternatives to solve their problems. One possible option is by the importation of both technological expertise (expatriates) and capital equipment that are highly proficient, able to adapt, innovate and invent in response to the quickly changing supply and demand pattern.

Table 4

MANPOWER REQUIREMENTS BY TYPES OF OPERATIONS

Types of Operations	Current	Vacancies	1994	1996
Manufacturing	9171	1940	3764	3505
Trading	849	162	264	327
Services	1656	1244	1040	1161
Manufacturing and Trading	1893	695	1101	1073
Manufacturing and Services	155	103	38	46
Trading & Services	1540	328	379	385
AU 3 Operations	1533	290	433	44

Source: Manpower Survey in Malaysian Industries Report.

Third, the government through various policy instruments has asserted the need for technological advancement to enhance the quality and productivity levels of Malaysian enterprises. For instance, the Industrial Master Plan (IMP) and the Action Plan for Industrial Technology Development (ITD) outlined significant technologies to consolidate the nation's industrialization goals. Long-term plans were initiated for substantial allocation of

resources in new and emerging technologies to ensure focus in areas which can yield the highest economic returns. The Sixth Malaysia Plan (SMP) has also identified the strategies for sustaining development through utilization of resources. The SMP emphasizes the need to restructure domestic industries towards enhanced technological sophistication and better quality products that are integrated and competitive with the markets of the developed countries. In encouraging technological upgrading and diversification, it is therefore necessary for industries to adapt new technologies from the advanced industrialized countries.

EFFECTS OF TECHNOLOGY TRANSFER

Since Malaysia began its industrial programme in the fifties, the transfer of technology to Malaysia has been very limited, whether it was in the form of engineering, training of personnel and marketing distributions. The problem is due to the lack of Malaysian technical and managerial capabilities to choose and assimilate imported technologies. Besides, the decision and choice of technologies and improvements are generally made by the foreigners or technology suppliers. As a result, some of technologies imported are not appropriate for domestic needs, despite of the high costs involved in purchasing them.

The following discloses the effects of technology transfer to Malaysian enterprises. Looking at the data collected from 11 Japanese electronic firms in Malaysia (Osman, Toh & Anuwar, 1985) with regard to their performance in technological transfer and the development of technological skills, the survey showed that:-

(i) The choice of products or the type of products to be produced was mainly decided by the parent companies. Of the 11 firms surveyed, 8 indicated that the decision on what to produce was determined by the parent companies, 4 mentioned by the firms' own technical capability, while only one company mentioned that the Government policy influences the choice. Firms which produce electronic components such as semiconductors and integrated circuits, the choices were determined by the nature of foreign markets. That was why most of those types of companies were export-oriented. Seven out of the eight firms that export electronic and semiconductors products indicated that the foreign market needs influenced the types of products they produced.

(ii) The availability of various technological options or choices for the firm's production was rather limited. Two firms mentioned that they have substantial choices of technology that suited to the country's needs. Five replied that they have only limited choices, while two replied that there were no choices available.

(iii)The experience of firms with regard to R & D efforts was mixed. Five firms did not have any formal efforts aimed at R & D in any area while four firms had formalized efforts aimed at R & D in production methods and process. The majority of the firms claimed that R & D had continously improved their production methods.

(iv) The method of technology transfer was in the form of "know-how" and technical assistance from the parent companies. That was confirmed in all the 11 firms surveyed. In addition, seven firms said that technological transfer was given with greater emphasis on training and seminars, while two mentioned patents/trademarks/licences as important methods.

(v) The bulk of the total cost of technology transfer was taken up in the form of payments for the importation of new machinery and equipment through parent companies. That was mentioned by nine companies surveyed. Other expenses were done by sending their staff overseas, usually Japan, for training, while some were payments for royalty and technical fees.

(vi) The majority (8) of the firms had agreements relating to technical assistance, royalty, patents or trademarks with foreign companies while three said they had none.

(vii)Technology transfer benefited local industries because many foreign, especially Japan, investors come to Malaysia. Also, with the establishment of various industries, it created a little "spin-off" effects which encourage the growth of domestic firms.

(viii)The firms did not encounter much difficulty in acquiring new ideas on technology and products. That was because the ideas were readily provided by the parent companies which were willing to provide them to their own subsidiaries.

(ix) There was a mixed opinion of the general skills and efficiency of the local personnel. At the managerial level, most companies reported that there is substantial improvement as compared to the situation 3 years then (1982). Three companies reported slight improvement while four companies reported no change. At the level of technician/engineers, quite a number of companies reported substantial improvement while the number of companies reported slight improvement. Three companies reported no change. At the level of factory workers, the majority of companies reported slight improvement while only three companies reported substantial change. Four companies reported no change at all.

(x) There was considerable participation by the parent companies in the planning and decision making process in most of the companies. Expatriates generally played an important role in decision-making compared to the local counterparts whose participation was in most cases were fair.

Based on the findings of the research, indicated that there were several advantages of some of the technology transfer to Malaysia. However, there were some problems that need to be overcome through appropriate policies.

These were some of the findings from the research. In a research study on Malaysian and Japanese Managers: a comparative study of cultural values, (Jaafar and Shukry 1983), which basically trying to develop the value profiles of Malaysian and Japanese managers. The values were linked to the character of human nature, the relation between man and nature, and the temporal focus of human life. Out of those links values were further subcategorized into the following manners:-

(i) Character of human nature; Distrust (D) vs. Trust (T).

(ii) Relation between man and nature; Fatalism (F) vs. Mastery (M).

(iii) Temporal dimension of human life; past orientation (PO) vs. Future orientation (FO).

These value of the characters of human nature, the relation between man and nature, and the temporal dimension of human life were related to the traditional and modern continuum as follows:-

Traditional	Modern
Distrust	Trust
Fatalism	Mastery
Past Orientation	Future Orientation

Results

The result of the findings were that the Malaysian and Japanese managers tend to be modern in their value orientations. So they could possibly be described as being more trusting, less fatalistic and future oriented as compared to those traditional ones. Table 5 indicates that on every value orientation there is consistently a higher proportion of both Malaysian and Japanese managers with modern value orientation. The analysis suggests that there is no significant difference between Malaysian and Japanese managers of each value orientation.

Table 5

Values of Malaysian and Japanese Managers

Type of Values	Managers				X^2
	Malaysian		Japanese		
	TV	MV	TV	MV	
Broad	14	34	17	13	0.22
	D	T	D	T	
Human Nature	15	25	18	32	1.44
	F	M	F	M	
Man and Nature	15	33	20	30	0.83
	PO	FO	PO	FO	
Time	7	41	9	41	0.91

An attempt was also made to compare the values of managers from the Malay and Chinese group, the two ethnic groups of Malaysian, with the Japanese managers respectively.

From Tables 6 and 7, it was found that Japanese managers are no different from their Malay counterparts and the Chinese managers also share similar values.

Table 6

Values of Japanese and Malay Managers

Type of Values	Managers				X^2
	Japanese		Malay		
	TV	MV	TV	MV	
Broad	17	33	10	20	0.00
	D	T	D	T	
Human Nature	18	32	16	14	2.31
	F	M	F	M	
Man and Nature	20	30	20	30	0.35
	PO	FO	PO	FO	
Time	9	41	6	24	0.07

Table 7

Values of Japanese and Chinese Managers

Type of Values	Managers				X^2
	Japanese		Chinese		
	TV	MV	TV	MV	
Broad	17	33	5	10	0.00
	D	T	D	T	
Human Nature	18	32	9	6	2.73
	F	M	F	M	
Man and Nature	20	30	5	10	0.20
	PO	FO	PO	FO	
Time	9	41	3	12	0.42

As a conclusion of the findings on the value analysis of Malaysian and Japanese managers were indeed encouraging. If there were no significant difference between Malaysian and Japanese managers in term of cultural values, it might be possible for Malaysian managers to learn the art of Japanese management with ease especially when they have acquired similar educational exposure (Potmore and Chaney, 1974 and Inkles; 1973) and were doing the same type of work. However, it was rather difficult to say that the values of Malaysian managers in particular would remain relatively unchanged. Some values change with time as suggested by De Silva and Gemill (1971) in their study about generation gap and by Morris and Small (1971) in their investigation into the changing concepts of the good life. So, it appears that values can and have changed through time and in different settings. Hence, the capability of Malaysian managers to learn and accept Japanese management thinking depends on the stability of their values. Furthermore, in view of the exploratory nature of this study and because of the samples used are relatively small, the findings of that study should be viewed as tentative rather than conclusive. If conclusions from the study were to be strengthened, there is a need for elaborate and sophisticated effort to understand the cultural values of Malaysian and Japanese managers.

CONCLUSION

As a conclusion, technology transfer is absolutely needed and beneficial to Malaysian industries since the trend of globalization of the world economy has increased. The world becomes more integerated via increased trade, investment and capital flows as well as labour movements. Such linkages is then supported by rapid improvement in communications and transport, increased trade resulting from economic growth and increasing per capita incomes, the appearance of new growth poles "particularly" in the Asia Pacific region, further globalization of output and the opening up of "closed" economies like Eastern Europe, India and perhaps Indo-China. Judging by the trends of world trade which has increased tremendously, it is anticipated that this will continue in the future. The success of developing countries like Malaysia will, to a large extent, depend on its response to the global changes.

Furthermore, as more less developed countries enter the industrial age, access to abundant factors (land, labour and materials) will become less important because it will be replaced by the technology, skills, and ability to process output efficiently. As such more industries will become global in nature such as transnational corporations within which most valuable and high value-added activities take place which greatly

influencing the wealth of nations. If properly nutured, these TNCs could effectively utilized to enhance domestic technological capability.

Finally, the beliefs that cultural value is the main obstacle to technological transfer in management between the Malaysian and Japanese can no longer holds true, at least among managers with similar educational exposure and work. In general, the adaptability, transferability and the appropriateness of technology transfer to Malaysia basically lies upon the need, uniformity and stability of the objectives, strategy and cooperativeness among the countries involved in technology transfer.

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