

THE NEED FOR TECHNICAL SKILLS AND INNOVATIVE CAPACITY: THE CASE OF MANUFACTURING INDUSTRIES IN MALAYSIA

Anuwar Ali

Sinopsis

Tujuan utama kertas ini adalah untuk meneliti program perindustrian di Malaysia dari segi keperluan kemahiran teknikal dan keupayaan mencipta. Isu-isu yang berkaitan dengan struktur pekerjaan di sektor perkilangan dan kedudukan pekerja-pekerja tidak mahir dari segi kemampuan mendapat latihan kemahiran dan perancangan gunatenaga juga diselidiki. Kertas ini juga cuba memajukan cara-cara untuk memperbaiki perancangan pendidikan dan gunatenaga dalam konteks keinginan negara untuk memperluaskan asas perindustriannya.

Keperluan untuk menyediakan tenaga pekerja industri dengan kemahiran saintifik, teknikal dan pengurusan bermakna perlunya perancangan pendidikan dan gunatenaga yang amat teratur. Perancangan tersebut mesti merangkumi program-program untuk memperluaskan keupayaan teknologi tempatan, yang juga boleh diperolehi melalui latihan dan pengalaman pada peringkat kilang. Pembentukan dasar mesti juga mengambilkira program latihan pekerja-pekerja industri yang sedia ada, termasuk pekerja-pekerja tidak mahir, supaya kemahiran teknikal, mobiliti pekerjaan dan pendapatan mereka dapat dipertingkatkan.

Synopsis

The primary aim of this paper is to examine the industrialization programme in Malaysia in terms of its needs for new technical skills and innovative capacity. Issues relating to the existing occupational structure in manufacturing industries and the position of the unskilled labour force in relation to skill acquisition and manpower planning are also examined. This paper also tries to explore the possibilities for improving both educational and manpower planning in the context of Malaysia's desire to expand its industrial base.

The necessity to prepare the industrial labour force with the necessary scientific, technical and managerial skills calls for a well conceived educational and manpower planning. Such planning must include programmes on the development of domestic technological capability, which may also be achieved through the process of 'learning-by-doing' on the factory floor. Policy formulation must also make provisions for the training of the existing industrial labour force, including the unskilled, so as to enhance their skills, occupational mobility, and thus income opportunities.

Introduction

During its infancy, the manufacturing sector contributed only 8.7% to the gross domestic product (GDP) in 1960. However, by 1980, its contribution increased to 20.5%. During the last two decades the sector exhibited remarkably high growth rates in comparison to the other sectors of the economy. In terms of total labour absorption, its share increased from 8.4% in 1965 to 15.8% in 1980. By 1985, the percentage share is expected to increase to 18.0%; giving employment to slightly more than one million out of the total 6.3 million of the country's labour force. (Malaysia, 1981: 227).

The industrialization programme that has begun in earnest since the mid-1960s has therefore transformed, albeit slowly, the sectoral composition of the Malaysian economy such that manufacturing has now become an important sector in terms of its contribution to the GDP and employment creation. Nevertheless, agriculture is still a dominant sector; especially in terms of labour absorption where it accounted for 40.6% of total employment in 1980. (See Tables 1 and 2).

The transformation of the economy towards and increasingly 'industrialized' character implies the need for a greater supply of scientific, technical and managerial personnel as well as skilled production workers. This calls for a well-conceived manpower planning as the progress towards a higher level of industrial capability and thus technical progress will ultimately be determined by the skills acquired by the working population. Priority should therefore be placed upon the creation of a highly competent professional and technical labour force since it is equally important as the act of accumulating capital (Levitan, et al., 1981: 481).

It is in this context that this paper will firstly examine the industrialization process itself and its needs for new skills and innovative talents, without which the expansion of the country's industrial capability will be jeopardised. Secondly, it will examine the existing occupational profile of the industrial labour force and the positions of the unskilled in terms of skill acquisition and manpower planning. Lastly, we shall explore the possibilities for improving educational and manpower planning in the context of an expanding manufacturing sector.

Industrialization: Technical Skills and Innovative Capacity

Since the manufacturing sector will experience relatively rapid growth, it is expected to provide most of the employment opportunities

Table 1
Gross Domestic Product by Sector of Origin
1960 - 1980 (%)

Sector	Share of GDP (%)				Average Annual Growth Rate (%)				
	1960	1965	1970	1975	1980	1960-65	1966-70	1971-75	1976-80
Agriculture, forestry & fishing	37.9	31.5	30.8	22.7	22.2	4.0	6.8	4.8	3.9
Mining & quarrying	5.9	9.0	6.3	4.6	4.6	4.5	1.1	0.4	8.9
Manufacturing	8.7	10.4	13.4	16.4	20.5	11.1	9.9	11.6	13.5
Construction	3.0	4.1	12369	3.8	4.5	17.9	4.1	6.6	9.8
Electricity, gas & water	1.3	2.3	1.9	2.1	2.3	11.9	8.1	9.8	10.2
Transport & Communications	3.3	4.3	4.7	6.2	6.5	5.5	3.0	13.0	9.6
Wholesale & retail trade	15.7	15.3	13.3	12.8	12.6	6.1	3.2	6.3	8.2
Finance, insurance & real estate	6.1	6.0	8.4	8.5	8.2	6.6	6.0	7.2	8.0
Government services	6.4	5.2	11.1	12.7	13.0	4.6	5.2	10.1	9.0
Other services	11.4	10.8	2.5	2.8	2.5	7.4	4.7	9.3	6.6
Gross Domestic Product	—	—	—	—	—	6.3	5.5	7.1	8.6

Note: a. 1960 and 1965 figures apply to Peninsular Malaysia

b. The percentages shares of GDP for 1970, 1975 and 1980 do not add up to 100% because imputed bank service charges and import duties are not considered in the computation.

Sources: First, Second and Fourth Malaysia Plans.

Table 2
Employment and Employment Growth by Sector
1965 - 1980

Sector	Share of total employment (%)				Average Annual Growth Rate		
	1965	1970	1975	1980	1965 - 70	1971 - 75	1976 - 80
Agriculture, forestry & fishing	52.1	50.5	45.3	40.6	1.5	2.3	1.5
Mining & quarrying	2.5	2.6	2.1	1.7	-0.6	-0.1	0.3
Manufacturing	8.4	11.4	13.5	15.8	4.5	8.2	7.0
Construction	3.5	4.0	4.4	5.2	2.7	6.6	7.0
Electricity, water & gas	0.6	0.8	0.8	1.0	3.5	4.6	8.3
Transport & Communications	3.9	3.4	3.9	3.8	1.7	7.5	3.1
Commerce ^a	11.1	11.8	12.7	13.7	3.4	7.0	5.6
Services ^b	17.9	15.5	17.3	18.2	4.5	7.9	5.3
TOTAL EMPLOYMENT	100	100	100	100	2.6	4.6	3.7

Note: 1965 figures apply to Peninsular Malaysia

a — Commerce includes wholesale and retail trade, hotels and restaurants, finance, real estate and business services.

b — Services include government and other services

Sources: Second and Fourth Malaysia Plans.

in the future. According to the *Fourth Malaysia Plan* (1981 - 85), manufacturing industries are expected to provide 31% of new employment within the Plan period. Given this target, economic planners therefore have the important task of formulating strategies to develop new technical skills and upgrade existing ones. This is all the more significant given that the import-substitution phase of Malaysia's industrialization programme based on consumer-goods industries has almost been exhausted. There is not much room either for further expansion of export-oriented industrialization if it is mainly concentrated on resource-based and labour intensive industries.

Moving into the phase of the industrialization programme, i.e. high-technology and heavy industries, not only involves the capacity of the economy to accumulate capital and utilize it effectively but also the capacity to develop new technical skills. New skills must be acquired to cater for the growing needs of these industries and to sustain the momentum of industrial growth if more employment is to be created. The acquisition of new skills must also encompass the capacity to innovate new techniques of production, to introduce new and appropriate products, and the ability to adapt imported technology to suit domestic factor endowments.

At the same time the dependence upon imported technology of the industrialized countries needs to be reduced (Anuwar Ali, 1983). This issues needs to be emphasised because of the imperfect nature of the international market for industrial technology where 'the coast of acquiring technology are frequently bloated by the manipulation of prices for transactions between constituent units of transnational companies; technology contract clauses that restrict the buyer's exports and require purchases of imported inputs from the supplier'. (World Bank, 1979: 65). Manpower planning must take cognizance of this issue, and it is in this sense that such planning should become a coherent component of the overall development programme. Although it is only a partial plan to complement the overall development effort, its principal purpose is to provide the human resources and skills necessary to achieve national development objectives.

Any programme to upgrade technical capability will have to consider the adaptive skills of the existing industrial labour force since it is more difficult to acquire in a newly industrializing country like Malaysia where presently less than 20% of the total labour force is engaged in manufacturing. The absorption of labour into manufacturing industries, which generally requires an engineering or technical background, cannot sometimes be done smoothly because of the adjustments needed in a totally new environment. Such adjustments will take time as this also requires on-the-job training; particularly for those who are newly recruited into industry.

Furthermore, most of the industrial equipment or machinery that are imported from the industrialized countries are so modern and sophisticated that this requires a longer period of training for a local operator as compared to his counterpart in the industrialized countries. In the latter, technological innovations which are widespread in most industries are often directly related to the kinds of techniques which have preceded them. This suggest that the need for adaptation by the labour force might have been abrupt than what is needed for the adoption of modern technology in Malaysia. It is also for this reason that, in many manufacturing enterprises, the demand for technically skilled (including top management) has to be filled in by expatriates.¹

¹According to the 1979 Industrial Surveys, foreign personnel were mainly concentrated in the following industries:

- i. textiles and cloting industries (20.6% of total).
- ii. electrical machinery and appliances (14.7%);
- iii. food and beverages (10.5%);
- iv. transport equipment (8.5%); and
- v. chemical and chemical products (6.8%).

Malaysia has gone through its import-substitution industrialization during the 1960's while since the early 1970's the share in export-oriented activities had increased quite significantly. This is reflected in the changing structure of the country's external trade, whereby by 1982, it was estimated that 24.8% of the total receipts were from manufacturing exports. The main items of manufacturing exports were electrical machinery and components, comprising 51% of the total manufacturing exports in the same year; followed by textiles and footwear; food, beverages and tobacco products; and wood products (Malaysia, 1982a: 99).

The increasing importance of manufactures in terms of the country's exports must however be seen in the context of the country's changing import structure where, with increasing industrialization, imports of machinery and capital equipment have increased at a substantial rate during the last decade.² In 1982, for example, imports of machinery and equipment accounted for 39.5% of the country's total imports. Since almost all of these imports are from the developed countries, the growth of domestic manufacturing industries are continually interlocked with developed country technology (Stewart, 1978: 169). This is also a reflection of the inability to develop fully the domestic capital goods industries.

In respect of the above, a comprehensive programme must therefore be formulated so that these industries will get a foothold in the manufacturing sector without unreasonable costs to the economy. The establishment of Heavy Industries Corporation of Malaysia (HICOM) in 1980 was primarily aimed at achieving this objective, although there are numerous constraints that an industrializing economy has to overcome in establishing such industries. These are the industries which require substantial investment outlays and have long gestation periods. Examples of such industries include steel and non-ferrous metal, machinery and equipment, transport equipment and petro-chemicals. The small domestic market may impede their growth in the formative years of Malaysia's industrialization programme, but in the longer term the development and expansion of these industries must be seen as necessary.

²Imports of machinery increased at an average annual rate of 16.4% during the 1971 – 75 period, and at a higher rate of 21.7% during the 1976 – 80 period. (Malaysia, 1982: 5). Imports of machinery and equipment accounted for 22.9% of total imports in 1970 and increased very rapidly to 26.9% in 1980. (Malaysia, 1981: 136).

The experience of the newly industrializing countries (NICs) such as Argentina, Brazil, India, South Korea and Mexico since the middle of the 1970s have indicated the importance of emphasising the expansion of the domestic engineering and metal-working sector in furthering the development of technological expertise and industrial efficiency. These countries have lately begun to export capital equipment, turnkey projects and engineering consultancy services. According to the World Bank, 'the competitiveness of these technology exports is founded on a history of learning, improving, and adapting technological process and products imported from industrialized nations'. (Ibid: 66).

This phase of industrial development must also be related to the establishment of high-technology industries. But their development requires not only the provision of a highly-skilled labour force but also a substantial increase in research and development allocations. It is in both these areas that manpower planning should focus its attention in attempting not only to develop the necessary skills but more importantly to develop labour's capacity to innovate. It is the latter that will determine the economy's competitive edge vis-a-vis other countries (Foster, 1980: 136).

Basically, existing manpower planning puts little emphasis on the capacity to innovate. The lack of funds for purpose of research and development may be an important factor in this respect; but more importantly, the existing industrial structure, arising from the role of foreign enterprises and the nature of existing investment incentives, encourages the adoption and importation of relatively capital-intensive equipment from the industrialized countries. This not only discourages the adoption of relatively labour-intensive techniques in domestic industries but also negates the capacity to innovate as the dependence on imported technology is perpetuated.

Foreign multinational companies (MNCs) in Malaysia seem to discourage the real transfer of technology and the development of domestic innovative capacity. There is a reluctance on the part of foreign MNCs to allocate funds for R & D activities in their local subsidiaries since most of these activities are controlled by their head offices in the developed countries where extensive R & D facilities have already been established (See Ozawa, 1982: 7 – 53). The shortage of qualified and technically experienced scientists and engineers is an added impediment to the establishment of R & D facilities (Fisher, 1979: 88 – 103). Consequently, the top management of foreign MNCs tend to perform mostly management and organizational functions rather than innovate functions; unlike their counterparts in the developed countries.

Such a situation has a stifling effect on the development of domestic entrepreneurship (including those in public enterprises). But in an industrializing economy, it is the domestic entrepreneurship that must play a more prominent role in combining the factor of production, developing new products, opening new markets and sources of supply and the introduction of new production techniques (Sutcliffe 1971: 109). The observed lack of real domestic entrepreneurship does not imply that there are very few individuals who can see commercial or industrial possibilities, but more often implies that certain features of the economic environment inhibit entrepreneurial activity.

Many existing manufacturing enterprises do not provide a sufficiently relevant example to potential domestic entrepreneurs to stimulate their own independent activity. Large scale foreign-owned enterprises, using techniques of organization and production of the developed countries, cannot be regarded as good examples simply because their techniques are so very different in character from the sort of industrial activity which ought to characterise the early stages of industrialization.

In comparison to locally-owned enterprises, foreign enterprises are generally larger, possess longer experience in manufacturing activities and have greater access to more readily and often cheaper sources of capital.³ As such the latter will have a competitive advantage so that, together with various fiscal incentives and tariff protection, they can easily take up the most profitable opportunities in manufacturing to detriment of domestic enterprises. (See also Griffin, 1969: 125).

This creates an industrial structure which leaves domestic entrepreneurship in areas which contribute least towards an independent industrialization programme; namely into services industries, and into small and medium scale trading activities. This tendency is reinforced by other structural features characteristic of open economies like Malaysia's where a high demand for luxury consumer goods tend to ensure that the areas of economic activity of highest profit, into which domestic entrepreneurs are attracted, are found in commercial activities related to consumption goods.

³The larger size of foreign manufacturing enterprises may be shown as follows:

1979	No. of Employees Per Enterprise	Output Per Employee	Fixed Assets Per Employee
Malaysian Enterprises	62	\$49,822	\$13,984
Foreign Enterprises	299	\$75,861	\$14,822

Source: Malaysia, 1982b.

Occupational Structure and Unskilled Labour

The expansion of the country's industrial base will depend, to a great extent, on labour's achievements through technical progress. The latter is essential for it signifies changes in technology itself or improvements in the art of production, resulting from a combination of research, invention, development and innovation. (Thirwall, 1972: 109).

Technical progress can either be externally induced or be achieved through the process of 'learning by doing' which involves the accumulation of experience by the working population at all levels in the course of production. The latter aspect of technical progress must be given more emphasis by domestic industries, not only because it paves the way for an internal diffusion of technical knowledge but it will also enable productive efficiency to be improved. Industrial labour will thus improve its skills through 'on-the-job' training, work specialization and work experience, and become more adept at the job in hand.

There is no doubt that the process of 'learning by doing' does take place in manufacturing industries, although it may be difficult to conclude that it is widespread, i.e. affecting all levels of the occupational hierarchy. It may only affect those who are considered technically skilled; including the managerial and professional, technical and supervisory categories, and skilled workers. However, as indicated in Table 3, on average these groups accounted for less than 45% of the total labour force in manufacturing industries during the four years shown. In 1979, for example, they accounted for 45%; with the managerial and professional category accounting for 3.5%, the technical and supervisory category accounting for 7.2%, and the skilled accounting for 34.3%. On the other hand, the semi-skilled accounted for 7.2%, and the unskilled 33.6%.

If technical progress is to be enhanced, particularly through 'learning-by-doing', it is the unskilled and the semi-skilled that needs the attention. This is very relevant not only in the context of upgrading their skills but also in terms of increasing their incomes. The fact that substantial income differentials exist particularly between the unskilled on the one hand and the technical and supervisory and the managerial and professional categories on the other (as in Table 3) is indicative of the need to examine the structure of earnings within the context of manpower planning. It is important that the unskilled be given more opportunities to upgrade their skills so that their incomes too will be increased. Equally important, there must be opportunities for promotion, security of employment, and a good working environment.

All these constitute a 'process of advancement' which must be given emphasis in building-up a committed industrial labour force. The whole process must give meaning to labour's participation in the country's industrialization programme in the sense that it will acquire the necessary skills and attitudes towards a new industrial environment. This also implies that there is sufficient room for occupational mobility for the majority of the labour force since 'real progress comes only through movement to a new job involving more in the way of skill, responsibility, independence, and income'. (Reynolds, 1964: 390). It is also in this sense that manpower planning should create opportunities for upward mobility and facilitate the process by having appropriate strategies through training, retraining and upgrading while placing less emphasis on formal credentials.

The upgrading of skills is therefore an important ingredient in achieving a reasonable rate of technical progress. This is particularly important considering that the country's labour force is relatively youthful in character. In 1970, for instance, 32.5% of the labour force was within the 15 – 24 age group and 36.3% in the 25 – 39 age group. In 1980, the percentages were 34.2% and 37.6% respectively involving 1.84 million and 2.03 million employees respectively. Furthermore, a substantial proportion of new entrants into the labour force are ill-equipped in terms of technical skills. For instance, during the 1971 – 75 period, 30% of these new entrants had only primary education and 32% with lower secondary education. (Malaysia, 1971; 104).

According to the Ministry of Labour and Manpower, 'the shortage of skilled manpower will continue unless social stigma attached to blue collar jobs is erased and such jobs command competitive wage and generate dignity in labour'. (Malaysia, 1981a: 56). Some have argued that a marked preference for white collar jobs is associated with current attitudes towards manual work; and such attitudes are substantially influenced by existing social stratification. But, more importantly, the latter is associated with one's position in the occupational hierarchy; and thus one's income. As indicated in Table 3, most of the 'blue-collar' jobs are paid even less than those in the 'clerical and related occupations' categories. As such, the stigma attached to 'blue-collar jobs' is difficult to erase under the existing social environment.

Furthermore, the curriculum in schools, tend to be literary and academic, and the tendency of even graduate engineers to expect desk jobs and recoil from the prospect of physical contact with machines aggravates the problem (see Myrdal, 1968: 1124 – 31). It is therefore important that these issues be examined in the context of an all-

Table 3
 Percentage Distribution According to Occupational Categories and Average Earnings
 in Manufacturing Industries (1975 - 79)

Occupational Categories	Percentage Distribution				Average Monthly Earnings Per Employee (\$)			
	1975	1976	1978	1979	1975	1976	1978	1979
Managerial & Professional	1.5	1.5	1.6	1.6	1,644	1,899	2,126	2,267
i. Professional	1.5	1.5	1.6	1.6	1,644	1,899	2,126	2,267
ii. Non-Professional	1.6	1.5	1.6	1.9	983	1,243	1,301	1,407
Technical & Supervisory	6.0	6.5	7.0	7.2	483	513	581	632
Clerical & Related Occupations	7.5	7.6	7.6	7.8	331	354	405	432
General Workers								
i. Drivers, conductors & lorry attendants	3.0	2.1	2.0	1.9	237	293	332	369
ii. Others	4.5	4.3	4.3	4.4	190	205	233	256
Other Directly Employed Workers								
i. Skilled	28.2	28.1	29.6	29.6	200	291	245	271
ii. Semi-skilled	3.4	6.2	5.8	5.3	161	154	207	223
iii. Unskilled	31.8	31.5	30.5	29.2	134	147	165	193
Workers Employed Through Labour Contractors								
i. Skilled	5.1	5.0	3.7	4.7	237	247	365	398
ii. Semi-skilled	1.4	1.6	2.2	1.9	216	236	251	279
iii. Unskilled	4.9	4.1	4.1	4.4	152	163	178	199
Total	100	100	100	100	238	262	306	343

Sources: Computed from Industrial Surveys (various years).

embracing policy on manpower training. It is in this respect that educational planning has to play an important role to complement manpower planning.

Planning of Manpower for Industrial Advancement

Unlike manpower planning, educational planning has to concentrate on the development of the curriculum at all levels of education, and to appraise continually its contribution towards the changing needs of the new industrial structure. The development of a curriculum must also consider its impact on individual and collective attitudes towards 'blue collar' jobs. Unless values inculcated in schools towards employment of a technical nature are correct, there may arise the problem of a divergence between the need and actual demand for this type of labour force. Priority should therefore be placed on changing the curriculum particularly at the secondary level, from being too academic in orientation towards more vocation oriented (see also Anuwar Ali, et al., 1979: 283 – 310). Such a strategy would benefit the majority of students since the intake into higher institutions of learning are relatively limited.

In spite of the above, the existing 'educational approach' seems to confine the planner's attention to high level manpower needed in the modern sector or urban-based employment. The bias towards high-level education, particularly degree programmes, has been explicitly acknowledge in the Fourth Malaysia Plan so that there has been significant shortages of middle-level manpower, especially in the scientific and technical fields (Malaysia, 1981: 92). Given that planners tend to emphasise high level manpower, it is important to note that a substantial proportion of such manpower is engaged in the public sector rather than in industry. In 1980, approximately 76% of professional and technical personnel were employed in government services; and the projection is that it would absorb 73% of the increase during the 1980 – 85 period. (Malaysia 1981a: 58).

Educational planning seems to neglect not only middle-level manpower but more importantly the requirements of the vast majority of the country's labour force; mostly the semi-skilled and unskilled labour in the urban centres and the majority of rural labour. Policy formulation must consider that in most industries the proportion of unskilled labour is still substantial (See Malaysia, 1981a: 74 – 77). This is particularly conspicuous in the electronics industry where, in 1980, 81.9% of the labour force was considered unskilled.⁴

⁴The proportion of unskilled labour in 1980 was 67.2% in the tobacco products industry; 18.7% in machinery and parts industry; 62.4% in rubber products industry; and 20.5% in motor and parts industry (Malaysia, 1981a).

An important consideration is that manpower is not only a major factor of production, but must also be seen as the major beneficiary for which the effects of industrialization and economic development are intended.⁵ Thus the development of human resources through the educational system is an important pre-requisite for economic development and a good investment of scarce resources, provided the pattern and quality of educational output is geared to the economy's manpower needs.

The implementation of a manpower planning programme must encompass not only the need to progress technologically through educational planning and through upgrading existing skills but also the basic needs of the labour force. Improvement in these areas are important because they are related to 'investments in human capital'. Such investments may take many varied forms, including public sector allocations for health facilities, low-cost housing subsidies, on-the-job training and retraining, formally organized education, study programmes and adult education. Investments in human capital can overcome the impediments to greater productivity, such as poor health, illiteracy, unresponsive to new knowledge, a lack of incentive and immobility.

Although education has received substantial public expenditure allocations, there is still a need to create an appropriate institutional framework which caters for the needs of the existing labour force; particularly to upgrade their existing skills, to acquire new skills and to instill an innovative mind at the managerial and technical levels. This is the situation that has to be appropriately remedied through educational and manpower planning. Given the resource constraint,⁶

⁵According to the Ministry of Labour and Manpower, "the provision of gainful employment has been regarded as one of the most powerful poverty eradication tools in development plans in Malaysia. The unemployed and underemployed are not only likely to be poor but also ill-equipped to participate in the economic life of the nation. The thrust of the national development effort has been to create more employment opportunities, to upgrade skills and levels of income so as to improve the quality of life of Malaysian" (Malaysia, 1981a: 25).

⁶Education has to compete for public expenditure allocations with other sector that also need public funds such as economic (including agriculture; mineral resources development; commerce and industry; transport; communications, energy and public utilities), social (besides education and training, this include health, housing, culture, youth, sports, local councils and welfare services, community development) security and public administration. Out of the total allocation (amounting to \$42,829.5 million) during the Fourth Malaysia Plan (1981 - 85), the allocation for education and training accounted for 7.6% as compared to, for instance, 18.3% for defence, 21.3% for agriculture and rural development and 13.8% for commerce and industry. (Malaysia, 1981: 240 - 243).

the issue is whether a bigger amount of public expenditure could be allocated for the development of technical skills amongst the existing labour force, including the majority of school-leavers given that the intake into higher institutions of learning is limited.

Table 4 shows that student enrolment into post-secondary education (including teacher training, certificate/diploma levels and degree level) were 1.3% and 2.7% during 1970 and 1980 respectively; and in 1985, the figure is expected to increase to 3.3%. A substantial proportion of student intake is still concentrated at the primary and secondary levels. It is therefore imperative that students enrolled at this level be given the technical and vocational training needed to prepare them for gainful employment.

Table 4
Student Enrollment by Levels of Education
1970 - 85 (%)

Educational Level	1970 (%)	1980 (%)	1985 (%)
Primary	75.0	63.7	60.2
Lower Secondary	19.3	25.7	26.6
Upper Secondary ^a	4.4	7.9	10.9
Post Secondary ^b	0.6	1.0	1.1
Teacher Training	0.1	0.4	0.5
Certificate/Diploma Level	0.3	0.7	0.9
Degree Level	0.3	0.6	0.8
Total	100	100	100

Notes: a — Upper secondary includes technical & vocational training.

b — Post secondary includes Kolej Tunku Abdul Rahman and Institut Teknologi MARA.

Total Student Enrolment: 1970 — 2,240,064

1980 — 3,152,089

1985 — 3,756,273

Sources; Fourth Malaysian Plan (1981 - 85).

With respect to the existing labour force and school-leavers, perhaps the Manpower Development Board should be given more public expenditure allocations to formulate its training programmes more effectively in areas that will enhance the expansion of industrial ac-

tivities. The Board, established in 1979 under the Ministry of Labour and Manpower, is responsible for the formulation of national manpower development policies, co-ordination of national manpower development programmes in the public and private sectors and for ensuring the optimal utilization of manpower and skills.

However, if we examine the public expenditure allocations for education, as given in Table 5, we find that a substantial proportion has to be allocated for primary and secondary education (ranging from 39 – 48% during the 1971 – 85 period), while allocations for training programmes for technical, vocational or skill purpose account for less than 25% of the total educational budget during the 1971 – 85 period. If we only include technical and vocational and higher technical education under the Ministry of Education and training programmes under the Ministry of Labour and Manpower, the percentage is less than 7% during the same period. This reflects the attention given to academic and literary achievements at the primary and secondary levels.

In the Malaysian context, the private sector too must play a significant role to enhance the skills of the industrial labour force in return for the 'active promotion and the maintenance of a favourable investment climate by the government'. (Malaysia, 1981: 133). Given that the private sector is entrusted with the role to spearhead the industrialization drive, it should also be responsible to provide comprehensive training programmes for its labour force. These programmes are particularly relevant in terms of on-the-job training. If the Japanese experience were to be duplicated, domestic industries should be encouraged to establish 'factory schools' basically to increase technical competence. (See Hayashi, 1983).

However, it must be noted that such a programme may only be possible within large-scale manufacturing firms which are capable of sustaining the training costs. However the size of domestic manufacturing firms are relatively small by developed country standards. Even the larger ones are mostly owned or controlled by foreign interest and as such they might be reluctant to provide the necessary facilities to upgrade the skills of their labour force.

Concluding Remarks

The increasing importance of manufacturing in terms of national output and employment creation in the years to come means the need to prepare the working population with the necessary scientific, technical and managerial skills. This calls for a well conceived educational and manpower planning, particularly so in terms of Malaysia's desire to develop heavy and high-technology industries.

Table 5
Public Expenditure Allocations: For Education and Training Programmes
(1971 - 85)

Types of Education/ Training	Actual	Estimated	4MP Allocation	Expenditure	
	Expenditure (%) 1971 - 75 (A)	Expenditure (%) 1976 - 80 (B)	(%) 1981 - 85 (C)	Increase (%) (A - B)	(B - C)
(i) Ministry of Education					
Education	94.4	84.7	75.0	98.6	71.5
Primary	16.6	18.8	21.1	150.2	116.8
Secondary	31.5	25.2	18.2	77.4	39.7
Technical & Vocational	5.0	2.8	3.8	23.0	169.0
Higher Technical Education	1.0	1.1	0.6	148.9	- 3.3
KTAR _a	0.4	0.3	0.4	53.1	216.3
ITM _b	17.5	2.4	3.5	- 69.9	185.5
Universities	15.8	25.3	18.5	254.1	41.1
Teacher Training	1.0	4.0	2.8	787.4	35.6
Other Programmes	5.6	4.8	6.2	91.0	149.3
(ii) Other Agencies					
Ministry of Labour & Manpower	0.5	0.5	1.4	137.5	391.1
MARA Training	4.7	13.9	22.1	547.3	208.5
INTAN	0.1	0.8	1.1	2454.0	166.2
Youth Training Centres	0.3	0.1	0.3	- 8.2	391.0
TOTAL	100	100	100	121.5	93.4

Notes: a — Kolej Tunku Abdul Rahman
 b — Institut Teknologi MARA
 Total Allocations: A — \$697.59 million
 B — \$1,545.13 million
 C — \$2,988.03 million.

Source: Computed from Fourth Malaysian Plan (1981 - 85)

As it stands to-day, both educational and manpower planning seem to put little emphasis on labour's capacity to innovate, which is an important element of technical progress. Equally important is the pro-

position that the existing industrial structure (including the role of foreign enterprises and the incentives system) seem to perpetuate the state of dependence on imported technology. Although technological diffusion may be externally induced, it is important for the expansion of the country's industrial base that the domestic technological capability be enhanced.

This may be achieved through the process of 'learning-by-doing' on the factory floor. Such learning does take place especially amongst the skilled labour force, although it is not widespread since a substantial proportion of the industrial labour force is unskilled. It is essential that manpower planning directs its attention towards this group not only for purposes of increasing their skills and opportunities for self-improvement but more importantly to reduce income inequalities between the unskilled on the one hand and the skilled, the managerial and professional work force on the other.

Educational planning as a subset of manpower planning must complement the latter particularly with respect to changing attitudes towards blue-collar jobs. Changing educational objectives towards vocational and technical training rather than an academic orientation would benefit a larger student population at the secondary level since only a small proportion of them will be enrolled into higher institutions of learning.

At the same time policy formulation must consider the unskilled labour that accounts for a substantial portion of the existing industrial labour force, because in terms of the country's economic development, manpower must be seen not only as a major factor of production but also as the principal beneficiary of the development process. As such investments in human capital, encompassing all aspects of education and training, health and housing needs, must be given due consideration in any manpower planning.

It is of course essential to balance the need to maintain a reasonable standard in education and the need to upgrade labour's technical skills arising from constraints imposed upon public expenditure allocations. It is therefore important that economic and educational planners have a proper perspective on these needs. In view of the country's current drive towards heavy industries and high-technology industries, it is appropriate that a comprehensive scheme for upgrading existing skills and acquiring new skills be formulated. Such a comprehensive scheme must also consider issues relating to the transfer of technology from the industrialized countries, the adaptive skills of the existing labour force, R & D of appropriate techniques, processes and products.

References

- Anuwar Ali, 1983, "Industrialization and Employment Policies in Malaysia: A Critical Review and An Alternative", Paper presented at the Seventh Economic Convention, Persatuan Ekonomi Malaysia, January, Kuala Lumpur.
- , Toh Kin Woon & Zulkifly Hj. Mustapha, (1979). "Unemployment, Educational Planning and Strategies for Employment, in Malaysia", in Cheong Kee Cheok, Khoo Siew Mun & R. Thillainathan (eds), *Malaysia: Some Contemporary Issues in Socioeconomic Development*, Persatuan Ekonomi Malaysia, Kuala Lumpur.
- Fisher, W.A. 1979, "Institutional Development of Appropriate Industrial Technology in Developing Countries: R & D Policies and Programmes", in UNIDO Monographs on Appropriate Industrial Technology, No. 1, *Conceptual and Policy Framework for Appropriate Industrial Technology*, United Nations, New York.
- Foster, D., 1980, *Innovation and Employment*, Pergamon Press, Oxford, U.K.
- Griffin, K., 1969, *Underdevelopment in Spanish America: An Interpretation*, George Allen & Unwin Ltd., London.
- Hayashi, T., 1983, "Japanese Educational and Technological Infrastructure: Role of Vocational and Technical Education in Japanese Development", Paper presented at *Seminar on the Japanese Experience: Lessons for Malaysia*, January, Penang.
- Levitan, S.A., G.L. Mangum, & R. Marshall, 1981, *Human Resources and Labour Markets*, Harper & Row Publishers, New York.
- Malaysia, 1965, *First Malaysia Plan, 1966 – 70*, Jabatan Cetak Kerajaan, Kuala Lumpur.
- , 1971, *Second Malaysia Plan, 1971 – 75*, Government Press, Kuala Lumpur.
- , 1981, *Fourth Malaysia Plan, 1981 – 85*, National Printing Department, Kuala Lumpur.
- , 1981a, *Labour and Manpower Report 1980*, Ministry of Labour and Manpower, Kuala Lumpur,
- , 1982, *Bank Negara Quarterly Economic Bulletin*, September, Kuala Lumpur.
- , 1982a, *Economic Report 1982/83*, Ministry of Finance, Kuala Lumpur.
- , 1982b, *Industrial Surveys 1979*, Department of Statistics, Kuala Lumpur.
- , *Industrial Surveys 1975, 1976 & 1978*, Department of Statistics, Kuala Lumpur.
- Myrdal, G., 1968, *Asian Drama: An Inquiry Into the Poverty of Nations*, Penguin Books, U.K.
- Ozawa, T., 1982, "The Role of Transnational Corporations in the Economic Development of the ESCAP Region: Some Available Evidence from Recent Experience" in ESCAP/UNCTC Publication Series B No. 2 United Nations, Bangkok.
- Reynolds L.G., 1964 *Labour Economics and Labour Relations* Prentice-Hall, U.S.A.

Stewart, F., 1978, *Technology and Underdevelopment*, Micmillan Press Ltd., London.

Sutcliffe, R.B. 1971, *Industry and Underdevelopment*, Addison-Wesley, U.K.

Thirlwall, A.P. 1972, *Growth and Development: With Special Reference to Developing Economies*, Macmillan Press Ltd., U.K.

World Bank, 1979, *World Development Report*, Oxford University Press, New York.

