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PROMOTION OF SUPPORTING INDUSTRIES IN

MALAYSIA*

REPORT OF THE JOINT UNIDO/ECFA MISSION TO MALAYSIA
10-20 APRIL 1989

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Abbreviations used

ADB	Asiar. Development Bank
AJDF	ASEAN-Japan Development Fund
APDC	Asian and Pacific Development Centre
ASEAN	Association of South East Asian Nations
BIMB	Bank Industri Malaysia Bhd. (Industrial Bank of Malaysia, Ltd)
BPMB	Bank Pembangunan Malaysia Bhd. (Development Bank of Malaysia, Ltd)
COI	Co-ordination Centre for Investments, MIDA
ECFA	Engineering Consulting Firms Association, Japan
ECR	export credit refinancing
EPU	Economic Planning Unit, Prime Minister's Department
EPZ	export processing zone
ESCAP	United Nations Economic and Social Commission for Asia and the Pacific
FIC	Foreign Investment Committee
FIMA	Food Industries of Malaysia
FMM	Federation of Malaysian Manufacturers
POMFEIA	Federation of Malaysian Foundry and Engineering Industries Associations
FTZ	Free trade zone (export processing zone)
HICOM	Heavy Industries Corporation of Malaysia Bhd.
ICU	Implementation Co-ordination Unit, Prime Minister's Department
IFC	International Finance Corporation
IMP	Industrial Master Plan
JETRO	Japan External Trade Organization
JICA	Japan International Co-operation Agency
LMW	Lincensed manufacturing warehouses (bonded factories)
MARDI	Malaysian Agricultural Research and Development Institute
MARA	Council of Trust for Indigenous People (Majlis Amanah Ra'ayat)
MECIB	Malaysia Export Credit Insurance Berhad
MEDEC	Malaysian Entrepreneurial Development Centre
MEXPO	Malaysian Export Trade Centre
MIDA	Malaysian Industrial Development Authority
MIDEC	Metal Industry and Development Centre, SIRIM
MIDF	Malaysian Industrial Development Finance bhd.
MIEL	Malaysian Industrial Estate Sdn. Bhd.
MIMOS	Malaysian Institute of Microelectronic Systems
MIER	Malaysian Institute of Economic Research
MISIF	Malaysian Iron and Steel Industry Federation
MITEC	Metal Industry Technology Centre, SIRIM
MRPRA	Malaysian Rubber Producers Research Association
MRRDB	Malaysia Rubber Research and Development Board
MTMA	Malaysian Textile Manufacturers' Association
NEP	New Economic Policy
NPC	National Productivity Centre
OECD	Organization for Economic Co-operation and Development
OECP	Overseas Economic Co-operation Fund, Japan
PERNAS	Perbadanan Nasional Bhd.
PETRONAS	Petroleum Nasional Bhd. (National Oil Corporation)
PIDC	Patent Information and Documentation Centre, SIRIM
PORIM	Palm Oil Research Institute of Malaysia
PROTION	Perusahaan Otomobil Nasional Sdn. Bhd.
RRIM	Rubber Reserach Institute of Malaysia
SIRIM	Standards and Industrial Research Institute of Malaysia
UNDP	United Nations Development Programme
UNIDO	United Nations Industrial Development Organization

Introduction

In the ASEAN countries acceleration and diversification of industrial development has been the most effective means to create additional employment opportunities for a rapidly growing labour force, to alleviate the balance of payments situation and to achieve higher utilization of domestically available resources. Based on strong national industries, the ASEAN countries have increasingly adopted an outward-looking industrial development approach both in fostering industrial exchange and cooperation at the regional level and in strengthening their exports of manufactures towards the world market.

In the strategy framework of both export diversification and import substitution the existence of a dense network of supporting industries - such as local parts/components manufacturers and sub-contracting industries - assume critical importance in generating self-sustained industrial development. It is in this context and based on a Trust Fund given to UNIDO by Japan that UNIDO and the Engineering Consulting Firms Association of Japan (ECFA) have agreed to initiate a joint study on the requirements and options for the promotion of supporting industries in the ASEAN countries. The individual country studies are to provide specific recommendations on the basis of which the Japanese Government will consider the provision of further funds for related technical assistance measures in cooperation with UNIDO.

The project has adopted a broad concept of supporting industries incorporating local parts/component manufacturers and subcontracting industries as well as local equipment suppliers and the provision of key industrial services (such as quality control, training, design, packaging, etc.) which can either be rendered by other enterprises or by specialized institutions. In the development context of the ASEAN countries most of these support industries tend to be medium-sized establishments, predominantly to be found in the private sector.

A Joint UNIDO/ECFA Study Mission was fielded to Malaysia between 10 and 20 April 1989. Its terms of reference called for a review of the present status of supporting industries and the identification of suitable technical co-operation projects geared at improving their performance. Especially, the mission was

- to provide an overall assessment of the role, the development potential and the bottlenecks of local supporting industries within the broader macro-economic and sectoral trends of the national economy and the framework given by national industrial policies and priorities;
- to identify possible new or adapted policies and measures to promote supporting industries, in particular through international co-operation;
- on the basis of factory visits, to single out crucial micro-level constraints (technological, managerial, financial, marketing-related etc.); and

- to generate suitable project concepts for the rehabilitation and modernization of existing enterprises and the establishment of new production facilities.

The Mission team had the following composition:

Surjit Sachdeva (team leader)	Special Technical Adviser, Special Trust Fund Projects Section, UNIDO
Nils Ramm-Ericson	Senior Industrial Development Officer, Regional and Country Studies Branch, UNIDO
Tsunenobu Miki	Industrial Economist, ECFA

The Mission was advised throughout its stay through consultations with Dato A.B. Ahmad Sarji, Secretary-General and other officials of the Ministry of Trade and Industry.

Mr. Lavidés, Senior Industrial Development Field Adviser, UNDP, Bangkok; Mr. H. Ohta, Programming Officer, Area Programme for Asia and the Pacific, UNIDO, Vienna; and Mr. R. van den Berg, Assistant to the SIDFA, UNDP, Kuala Lumpur also participated in the Mission's deliberations.

The Report of the Mission has been prepared at UNIDO headquarters by the Regional and Country Studies Branch on the basis of inputs from the Mission members. It reflects the findings and recommendations of the Mission as well as results of research previously undertaken by UNIDO. In particular, certain prospective areas for future technical assistance and co-operation activities with the purpose of strengthening supporting industries have been drawn attention to and various projects warranting further examination have been identified. It is hoped that the project profiles presented in the Annex will provide the basis for drafting of concrete project proposals for subsequent Trust Fund arrangement(s) between Japan (the private sector in particular) and UNIDO. Implementing these projects under other arrangements is, however, also possible; the ultimate objective of this exercise being the promotion of supporting industries in Malaysia.

The members of the Mission wish to express their thanks to the many Government officials as well as private sector representatives who devoted their time to often long discussions of various issues. Without their cooperative spirit the tasks foreseen could not have been accomplished in such short time, considering the complexity of the exercise.

I. The industrial sector in the Malaysian economy: Performance and challenges ahead

(a) STRUCTURAL CHARACTERISTICS

(i) The industry sector as a whole

The industrial development of Malaysia in its early stages concentrated on processing of natural resources. By 1970 industries processing food, rubber and timber accounted for nearly half of all value added in manufacturing. With the adoption of the New Economic Policy in 1970 emphasis in industrial policy was placed on encouragement of other industries such as labour-intensive export industries. The main policy instruments were a system of industrial incentives, industrial estates and export processing zones and participation in industrial ventures by government-aided institutions.

By the end of the 1970's this policy had brought about a significant change in the country's industrial structure. The share of labour-intensive manufacturing industries (e.g. electronics assembly, textiles and garments) had risen from 12 to 20 per cent of MVA. By 1982 these three branches were estimated to generate two-thirds of manufactured exports. Meanwhile, however, with the onset of international recession, the vulnerability of such export-oriented industries to external events had become very apparent. In the early 1980s it became clear that Malaysia would have to focus attention on building a more complex industrial system, thereby diversifying its economy from the plantation (mainly rubber and palm oil), mining (tin) and petroleum sectors and the labour-intensive "foot-loose" export-oriented light industries. Using the example of the East Asian NICs, export-led growth in the manufacturing sector continued to be pursued in particular through encouragement of international joint venture investments, within and outside free trade zones, e.g. in the fields of semi-conductors and garments. Intertwined with these were very substantial investments mainly by public sector (Federal or State) corporations in automobiles, machinery, petrochemicals, ferrous metals and cement industries.

Indeed, the development of heavy industries to reduce dependence on imports for the supply of machinery and intermediate inputs was to constitute a major objective of industrial policy as were regional dispersal of industry, and promotion of both high-technology precision-based industries, and small-scale industry. It is noteworthy that, while there is a good deal of small-scale enterprises in the country's manufacturing sector, large- and medium-scale enterprises tend to play a somewhat greater role than in the ASEAN partner countries Indonesia, Philippines and Thailand.

(ii) Small and medium scale industries - Main issues

The latest available Survey of the Manufacturing Industry undertaken by the Department of Statistics in 1985 indicated that there were 3,722 small scale industries representing 64 per cent of the total number of manufacturing establishments within the country. There were also 1,638 medium scale industries representing 28.1 per cent of the total number of manufacturing establishments. [The remaining 460 establishments or 7.9 per cent were large scale industries.]

Collectively, the small scale industries accounted for 16.5 per cent of total employment, 9.2 per cent of total value added and 7.8 per cent of total fixed assets in all manufacturing establishments in 1985. Medium scale industries accounted for 32.9 per cent of total employment, 27.3 per cent of total value added and 23.6 per cent of total fixed assets in the manufacturing industry.

Small scale industries are currently engaged in a wide variety of non-agricultural economic activities producing finished goods such as foodstuff, furniture, handicraft, fabricated metal products, wood-based products, textiles and clothing. The medium scale industries tend to concentrate more on the processing of beverages and tobacco, electrical and electronics products, chemical products, non-metallic mineral products and the production of automotive components and parts.

The problems encountered by small- and medium-scale industries (SMIs) in Malaysia are not much different from those in other developing countries. Some of the major problems faced by the SMIs are inherent in their small size. Broadly, the problems of SMIs can be seen as reflecting either: inadequate capital or inadequate managerial, marketing, production and technological knowledge.

The most acute problem confronting SMIs is the inadequacy of finance. As revealed in a Survey of 167 SMIs undertaken by the Tokyo-based Institute of Developing Economies in collaboration with the University of Malaya in 1986, 75 per cent of entrepreneurs ranked inadequacy of financial resources as their crucial major difficulty. This situation arises from the small sizes of the businesses which are traditionally family-type businesses and which started out with personal savings or loans from friends and relatives. In fact, 80 per cent of the firms surveyed listed own funds as a major source of financing. The inability of SMIs to put up the required financial deposit with banks is the main reason for their restricted access to commercial bank credit. In efforts to alleviate the situation various schemes involving the provision of venture capital are presently being discussed.

Closely related to the low capital investment of the SMIs is the low level of technology utilized. SMIs also face problems associated with out-dated designs, poor production scheduling, inventory controls and quality assurance. SMIs are further lacking in marketing knowledge and skills to effectively penetrate limited domestic market or potential export markets. This inability is certainly a contributing factor towards the often low rate of capacity utilization.

In contrast to the situation in Japan, Republic of Korea and Taiwan Province of China where large downstream firms provide financing, quality control and technical assistance to upstream small and medium scale firms, domestic Malaysian SMIs suffer from the widespread absence of linkages with large downstream firms. The above-mentioned Survey conducted in collaboration with the University of Malaya, indicated that only 13.8 per cent of the firms surveyed had fostered some linkages with other large and foreign joint-venture firms in terms of subcontracting and other business transactions. The given reasons for the lack of linkages include poor quality of products, lack of necessity for subcontracting because of sufficient self-production capacity on the part of the large firms, delays in delivery, shortage of suitably qualified small firms and instability in the management of the small firms.

A key element in the development strategies formulated in the Malaysian Industrial Master Plan (IMP) is the modernization of the small scale industries to ensure the necessary building up of an extensive network of modern ancillary firms which will be able to supply high quality components and parts at competitive prices. As evidenced by the experience of Japan and the newly industrializing economies i.e. Taiwan Province of China and Republic of Korea, SMIs can play a significant role in providing the feeder and technological linkages for the successful development of the larger enterprises. The SMIs in turn are often financially and technically supported by the larger enterprises in the context of long-term stable business relationships. In Malaysia too, SMIs have a vast potential for contributing towards more dynamism and competition within the economy. Specifically, SMIs can often assume a complementary role to the larger industries in supplying parts, components and services at lower unit cost.

(b) PRESENT PERFORMANCE AND IMMEDIATE TARGETS

Growth of the manufacturing sector in 1988 was estimated to be 15.5 per cent as compared to 12.8 per cent in 1987. The manufacturing sector was estimated to contribute 24.2 per cent to the country's GDP, thus being the largest sector in the economy. Although the continued growth in 1988 of the manufacturing sector was spearheaded by export-oriented industries as a result of strong external demand, also improved domestic demand was an important factor.

A sharp increase in the level of foreign investment was also registered in 1988. The rising cost of production in Japan, Taiwan Province of China and some other economies and the appreciation of their currencies in relation to the Malaysian ringgit, contributed to increase the attractiveness of Malaysia as a location for the establishment of offshore plants producing goods for customers worldwide. Foreign investment was mainly in the fields of electrical and electronic products (23.6 per cent of all foreign investment), chemicals and chemical products (15.6 per cent), and rubber products (12.6 per cent). Three Malaysian States, Selangor, Johor and Penang, attracted about two-thirds of the number of projects approved in 1988 (and about 53 per cent of total investment). The number of export-oriented projects was significantly higher in 1988 than in the previous year. These projects were mainly in the fields of rubber products (292 projects), electrical and electronics products (83), textiles and textile products (49), wood and wood products (42) and furniture and fixtures (25). Japan was the major source of

foreign investment in 1988 (with 25.0 per cent of total foreign investment) followed by Taiwan Province of China (17.0 per cent), US (11.0 per cent), France (10.8 per cent), Singapore (8.6 per cent) and Hong Kong (6.1 per cent).

Prospects

Given the prospects of lower international growth, the rate of MVA growth in 1989 is likely to be somewhat lower than that in 1988, although the sector will no doubt continue to provide major impulses to the country's economic progress.

Further improvements in the investment conditions are foreseen. Foreign direct investment is expected to increase in particular from Singapore due to Singapore's tight labour situation. The Singapore Economic Development Board has recently tended to redirect potential (labour-intensive) foreign investment, *inter alia*, to Johor in Malaysia. The Economic Development Board even provides incentives for existing investors to move to Johor. [In 1988 Johor-Singapore trade grew by 40 per cent].

Recognizing the importance of the small-scale industries, the Malaysian Government has introduced a number of incentives to encourage their further development as important means to support the growth of the manufacturing sector as a whole. A new incentive aimed at furthering the linkages between small and big industries involves the reduction of adjusted income granted to large industries that purchase small industries' manufactured goods. This incentive scheme applies to big companies that purchase automotive, rubber, plastics, light engineering, electric and electronic components produced by small industries registered under the Ministry of Trade and Industry's subcontracting exchange. The purchase of other components could also be considered for inclusion in this incentive scheme.

II. The development of supporting industries in Malaysia: Basic issues

(i) Policy framework

Since 1986 initiatives to further the country's industrial development have been pursued within the framework of the Malaysian Industrial Master Plan (IMP) and the recommendations of the 13 Sectoral Task Forces established with the task of specifically addressing the issues and problems faced by Malaysian manufacturing industries. The Task Forces covered a wide ground in reviewing the various strategies affecting the industries and in recommending appropriate measures for the expansion and diversification of the product range and for effecting significant improvements in production processes and technology.

As noted above, the policies affecting earlier industrial development had been contributing factors to a concentration on industries processing agro-products and on industries producing end-products for domestic consumption. The import content of these industries, in particular those of the latter category, was generally high, as capital goods and intermediate goods industries had not been sufficiently developed and inter-industry linkages thus remained weak.

The industrial restructuring and development programme launched with the Industrial Master Plan as well as subsequent industrial policy announcements have addressed these issues. It has been recognized that the basic facilities and promotional support provided had been inadequate to effectively foster the development of a dynamic export industry. Above all, more attention should be given to the active promotion of the development of the small and medium scale industry sector and thus greater diversification of manufacturing activities. In particular, it has been noted that production linkages, through activities of supporting industries or subcontracting between small and medium scale industry and large scale industry had been very limited. Indeed, one effect of the earlier policies had been that little attention was paid to the creation of 'supporting industries' with different product or process specialization along with the development of larger industries. In order to further deepen and strengthen the industrial structure, both in terms of linkages with other economic sectors and in terms of a stronger interdependence of the various branches of manufacturing, a comprehensive promotional approach would be required aimed not only at final producers but also at their, so called, supporting industries, that is, their suppliers of production inputs (including machinery) and of industrial services required.

(ii) The concept

As the term 'supporting industries' is not yet well established and hence subject to differing interpretations, a brief conceptual outline of the term's use in this report may thus be warranted (bearing in mind, however, that a watertight definition is not intended nor does it appear to be feasible at all). In principle, each industry providing inputs to other producers can be considered as a supporting industry. In this sense, the production of textiles 'supports' clothing manufacturers, a steel factory 'supports' the fabrication of metal products, plywood manufacturing 'supports' furniture-makers etc. At the same time, being a supporting industry is not an intrinsic

property of any industrial branch or factory but essentially depends upon the length and nature of the production chain and the corresponding position of a specific industry therein. Typical categories of supporting industries - essentially in the small or medium industry category - would cover:

- separate manufacturing operations, e.g. in the metalworking field (often in the context of subcontracting);
- materials processing, e.g. in the textile field;
- production of dies and moulds, spare or replacement parts production;
- production of parts and components;
- production of accessories, e.g. to the garments industry;
- production of packaging items, e.g. containers, caps etc.; and
- service industries, e.g. to undertake repair and maintenance work, testing and calibration services, design services.

The present report adopts a rather broad concept of supporting industries:

- At the core of the support industry concept have traditionally been those industries producing parts and components. They tend to belong to the private sector and have been the domain of small- to medium-sized enterprises. Often they are linked to prime manufacturers by subcontracting arrangements as is predominantly the case in the automotive sector. Also (independent) manufacturers of accessories for, say, the garment industry constitute an important category of supporting industries.
- A less obvious albeit essential segment of supporting industries are the producers of machinery and equipment, be it moulds and dies for plastic or rubber processing industries; woodworking machinery; industrial pumps etc. By definition they are part of the engineering sector although they serve, of course, other industrial branches as well. This category may also include specific industries involved in materials processing, such as metal plating or textile dyeing.
- Finally, industrial services have been included as a third support category. Such services can either be provided by other enterprises (e.g. packaging or design) or by specialized institutions (e.g. training or quality control) which can be operated by private associations or public sector entities.

(iii) Basic future issues

In overall terms, the strengthening of the supporting industries in Malaysia can be seen as contributing to making industrial development more self-sustained by generating stronger industrial interlinkages and hence reducing the high degree of import dependence. The building-up of a viable domestic parts/components and equipment industry is particularly important in order to raise the local content ratio of industrial production.

As noted earlier: there is a general danger, as has been the case in many countries including Malaysia, to put too much emphasis on the promotion of assembly operations while at the same time neglecting capability generation in medium-sized firms supplying the required production inputs. A biased processing pattern in favour of final (assembled) products is the consequence. In this context, a brief comparative look at the experience of the Republic of Korea and Taiwan Province of China, is instructive. While the former long neglected the development of an efficient local supply base of parts/components and hence continued for some time to suffer from high import dependency, in the latter industrial priorities were different from the start with stress having been placed on establishing a powerful domestic parts/components industry first. It was only out of parts manufacturing that the assembly sector subsequently grew.

However, in a competitive world economic environment based on comparative advantages and specialization there should be reasonable limits to a strategy of import substitution and the raising of domestic content. After all, 'support' should not be regarded as a physical concept. Whether a supplying industry effectively 'supports' or rather 'weakens' a user industry, is a question of the former's production costs and product quality as compared to a potential sourcing from the world market.^{1/}

^{1/} Cf. UNIDO, "Industrial Policy in the Developing Countries. An Analysis of Local Content Regulations", UNIDO/IS.606, 3 February 1986.

III. Target industries: Linkage creation towards an integrated industrial structure

(a) THE MACHINERY AND ENGINEERING INDUSTRY SECTOR

The machinery and engineering industry plays a key role in the industrial development of Malaysia, providing the foundation and support for most other industries both within and outside the manufacturing sector. The industry provides products, components, essential repair and maintenance services to ensure the smooth and efficient operation of the production sector in the country. In other words, the industry forms not only the core of the manufacturing sector in the country but has also extensive linkages with all other economic activities.

The basis of the engineering industry has been established in Malaysia since the early years of the century in response to the need to service and provide replacement equipment for the tin mining industry. Subsequent development of the rubber and timber industries increased the production base of the industry.

The production of castings and simple fabricated metal components and structures is quite widespread catering to a substantial proportion of the country's needs. However, in many cases, local producers are merely copying original foreign designs. For more sophisticated equipment, the production of which requires advanced technology, the local capabilities are limited.

It is to be noted that, although the output of the machinery and engineering industry sector has grown significantly in the 1980s, its relative share in the country's total manufacturing value added and employment has declined indicating that the sector has not yet emerged as playing a key catalytic role in Malaysia's industrialization. Indeed, it was observed in the Industrial Master Plan research reports that "even more important than poor overall performance [of the machinery and engineering industry] is the fact that at present the technology base of the industry in Malaysia is shrinking and the industry is degrading into the lower technology areas."

The lack of progress of the country's machinery and engineering industry can be attributed to the many structural and operational problems encountered by the industry. The problems relating to the structural weaknesses of the industry may take a relatively long time to be solved. Government initiatives, however, can help to provide more immediate relief to most of the other problems.

The machinery and engineering industry is its own major supplier and the lack of only a few crucial links makes it difficult to start a chain of supply and demand. However, once a supply infrastructure of primary products has been established, production of machinery and other engineering products for the processing industry and related services, will gradually follow.

Indeed, the activities of the local machinery and engineering industries have been traditionally and are still oriented almost entirely to the needs of the resource-based industries viz. tin mining, timber processing, palm oil processing, rubber processing and the construction industries. There is an

absence of diversification of production from the manufacture of simple component parts and machinery for these primary industries to more sophisticated and higher technology products for other industrial activities. Furthermore, the weakening of the traditional markets due to the decline in the production of tin and the slow growth of the rubber, timber and palm oil processing industries has created intense competition in the machinery production sector. This situation is further aggravated by competition not only from imports but also the increasing use of substitutes of other non-metal materials such as plastics. The industry has not been able to exploit fully the opportunities resulting from the expansion of other industrial sectors. As a result, Malaysia is still heavily dependent on imports.

The products "manufactured" in Malaysia are generally simple fabrications which have few components or parts. Some examples of these are structures, tanks, drums, pipes and castings of iron. Owing to the lack of engineering component products from indigenous supply, most of the secondary and tertiary products are assembled from imported components with perhaps only the simple metal fabrications done locally. Although this is the general pattern of local production, there are exceptions in a few large-scale establishments which produce more sophisticated components mainly for their own use based on technology provided by their foreign joint-venture partners or licensors. An example of this is Matsushita Industrial Corporation (M) Sdn. Bhd. which produces electric motors based on technology supplied by its parent company.

Malaysia has developed considerable abilities in many of the basic operations or processes such as cutting, welding and assembling but the casting, forging and machining capabilities remain inadequate. It would be necessary for Malaysia to commence production of products or components whose production would help to enhance the development of skills in these processes. As more of these products or components are being produced, the related process skills will naturally develop as the same processes and production methods are applied in the production of most products of the industry.

Another ingredient for the development of the industry lies in the linkages or inter-dependence of the various production units within the industry. In Malaysia it is common to find establishments which are self-contained units and which produce all their own components or parts independent of other establishments. In contrast, most industrialized countries have developed a good supply infrastructure within the industry with specialized production units supporting one another. Indeed, the production efficiency resulting from specialization and complementation is a key factor for the strength of the developed countries in the machinery and engineering industry field.

Prospects

The machinery and engineering industry in Malaysia is able to supply most of the country's requirements of simple assembled and fabricated equipment for the resource processing industries. The industry has accumulated a considerable amount of experience and technological know-how and developed the capability to copy foreign machinery with features to suit local conditions through "reverse engineering". For example, when the rubber

industry first started in Malaysia, most of the machinery requirements were met by imports from abroad. Today the local manufacturers are able to supply more than 75 per cent of the rubber processing machinery needs of the country. The industry was able to develop in a competitive market with very little incentives or government support. This is an indication of the engineering ability and resourcefulness of the existing engineering industries.^{1/}

Malaysia is currently importing a substantial amount of machinery and metal products. In 1988, for example, such imports totalled 6.7 billion ringgit accounting for 15.5 per cent of the country's total imports. Significantly, imports of machinery alone accounted for 8.9 per cent of total imports. [To compare the machinery percentage in 1981 (when the Industrial Master Plan research was carried out) was 12.3 per cent.] Thus, there is still a vast potential for the expansion of machinery and engineering industry through diversification from its present role of supplying machinery and equipment at the level of simple fabrication and assembly to more sophisticated products.

Another area where the industry could diversify into non-traditional markets is through the activities of the Heavy Industry Corporation of Malaysia (HICOM). The various projects which are being currently undertaken by HICOM should open up new opportunities for the local machinery and engineering industries.

Constraints

Although the total consumption of machinery and equipment in Malaysia is quite large, as reflected in the substantial annual imports of investment goods into the country, the domestic market for the various equipment is nonetheless highly fragmented. A very wide range of machinery and equipment is used in the country, but the demand for each individual type of equipment is generally not significant enough to form a viable market base for local production.

There are several unfavourable factors which reduce the competitiveness of local products against imports. These include the lack of economies of scale in production in view of the limited local market; relatively high costs of raw materials; and predominantly small manufacturing units which employ outdated and inefficient production equipment and techniques. These and other problems have resulted in high cost of production which places local industries at a disadvantage in terms of competitiveness not only against imports but also on the export markets.

Apart from cost disadvantages, the products of the industry are often of inferior quality compared to imports. The lack of quality control facilities, particularly in smaller firms where quality control is mostly performed by visual inspection, have resulted in inconsistent product quality and a high

^{1/} A very comprehensive "Directory of Engineering Supporting Industries in Malaysia" has been compiled by MIDA and DEG (within the framework of a Joint Investment Promotion Programme between Malaysia and the Federal Republic of Germany).

rate of rejects. Imported equivalents which are of better and more reliable quality are therefore preferred by the downstream users.

Most of the local engineering firms lack the resources to invest in testing facilities which can help to improve the quality of their products. They therefore, have to rely on outside sources for technical subsidies.

The Standard and Industrial Research Institute of Malaysia (SIRIM) has only limited resources and capacities to provide the testing support and the wide variety of other technical services needed by the smaller scale industries. The Institute is developing its programme of support to the automotive components, plastics, metalworking and electronics industries. This programme includes among others the product design and product development for consumer and engineering products, machine design for small and medium scale industries, packaging design, hard chroming and electro-forming for the plastic industry.

The existing foundry and supporting engineering services industries which provide castings and other essential components and supporting engineering services to the machinery production sector are in the initial stages of development. They are only capable of servicing the replacement part and simple equipment needs of the tin mining and other resource extraction and processing industries. Despite its long history most of the foundry and supporting engineering services industries have remained small in operations and poorly equipped. They generally do not have the ability or the resources to modernize and diversify to cater to the increasingly sophisticated needs of the other industrial sectors.

Hence, in order to strengthen the basic production capabilities of the machinery and engineering industry, priority must be given to upgrading the supply and technological capabilities of the foundry and supporting engineering services sector. The Industrial Master Plan research studies draw attention to a lack of organized efforts in the industry. At present there is the Federation of Malaysian Foundry and Engineering Industries Associations (FOMFEIA) whose members comprise mainly small scale foundries and engineering workshops. FOMFEIA's present activities are mainly directed towards making representations on behalf of individual members on matters relating to Government regulations. Some attempts are also made to assist members in bulk purchases of raw materials. There are no other organized efforts such as to promote the products of the industry, to ensure better quality standards and to make effective representation to the Government on various matters important for the continued growth of the industry.

To further strengthen the primary production sector, it has been suggested to establish one or more Foundry and Engineering Complexes to increase the supply of good quality castings, forgings and other basic components. Facilities for the supply of small and medium castings and forgings must be established. The production of large castings and forgings may be considered at a later stage as the industry moves on to produce heavy equipment such as heavy construction equipment, large material handling equipment, heavy industrial process equipment and etc.

The basic concepts of the proposed Foundry and Engineering Park are to bring together the foundries and related engineering industries at one location to take advantage of common testing equipment, research and development, CAD/CAM and other common facilities e.g. market intelligence,

resource centre with advisory services, store room with printing facilities, productivity display area, etc., which will enable the engineering industries to operate with access to up-to-date technical and market-related information. The access to the specialized services e.g. centres for instrumentation, technology transfer, industrial machinery design, testing, development of moulds, dies, jigs and fixtures and product design will enable the small and medium units in the Park to avail themselves of the best technological support.

The Industrial Master Plan addresses specifically the issue of promoting local sourcing of components, and the problems of ensuring the products produced in the country are accepted and incorporated into downstream uses. It is aimed primarily at creating a demand for local products and reducing, at the same time, the country's heavy dependence on imports.

There are two basic considerations for encouraging greater use of local products. The first concerns the quality and price of local products while the second deals with the preference of the users for their traditional sources of supply which, in this case, are mainly imports. The quality and price of local products relates essentially to the strength of the industry in terms of technical competence and production efficiency. As local industries achieve higher levels of technical competence and production efficiency, there should be no problem in ensuring the supply of local products of acceptable quality and price.

To induce downstream users to source more of their component requirements locally, consideration is given to administrative measures, such as tariff protection and local content rules. Similarly, there are other instruments such as preferential government procurement, tax assistance, special loan schemes and other forms of assistance, which may help to increase the competitiveness of local products.

Most larger companies have their own programmes of promoting local sourcing. The Mission was informed by Perusahaan Otomobil Nasional Sdn, Bhd. which produces the Proton cars as follows: In metal working, production facilities of local companies are not good enough in certain areas such as forging, casting (for precision work), heat treatment and machining except for stamping. Their prices are not competitive with imports.

(b) THE ELECTRONICS INDUSTRY SECTOR

The electronics industry has been a highly visible contributor to the Malaysian manufacturing sector's growth. Electronics exports accounted for 32.3 per cent of manufactured exports and 15.7 per cent of the country's total gross export earnings in 1988. The total gross value of the exported electronic components was 8,711 million ringgit. However, after adjusting for imports of electronic components valued at 6,893 million ringgit, the net export earnings of the electronics sector were only 1,819 million ringgit in 1988 (1,244 million in 1987). Some 85,000 persons are employed in the electronics sector.

The base of the electronics industry in Malaysia is in electronics components making, which accounts for about 80 per cent of the industry's output. Almost all of these manufacturers operate out of free trade zones

(FTZs), the value added being 10-15 per cent only. There are practically no linkages between firms operating in FTZs and the local industry.^{1/}

The heavy reliance of the industry on semiconductor assembly renders the industry highly vulnerable to trade cycles with obvious repercussions for workers in the industry. With the semiconductor firms being the domain of multinational corporations, Malaysian investment in the industry is very limited, mainly confined to consumer items such as colour television receivers for the domestic market in joint ventures with foreign partners.

The features of the industry indicate that the main development objectives for the industry should be to diversify the industry away from semiconductor assembly and test activities and to increase Malaysian investment in the industry, especially in the export-oriented sector. Pursuing these objectives means Malaysia must ensure that investments are forthcoming in non-semiconductors while existing semiconductor firms continue to reinvest in the country.^{2/}

The large presence of semiconductor assembly and test operations in Malaysia has made the country a centre of expertise on this particular aspect of semiconductor production. As the industry has moved in recent years towards progressive automation, this has meant that Malaysians have also acquired considerable experience in the operation, maintenance, and, in some cases, the engineering of automated assembly equipment. There may be a number of transferable skills which have been built up within the semiconductor assembly sector which can be employed in the use of robotics and CAM equipment.

At the same time, as pointed out in the above-mentioned UNIDO technical report, there seems to have been practically no high tech spin-off from the FTZ-firms to the local economy in the key areas of R&D and marketing, due to the fact that the multinational companies in the Malaysian FTZs are not active in these areas.

The very fact that a large number of internationally reputable electronics firms are active in Malaysia is undoubtedly an important factor for the future development of the country's electronics industry.^{3/} That those companies have chosen Malaysia as a location for their export-oriented

^{1/} This aspect has been subject of particular attention in a technical report "A Study on Electronics Industry in Malaysia" dated 25 April 1989, prepared under the UNIDO/UNDP project SI/MAL/88/801 ["Assistance in formulating a detailed implementation plan for the establishment of a Semiconductor Technology Centre"] by the consultant on Marketing of semiconductor products, Mr. G. Fandrich.

^{2/} The production/assembly of various electronics components and products in Malaysia at present includes semi-conductors (transistors, diodes and integral circuits), silicon wafers, capacitors, transformers and coils, resistors, relay, auto-displays, crystals, lead frames, speakers, telephones, telephone exchanges, VHR radio, PABXs, radio, tape recorders, stereo equipment, electronic clocks, amplifiers, etc.

^{3/} Practically all the multinational electronic component manufacturers in the world have set up operations in Malaysia and these include RCA, Texas Instruments, Motorola, Matsushita, Siemens, National Semiconductor and Intel.

investments and reinvestments underlines the international competitiveness of Malaysia-based operations in this field. One consequence of the presence of these international semiconductor firms is the potential that a few may be induced to integrate backward into circuit design and wafer fabrication, in particular if Malaysia succeeds in stimulating the rapid growth of its equipment manufacturing/ assembly industry.

Structural problems

Malaysia today has one of the largest installed semiconductor assembly capacities in the world. Yet, almost all the raw materials and components used as direct inputs into the production process must still be imported. Similarly, almost all the capital equipment and raw materials utilized in the industry is imported. Backward linkages to local suppliers have been minimal.

Malaysia has not developed a sizeable electronic equipment industry, either for consumer or industrial electronics end products. In recent years, a limited amount of investment in consumer electronics assembly has occurred as some multinational corporations and some Singapore-based firms have transferred their labour-intensive operations off the island in response to escalating labour costs. Still, the electronic equipment industry remains very small and is overshadowed by the semiconductor industry.

Among the components which Malaysia is currently producing in substantial quantities are resistors, capacitors, singled-sided printed circuit boards, flyback and other transformers, deflection yokes and relays. In the near future it should also be producing a sizeable quantity of audio speakers. Those companies manufacturing electronic equipment generally either do their own in-house plastic injection moulding of castings and plastics parts or contract out such work to local plastic moulding shops.

The fact that a growing number of components are being made in Malaysia is a positive factor for the development of the electronic equipment industry. Measures will continue to be required for the next several years to give stronger encouragement to local firms involved in the supply of components and services.

Malaysia's geographical proximity to Singapore could be of great benefit to the development of the local electronics industry. A significant portion of the consumer electronics and electronic components sectors in Singapore are likely to shift. Already some Singapore-based firms have shifted certain of their operations to Malaysia.

There is, as has been noted above, a serious lack of local linkages within the Malaysian electronics industry. The heavy dependence of the industry on multinational companies' subsidiaries and associates which carry out mainly assembly operations based on imported materials has contributed to such weakness. However, in a sector like consumer electronics, a much higher local content is observed in certain companies' products. The companies continue to source more local materials as the non-semiconductor components or supporting industries become more developed. Local material content in the order of 30 to 40 per cent has been achieved for certain products.

To establish linkages within the industry, stimulation must be given to the electronic equipment segment of the industry. Initially the focus would necessarily have to be on consumer electronic goods for export as well as

domestic consumption. The growth of this subsector would create a demand for the output of discrete semiconductors and integrated circuits.

Secondly, backward integration should be promoted within the semiconductor sector. This could involve efforts to attract investors in lead frame, ceramic package and gold and aluminium bonding wire manufacture. Given the large demand for these materials by the semiconductor firms in Malaysia, these potentials hold good promise. Another promising area in the longer term is the promotion of circuit design operations and wafer fabrication by semiconductor firms having assembly plants in Malaysia.

Malaysia has also been attracting industries for the manufacture of professional, scientific, measuring and controlling equipment. Precision product manufacturers which require the local supply of electronic components for incorporation into the final product would rely on the country's electronic components industry.

The market size in Malaysia for many products is relatively small at present. The government should continue to tackle the problem of the limited domestic market by encouraging all manufacturers to produce for export as well as domestic consumption. The government should gradually reduce protection in order to ensure that local firms are geared to competition. Specifically, measures could be taken to build up one or more local firms which could provide the leading edge of the industry's export thrust. It has been suggested that the government might need to consider either joining as a partner in a national electronics enterprise for a limited time, withdrawing when the venture is financially viable, or encouraging the consolidation of certain small-scale private sector firms into a single large-scale electronics venture. Even then, the government would probably need to provide marketing support to enable such a company to establish an international market presence.

It is advisable, under the circumstances and given the experience of electronic firms from other developing countries, for local firms to begin as original equipment market (OEM) suppliers of electronics equipment to foreign electronics firms or distributors, entrusting to the latter the responsibility of marketing the output abroad. In the course of time, if the local companies succeed in obtaining increasing orders and expanding volume on the basis of such OEM arrangements, they can then consider establishing their own separate identity in foreign markets.

Very few Malaysian entrepreneurs have ventured into the electronics industry. The shortage of local investment is most acute in the export-oriented sector, which accounts for about 90 per cent of the industry's output.

The preceding points make it advisable to focus development for the future towards:

- (a) Diversification of Malaysia's electronics industry away from its current overreliance on semiconductor assembly and test activities, to a more balanced growth in components, consumer and industrial products; and
- (b) Promotion of linkages to supplier industries and forward linkages to electronic equipment manufacturer. Specifically, linkages might be developed through the subcontracting of electronics assembly and test activities to local firms.

Ultimately, Malaysia may also need to develop the capability to manufacture/process certain strategic raw material inputs into its electronics industry as well, like high purity metals and metal alloys, industrial ceramics as well as electronics-grade chemicals.

Another area of the electronics industry which warrants promotion is the design and development of software and of integrated systems comprising both hardware and software. As Malaysia's economy further develops, the installed base of computer systems of all sizes - from micros to mainframes - is likely to grow significantly. As that happens, and as trends in computer technology and economics continue to increase the share of software in total system costs, the software industry will gain increasing prominence over the next decade.

Indeed, system integration constitutes one of the most crucial capabilities of a technologically autonomous electronics industry. Such integration involves the ability to combine standard "off-the-shelf" hardware with other hardware and software which has been specifically designed or modified to meet specialized end-user requirements. Whatever the particular configuration of hardware and software, the ability to adapt electronic systems to end-user requirements is a valuable skill to be acquired by the Malaysian electronics industry for its long-term development.

Building up of local R&D capabilities is critical to the long-term development of Malaysia's electronics industry. For most of the subsidiaries of transnational corporations whose R&D activities are concentrated in their home countries or in other advanced industrialized countries, it is unrealistic to expect the vast majority of such companies to transfer R&D to Malaysia, especially for their state-of-the-art technologies. Nevertheless, in the case of those companies which have transferred an entire product line or production process to Malaysia, there may be advantages to performing R&D, product design and/or process engineering for that range of product/processes, a number of firms have located their process engineering activities here to support their assembly and test operations.

Given the fact that existing technologies are largely the property of wholly foreign owned firms with no local R&D facilities and no plans to invest in them, the government needs to serve as a catalyst for the development of an indigenous R&D capacity. Moreover, it is advisable to foster collaborative R&D in view of the limited human, financial and physical resources available. The Malaysian Institute of Microelectronic Systems (MIMOS) could serve as the logical starting point for such an R&D initiative.^{1/} Attention is at the same time to be given to the establishment of a comprehensive institutional arrangement for the scientific research and technological development in this field.^{2/}

^{1/} Initial information indicates that a project for manufacture of PCBs could be explored further; the basic data is available with MIMOS (ref. project No.7 in the Annex).

^{2/} See the earlier mentioned technical report "A Study on Electronic Industry in Malaysia" dated 25.4.89 under UNIDO/UNDP project SI/MAL/88/801.

Encouragement of local sourcing

Presently local components and raw materials account for a small percentage of total material inputs into Malaysia's electronics industry. The principal reason for this is that the export-oriented semiconductor industry, which dominates the industry as a whole, imports an overwhelmingly large share of its inputs.^{1/} Even in the case of non-semiconductor electronics firms, a sizeable percentage of material inputs are still imported. This is due to the local unavailability of the required material or components; or the inability of local firms to offer products of comparable quality to imports; or the higher cost of local components or material supplies relative to imports; or the obligation of companies to source from related overseas producers.

In order for Malaysia to develop an integrated electronics industry, it is crucial for the government to encourage the local production of a wider array of quality components.

While local content requirements may be enforceable in the case of domestic market-oriented enterprises especially where such enterprises enjoy a degree of protection from imports, they can prove to be a serious handicap to export-oriented firms in situations where local component suppliers cannot compete on cost and/or quality. Thus, priority should be given to measures aimed at encouraging improvements in the efficiency, productivity and quality control of local component and material suppliers.^{3/}

Arrangements in this area suggested in the Industrial Master Plan sector studies include:

- Electronics firms operating in Malaysia and purchasing materials/components for use in the manufacture of their products should be given inducements to provide technical assistance to local suppliers to enable them to meet the necessary specifications. One way to do this would be to reward firms with fiscal incentives for achieving certain local content targets.
- Special attention should be given to the promotion of such foreign companies which normally source most of their raw materials/components from unrelated companies in order to induce them to invest in Malaysia so as to create opportunities for local suppliers in the future.
- At present, certain of the supplier and support industries comprise principally small-scale producers. In some cases this has been the result of low demand. In certain instances - for example, machine shops - economics and technology in the past made such small-scale operation cost effective. With changing cost structures and changing technologies - for example, the introduction of Computer Numerical

^{1/} The total gross value in 1988 of exported electronics components was 8,711 million ringgit, from which component imports of 6,893 million ringgit should be deducted in order to arrive at the figure for net export earnings of 1,819 million ringgit.

^{2/} A "Directory of Electrical and Electronic Parts and Services Industry in Malaysia" has been compiled by MIDA and DEG providing information on the capabilities of the local manufacturers and service facilities.

Controlled (CNC) machine tools - such small scale operations are often becoming less economically viable. The efficiency and productivity of small shops utilizing manual techniques cannot keep pace with larger, more automated shops. Moreover, given the substantial capital investment involved in CNC machine tools and the limited production volumes of many machine shops in Malaysia, the acquisition of such equipment may be financially neither possible nor justified. Under the circumstances, some degree of government support may be desirable to assist the metalworking industry to modernize plant and equipment so as to become more competitive with foreign, highly automated metalworking operations. Only in this way can Malaysia expect to be able to supply the electronics and other industries with metal casting, stamping and forging services.

In response to the above mentioned government policies and in order to satisfy their own companies' requirements, most multinationals have special programmes of promoting local sourcing. Some such programmes have achieved noticeable successes.

One of the most reputed cases is that of the Matsushita group of companies. The group comprises of 8 enterprises (see table below) with accumulated investments of nearly 300 million ringgit in Malaysia. It has a plan to use Malaysia as manufacturing and export centre. A large portion of the production (like colour TV) is 100 per cent export-oriented, to the Middle East and European markets.

Matsushita Group of companies in Malaysia

Name of company	Date of establishment	Products
Matsushita Electric Co., (M) Berhad -- (MELCOM)	September 1965	Colour TV, fridge, washing machine, fans, blenders, rice cookers, electrical home showers, batteries, vacuum cleaners
Matsushita Industrial Corporation Sdn. Bhd.(MAICO)	April 1972	Room air-conditioners, dehumidifiers.
Matsushita Compressor & Motor Sdn. Bhd. (MCIM)	January 1987	Compressors, motors
Matsushita Electronic Compo- nents (M) Sdn. Bhd.(MECOM)	December 1972	Electronic condensers, variable resistors, tuners, switches
Matsushita Electronic Devices (M) Sdn. Bhd.(MEDEM)	November 1987	Ceramic electronic devices
Matsushita Precision Indus- trial Co. (M) Sdn. Bhd.(MPI)	September 1978	Deflection yoke, flyback transformers
Matsushita Sales & Services Sdn. Bhd. (MASCO)	March 1976	Sales and services for MELCOM and imported products
Matsushita Television Co. (M) Sdn. Bhd. (MTV)	May 1988	Colour television sets

Matsushita Electric Co., (M) Bhd. uses local companies extensively as subcontractors and component and material suppliers. The number of such companies reaches around 200 - ranging from plastic moulding (some 10 firms), to pressed metal parts (15 firms), semiconductors and TV-parts manufacturing. The subcontractors are carefully selected and constitute a core group of companies linked with Matsushita. Many subcontractors have been linked with Matsushita for over 20 years - since the mid-1960s when Matsushita started in Malaysia. At the moment certain new areas for potential local subcontractor production are under consideration, e.g. CRT (for TV), copper sheets and pipes, good quality aluminium parts. Certain high precision parts are made by Matsushita themselves in their workshop in Kuala Lumpur while certain other parts (like thermostats) are imported from Japan.

The subcontractors are regularly invited to come to Matsushita in Malaysia for technological instruction and training and sometimes Matsushita also sends technical advisers to the subcontractor. Thus, for instance, plastic moulding plants are given assistance by Matsushita. Matsushita organizes, as annual event, a conference in Malaysia for some 40 selected subcontractors. At the conference matters, e.g. regarding processing technology, management, etc., are presented (by lecturers from Japan) and reviewed through discussions. Matsushita also arranges and subsidises from time to time 2-weeks observation trips for mainly the younger generation at managers level in the subcontractor companies (the travel is being paid by the respective subcontractor company itself). Staff from subcontractors are, furthermore, regularly invited to take part in Matsushita's staff training programmes, for instance, in quality control.

Another example is the case of NEC Semiconductors (Malaysia) Sdn. Bhd. The company started production in 1976. Since then it has diversified its semiconductor products including LEDs and expanded the production volume. It now employs around 1,400 persons. While local sourcing of most inputs for semiconductors is difficult for the time being, the company has made great efforts in developing local supply capacity of requisits for repair and maintenance. Since 1985, 100 per cent of the requirement for mould and cutter parts has been met from local sources. Between 1985 and 1988, the corresponding ratio for the machinery part requirement has increased from 43 to 77 per cent.

(c) THE PLASTICS INDUSTRY SECTOR

The plastics industry in Malaysia can be broadly categorized into the resin manufacturers, the intermediate raw material processors and the end-products fabricators.

They produce a wide range of products, the more important ones being bags, bottles and containers, household wares, sheets, and packaging products, plastic cots, sanitary and plumbing fittings, string and straps, pipes and hoses, PVC leather cloth and sheets, electrical components, industrial components and parts, foams, stationery and footwear, ABS and PMMA sheet etc.

To further develop the plastics industry in the country, the Standards and Industrial Research Institute of Malaysia (SIRIM) is promoting improvement of products through standardisation, quality assurance, industrial research and consultancy activities.

The industry is expected to get a boost with the setting up of a proposed plastic technology centre which will assist the mobilization of the Malaysian plastic industry. The plastic technology center is to be equipped with basic facilities, such as testing equipment and processing machinery to undertake testing of properties of materials, performance evaluation of end-products, processing and fabrication technology, engineering applications and design. The center will also provide technical advisory services to plastic processors of injection moulding, blow moulding, film blowing, extrusion and thermo forming. These services would include advice on process technology improvement, trouble shooting of production problems, evaluation of raw materials and product properties, choice of raw materials for product applications and quality management systems. The center would undertake research and development programmes with specific product application related focus. It is also intended to undertake joint venture research projects with the industry and universities. Training of personnel and information dissemination will form the most important activity of the center. The proposed centre is to work closely with the Metal Technology Centre (MITEC) and the Metal Industries Research and Development Centre (MIRDC) in SIRIM for appropriate ancillary services in the related fields such as the making of moulds and dies. There are currently about 20 manufacturers of moulds for the local plastics processing industry.

The IMP Task Force on Chemical Industry stressed the needs of the local plastic fabrication industry as regards development of moulds, dies and tools for the industry. The Task Force also called for policy measures to encourage the plastics manufacturers to upgrade their existing facilities to produce higher value added products as well as intensified research and training efforts to assist the industry in adopting new technology and developing new products.

The fast expanding electronics industry in Malaysia has generated a growing demand for plastic precision products and this requires the establishment of high precision plastic operations. Indeed, the plastic components manufacture is viewed as playing a key role in the government's strategy to foster the formation of electronics-sector support industries. Foreign investors are encouraged to form joint ventures with local firms to manufacture plastic components for the domestic electronics and electrical companies.

It is envisaged that increased local sourcing of plastic components by the electronics enterprises in the free trade zones and licensed manufacturing warehouses will follow. There are now about 30 companies with a total output valued at 142 million ringgit in 1987 and (est.) 213 million ringgit in 1988 supplying plastic components to the electronics industry in Malaysia's free trade zones and licensed warehouses.

In general, it may be considered that opportunities are abundant for the development of the plastics industry in the area of export-based operations. Some products which can be considered for manufacturing in Malaysia include household articles, industrial products, automotive parts such as linings and paddings panellings for construction and household purposes, and plastic items for use in the agricultural sector.

A comprehensive 'Directory of the Plastic Ancillary and Supporting Industry in Malaysia' has been compiled, providing information on the capabilities of the local plastic manufacturers.

(d) RUBBER-BASED PRODUCTS

Malaysia, the world's largest producer and exporter of natural rubber, is well advanced in the manufacture of rubber-based products.

There are currently about 140 rubber product manufacturers in Malaysia (excluding some 200 tyre retreaders).

Back-up R&D facilities are provided by the Malaysian Rubber Research and Development Board (MRRDB) whose two research institutes - the Rubber Research Institute of Malaysia (RRIM) in Kuala Lumpur and the Malaysian Rubber Producers' Research Association (MRPRA) in London - have made significant achievement in production technology and development of end uses.

Thermoplastic rubber production based on natural rubber presents particular suitability to Malaysian needs. MRRDB is aware of it; it should be possible to produce it for meeting the present range of applications required by local industries.

(e) TEXTILES

The IMP Task Force on Textiles/Apparel Industry noted that the textiles industry has been slow in keeping pace with use of modern technology and up-to-date machinery. Efforts should focus on increasing production and exports within the framework of broad strategies involving:

- 0 a comprehensive rationalization and modernization programme through improvement and upgrading of existing facilities with the support of adequate incentives particularly in the textiles subsector of spinning, weaving and knitting.
- 0 an intensification of the promotion and development of the export market, particularly in the apparel subsector. In this regard, emphasis would be placed on increasing exports of high value added items.
- 0 an increase of the productivity and technology absorptive capability through enhancing manpower training and technology transfer in order to achieve international competitiveness against those countries with a highly developed textile industry on the one hand and the newly emerging textile producers on the other.
- 0 a strengthening of the role of industry associations with a view to providing advisory, consultative and information services to their members and also in the industry's interaction with the Government.

Specifically, consideration is given to the setting up of a Textile Centre to meet the manpower and development needs of the industry.

IV. Focal points of future technical assistance: Prospective approaches and projects to strengthen supporting industries

This chapter deals with certain prospective areas for future technical assistance and co-operation activities with the purpose of strengthening supporting industries. It refers briefly to various projects identified by the UNIDO/ECFA team as warranting further examinations. Most of the project proposals are elaborated further in the Annex.

It is hoped that the project profiles in the Annex will provide the basis for drafting of concrete project proposals for subsequent Trust Fund arrangement(s) between Japan (the private sector in particular) and UNIDO. Implementing these projects under other arrangements is, however, also possible, the ultimate objective of this exercise being the promotion of supporting industries in this country.

As indicated in the previous chapter, the priority is to be given to the engineering, electric/electronics, textile, rubber-based, chemical and plastics subsectors, according to the government. The Mission is in full agreement with this.

(a) EXAMINATION OF GOVERNMENT POLICIES ON SPECIFIC ASPECTS AT THE SUBSECTOR LEVELS

Radical changes in the international environment surrounding the industrial sector and the sector's rapid expansion have made it necessary to review government policies of specific aspects and accordingly to formulate actions to be taken by the government as well as the private sector.

One such aspect calling for immediate attention is the fast improving conditions for achieving desired international division of labour between the ASEAN partner countries, notably between Malaysia and Singapore. Limited availability in Singapore of labour and thus higher costs associated to it is one of the main factors of the recent trend of labour intensive industries in Singapore looking for relocation of their production facilities to neighbouring countries, including Malaysia, and making use of production and service capabilities in the latter. Malaysia, on the other hand, has more abundant labour and rich natural resources waiting to be utilized for increasingly sophisticated industrial activities. Concerned parties in both countries share the view that an action-oriented study on this aspect is required. The project No.9 (in the Annex) has been proposed with the objective to promote industrial linkages between the two economies.

The Mission also proposes project No.10, which deals with manufacturing of parts of selected industries, such as automotive, electrical and electronics industries. Its main objective is to identify parts not yet produced locally but in respect of which it may be viable to do so by implementing measures to upgrade the existing industries and encourage such production.

Other projects, such as the projects No.2 and 3 can be implemented as a part of possible follow-up actions of these studies (projects No.9 and 10).

(b) MANPOWER DEVELOPMENT

The shortage of skilled workers and engineers is becoming acute due to the rapid industrial development in the recent past. Investors who are going to establish their new industries are faced painfully with this problem. The existing ones are in almost equally difficult positions by the increase of job-hopping practices.

Existing training/educational institutes include universities, technical colleges, vocational training schools, etc. A sudden surge of industrial investment has created demand for skilled workers and engineers which far exceeds the supply capacity of these institutes.

Many individual enterprises, existing as well as new ones, are now trying to meet their needs for such personnel by organizing their own training schemes. A number of companies, including Matsushita and Toyota, have established own training schools.

The manpower situation in the above-mentioned categories is expected to become even tighter. Alleviating this will be the most important challenge for Malaysia in order to maintain the present development momentum. Thus, there is need for a co-ordinated approach. Also, it is imperative to encourage and improve training schemes of enterprises, in order to supplement formal and vocational education.

With this background, the Mission proposes project No.13 which aims at giving immediate response to the situation.

(c) INDUSTRIAL INFRASTRUCTURE AND SERVICES

Malaysia has, generally speaking, a fairly well developed physical infrastructure and institutional services to help industries in technical, managerial and other aspects. There are, however, still some areas in which specialized supporting institutions, if established, can help industries substantially. Specifically, the Mission identified such need in the foundry and engineering industries, computer related technologies and plastic industries.

(i) Foundry and engineering park

Actions have been initiated to solve the problem of land tenure faced by small foundries. The project No.1 refers to such an opportunity for the modernization of the subsector and related engineering industries by planning/designing physical and institutional facilities for them. The facilities considered are land plots and flatted factories for the relocation of industries, advisory and information services, R&D and testing services, etc.

(ii) Business incubation for computer-related technologies

Recent development of export-oriented electronics industries is expected to create business opportunities for small scale high technology enterprises. Such opportunities will, however, be difficult to realize by small entrepreneurs alone. The projects 5, 6 and 7 aim at establishing pilot facilities for such industries.

(iii) Technical support to the Plastic Technology Centre at SIRIM

The Plastic Technology Centre at SIRIM was established in 1986 for providing technical and other related services to local plastic industries. Project No.11 has been proposed to help the Centre to further improve its capabilities in assisting local industries.

(iv) Technical support to the Penang Shipbuilding Corporation

A study on rehabilitation of the Penang Shipbuilding Corporation focussing on a strengthening of its production facilities, increased use of subcontracting and a reactivation of marketing activities is proposed in project No.12.

(d) DIRECT ASSISTANCE TO SMIs(i) Upgrading of the technological capabilities of SMIs to meet the standard of large industries as subcontractors or suppliers

The recent boom of foreign investment inflow is expected to continue for some time, though may not at the same level. In this, the export-oriented industries were the driving force, typically in the assembly of electric and electronics products. Foreign investments in supporting industries to these assembly industries are also increasing. Other industries such as automotive are expected to follow this.

In general, such development will offer excellent opportunities for a wide range of local supporting industries to emerge or the existing ones to be strengthened.

While efforts have been made to realize such opportunities, it has not taken place on a substantial scale. The project No.10 aims at identification of products and potentially capable SMIs to manufacture them, and programming of technical assistance required.

(ii) Case studies on transfer of know-how and production technology from multinational groups to local subcontractors and suppliers

Multinational companies have made considerable efforts to promote local sourcing or vendor development. Some of them have achieved noticeable success in this. The Mission proposes project No.4 which aims at demonstrating as case studies the ways and means by which such achievements have been made.

(iii) Assisting exports of engineering products by SMIs

The engineering industry in Malaysia, with exceptions of few larger companies, is still dominated by SMIs. Certain range of engineering products, typically electric equipment, has, however, reached the stage to be able to export their products, although it may be at the lower end of the markets for the time being.

With this objectives, the Mission proposes project No.2, which contains as the core components advisory services to the prospective exporters.

(e) PROMOTION OF FOREIGN INVESTMENTS

A number of factors including high cost of labour and recent Yen revaluations have made some industries in Japan weak in international competition. This is the main factor of the recent surge of investments to Malaysia from Japan. They are relocating production base in order to keep their markets which have so far been served from production in Japan. Many more, including SMIs (by Japanese standards), are considering to follow. These Japanese SMIs, with limited human and other resources to go into international operations, need to be assisted at the pre-investment stages. The project No.1 has been proposed to assist these potential investors to relocate more effectively, by way of conducting opportunity studies, so that such operations will be beneficial to both Japanese and Malaysian partners (and to the whole economy and bilateral relations).

V. Framework for implementation programme and institutional requirements

(a) PROGRAMME BASIS

The mission has attempted to identify needs and requirements for a further development of the Malaysian supporting industry structure in order to meet the challenge of an envisaged future development in key areas of the country's manufacturing. These needs and requirements have been seen in relation to a strengthening of existing industrial facilities directly or by means of institutional support - in technology adaptation, R&D, training and skills development, etc. - as well as in the form of proposed new investments and joint venture opportunities, often envisaged with specific technology inputs from the foreign partner(s). In some cases, in particular concerning proposed assistance to institutions working with the country's small- and medium-scale industry, projects are relatively well developed. Some are even being under active consideration for possible funding under various TA-programmes. The mission felt that even these latter projects should be taken note of and special attention given to their importance for the furtherance of the country's support industries. In other cases, only preliminary ideas could be presented requiring substantial preparatory work before implementation may be considered.

(b) CRITERIA FOR SELECTION

The programme to be designed on the basis of the present report and to be carried out by UNIDO jointly with Japan within a Trust Fund arrangement will have to operate within fairly narrow financial constraints. Accordingly, specific care will need to be exercised in selecting the projects to be implemented. It is suggested that the selection process be based primarily on the three following criteria:

- Programme focus: Individual projects should be selected as elements of a coherent action programme which clearly defines the relationship and interlinkages between the projects. Without a focussed implementation there is a danger of mispending the limited resources on dispersed activities. The overall objective 'strengthening of supporting industries', though important, appears too broad to provide the required focus.
- Impact maximization: If a programme as limited as the one under consideration here is to have an impact industrial progress of the Malaysian at all, it will need to concentrate on projects with maximum spread effects. Accordingly, priority is to be given to such projects (be they of an investment or technical assistance nature) which can be expected to affect a large number of downstream activities and user industries.
- Short gestation period: As the programme to large extent is aimed at the removal of constraints currently facing the country's engineering and other key supporting industry sectors, preference will be given to projects with a short gestation period, particularly those permitting immediate implementation.

- Direct assistance to industry: The programme will favour projects that involve direct assistance to the country's industries. Possibilities to combine direct assistance measures with institution-building projects should be explored and co-operation with other donor agencies (bilateral and multilaterals) be sought for this purpose.

The above general selection criteria - while providing a basic framework from which to derive priorities - certainly leave a number of different options to be pursued. Without wanting to prejudice the decisions to be taken, the present report holds that preference may be considered to be given to projects addressing key problems or opportunities of the small- and medium-scale engineering industries and other key supporting industry sectors to broaden the spectrum of supporting production and services of required quality in the country - be it in the metropolitan area or in provincial locations.

Another most important aspect is the effective pursuance of new investment opportunities. Here, the UNIDO/Japan programme may provide certain resources for promotional and investigatory activities, leaving costs directly linked with the investment to be covered under other arrangements.

New investments may in some cases be resulting from relocation of manufacturing plants from Japan, e.g. in the textiles field. Such relocation might be facilitated by the association of Malaysian engineering and construction companies in the setting up of the relocated plants.

As for proposed activities aimed to strengthen institutions in their provision of services and guidance to the support industries, it would be important to ensure that the requisite basic institutional infrastructural set up is already in place, as is the case with, for instance, SIRIM, so that immediate results may be achieved. Particular importance will be attached to industry or branch associations initiatives.

(c) INSTITUTIONAL ARRANGEMENTS

In view of the distinct orientation of any suggested programme towards medium-sized private industries as the relevant target group, the Mission has specifically sought to explore which type of institutional arrangement would be conducive to its efficient implementation. On this issue, there was a broad consensus that the nature of the envisaged projects would warrant the creation of specific counterpart institutional arrangement. Such arrangements may be set up through co-operation between the Small and Medium Scale Industry Section, Industrial Development Division, Ministry of Trade and Industry and the Federation of Malaysian Manufacturers.

Regarding institutional arrangements, while agreeing to the creation of a specific counterpart institutional arrangement, it was felt that there is no necessity to set up such arrangement through co-operation between the Small and Medium Scale Industry Section, Ministry of Trade and Industry and the Federation of Malaysian Manufacturers. The Small and Medium Scale Industry Section, MTI, alone should act as counterpart with the responsibility of coordinating and securing the co-operation and assistance of the various ministries, departments and other government agencies including industries and private sector organizations.

This arrangement would essentially serve as the proper counterpart and "clearing house" extending support to projects under the forthcoming UNIDO/Japan Trust Fund arrangement. Its main functions would be:

- to provide local support services to identified investment projects, particularly those involving foreign investment;
- to provide information required for identification, formulation and execution of advisory services and other technical assistance both for new investment projects and within rehabilitation programmes for existing industries; and
- to undertake liaison services with government and non-government agencies as required.

Annex I
PROJECT NO.1

- Project title:** Assistance to establish foundry and engineering parks
- Co-operating agency:** Federation of Malaysian Foundry and Engineering Industries Associations (FOMFEIA)
- Objective:** The basic objective is to help the foundry and engineering industries of Malaysia to improve productivity, efficiency and competitiveness. Immediate objectives are to propose for the consideration of the concerned parties concepts and action plans in establishing proposed Foundry and Engineering Parks in Selangor and Perak.
- Project description:** The project will help planning of already proposed Foundry and Engineering Parks in Selangor and Perak by:
- formulating the basic concept of the Parks concerning the industry mix to be accommodated (including tool and die-making and other engineering industries beside foundries), the targets of the level of the modernization of such industries, and the nature and extent of the service facilities to be included in the Parks;
 - formulating the basic plan of the physical layout of the Parks;
 - making proposals on other important aspects such as the ownership and management of the Parks, selection criteria of tenant enterprises, fiscal and other incentives, action plans to ensure the effective implementation of the project(s).
- Background:** Among several serious difficulties the Malaysian foundry and engineering industry is faced with, many enterprises feel the problem of land tenure has to be addressed most urgently. The government is recognizing this and steps are being taken in the States of Selangor and Perak to allocate a plot of land where the enterprises can relocate their factories.^{1/} A Foundry and Engineering Park Committee has been set up in each of the above-mentioned States, which has the

^{1/} See text of address by Y. Bhg. Dato' Ahmad Sarji bin Abdul Hamid, Secretary-General, Ministry of Trade and Industry at the closing of the Foundry Technology Seminar cum Exhibition on "Towards Quality and Competitive Castings", 8-9 April 1989, Kuala Lumpur, Malaysia. References are made in this paper to the high importance attached by the government to the foundry industry, the plan to establish the Parks and government incentives for small and medium industries.

task of conceptualization, fund raising and building of the Park.^{1/} The government and industrial circle concerned are of the opinion that external assistance from a body like UNIDO will be beneficial in the pre-construction stage of the Parks.

International

assistance inputs:

- Consultants for planning industrial estates (4 m/m).
- Study tour to more industrialized countries with good examples of relevance to the proposed Parks.
- Staff travel.

^{1/} According to the Committee the Park will have plots of land to be allotted to individual enterprises for their factories (flatted and terraced factories), and an 'Administration Block and Service Annex', which, inter alia, will include advisory and market intelligence services, R&D and testing facilities. The Committee also proposes that the Park will be run basically on a cost sharing basis.

PROJECT NO.2

Project title: Assistance to the exports of engineering products produced by Malaysian small and medium industries

Co-operating agency: MEXPO, SIRIM and MECIB

Objective: The basic objective is to enlarge and strengthen the country's engineering industry.

Immediate objectives are:

1. to explore the possibilities of exporting engineering products including components for assembling overseas;
2. to examine the technical and financial viability of such operations; and
3. to examine viable business transaction arrangement for such exports.

Project description: The project will pave the way for the Malaysian engineering industries, mainly of small and medium scale, to improve quality and strengthen technical specifications by entering into international operations by:

- reviewing the prospects of the market considered;
- recommending financial, managerial, administrative, commercial and contractual arrangements for effective materialization;
- suggesting other specific products to be exported if any;
- undertaking market research to identify foreign markets;
- identifying the engineering products having the potential for export.

Background: Some small and medium engineering industries are already engaged in the export business. If such move is encouraged, it will work as the catalyst to accelerate the modernization of the industries.

One example of local engineering industries which is making arrangements of exporting and assembling telephone sets and other electric equipment is a member of the Sapura group of companies.

International assistance inputs:

- Consultants for international marketing, business and quality development for 10 m/m (1-2 m/m per product and per country to be studied).
- Overseas travel of the proponent(s) to the country(s) considered as a potential market.
- Staff travel.

PROJECT NO.3

Project title: Assistance to promote foreign investments in Malaysia in selected technology-intensive manufacturing industries

Co-operating agency: MIDA

Objective: The basic objective is to enlarge and strengthen the country's industrial base by the promotion of foreign investments in the areas where local industries cannot meet the quality standards.

Immediate objectives are:

- (i) to explore the possibilities of joint ventures with local partners and transfer of technology from industrialized countries, notably from Japan; and
- (ii) to ascertain the technical and financial viability of the investment projects proposed.

Project description: The project will promote foreign investments and joint ventures with local partners in the areas where the existing technology gap is too large for Malaysian industries to fill. This promotion will involve:

- identifying (within the framework of the UNIDO/ECFA programme) subsectors suitable for foreign investments^{1/} and enterprises interested in pursuing the investment;
- conducting opportunity (pre-investment) studies for selected subsectors; and
- recommending guidelines for financial, managerial, administrative and other arrangements for prompt materialization;
- recommending investment and other incentives which the Malaysian Government could provide to the industries.

Background: A number of factors including high cost of labour and recent Yen revaluations have made some industries in Japan weak in international competition. This is the main factor of the recent surge of investments to Malaysia from Japan. They are relocating production base in order to keep their markets which have so far been served from production in Japan. Many more, including SMIs (by Japanese standards), are considering

^{1/} The subsector may include die and mould making, forging, casting, metal finishing/surface treatment, engineering design, etc. And, in terms of specific products, components for automotive, electric and electronics industries, rubber products, etc.

to follow. These Japanese SMIs, with limited human and other resources to go into international operations, need to be assisted at the pre-investment stages. The project has been proposed to assist these potential investors to relocate more effectively, by way of conducting opportunity studies, so that such operations will be beneficial to the both Japanes and Malaysian partners (and to the whole economy and bilateral relations).

International
assistance inputs:

- Consultants for project development and promotion (industrial economist, industrial engineer, financial analyst) (4 m/m).
- Staff travel.

PROJECT NO.4

- Project title: Case studies on transfer of know-how and production technology from a multinational group to local subcontractors and suppliers
- Co-operating agency: Industrial Development Division, Ministry of International Trade and Industry; SIRIM
- Objective: The objective is to demonstrate as case studies the ways and means by which multinationals have implemented programmes for promoting local sourcing.
- Project description: The project should identify and select a number of Japanese and American multinationals to study:
- ways in which these multinational corporations can enhance the use of local resources;
 - forms of assistance by the multinationals to the local firms with a view to enhance their capability;
 - components that can be locally produced but are presently imported; and
 - ways in which multinational corporations can effectively transfer technology to local firms.
- Background: In order for Malaysia to develop an integrated industrial structure, especially in the electronics industry, it is crucial to increase the local production of a wider array of quality components and other supplies. Some larger companies, notably multinationals, have demonstrated successful cases in the building up of a network of local subcontractors and component and material suppliers.
- International assistance inputs: International consultant

PROJECT NO.5

Project title: Computer-aided spare parts production

Co-operating agency: SIRIM; Technology Park Malaysia

Objective: The objective is to promote the establishment in Malaysia of a [commercial] capability to produce spare parts for equipment it has previously imported. The spares would be produced with Computer Numerically Controlled (CNC) machine tools from drawings supplied by the manufacturer or by copying parts which have failed or otherwise need replacement.

Project description:

Background: A small computer aided manufacturing (CAM) facility would be established with a CNC lathe, 3 or 5 axis machining centre, punch press and a grinder. This facility would also have a small computer capable of supporting N/C programming activities. This would permit the production of the required parts without expending foreign exchange and without becoming involved in a long lead time ordering cycle.

The cost of the equipment in such a facility is envisaged to be of the order of US \$700,000.

International assistance inputs: International consultant(s) pre-feasibility study, 3 m/m

PROJECT NO. 6

Project title: Computer systems software factory

Co-operating agency: MIMOS

Objective: To develop and establish the expertise, capability and organization to design, develop, implement and maintain both system and application software packages for business, scientific and personal use.

Project description:

Background: Software availability, portability and compatability has become both a limiting and driving factor in the field of applying computer technology. Software development in itself is a business in which the product can be turned out in a "software factory". The factory does not need a large capital investment and can be located almost anywhere. It is a labour-intensive activity that provides opportunity for technically educated professionals (some developing countries have an oversupply) and thereby prevents a "brain-drain" from a country. It would place developing countries in the position of exporting a product and gaining foreign exchange as opposed to exporting valuable human resources.

International assistance inputs: International consultant(s) pre-project assistance, including project formulation, 2 m/m

PROJECT NO.7

Project title: Promotion of microcomputer production for special purpose applications

Co-operating agency: MIMOS

Objective: To develop the capability to design and produce microcomputers for special purpose application such as analog/digital converters; desk top part programming computers; special purpose control computers.

Project description:

Background: Using imported integrated circuits and locally produced (or imported) printed circuit boards, special purpose microcomputers (micro-processor based) would be designed and built on prototype basis in co-operation with interested Malaysian sponsor/entrepreneur. Once the prototype is considered acceptable regular production on commercial basis would be envisaged.

International assistance inputs: International consultant(s), 6 m/m
Equipment, US \$300,000 (approx.)
Training

PROJECT NO. 8

- Project title: Promotion of textile finishing companies working on commission basis
- Co-operating agency: The Malaysian Textile Manufacturers Association
- Objective: To promote the establishment of specialized textile finishing (dyeing and printing) plants to work on commission basis. This would include promoting the establishment of industrial complexes for dyeing/printing plants, through co-operation among concerned enterprises.
- Project description: To formulate a comprehensive concept on the establishment of a dyeing and printing complex. To carry out a survey of existing finishing facilities in Malaysia and of potentials for the establishment of further private sector specialized textile finishing establishments with particular attention to opportunities for relocation of Japanese finishing enterprises and to other potential foreign and local investors.
- The survey will i.a. cover (existing and potential):
- types and amounts of fabrics being subject to finishing
 - types of machinery required for such finishing
 - ways to prevent related industrial pollution.
- Background: There has been considerable advances over the recent years in textile dyeing and finishing technology. The major advances have been to reduce the number of processes required, reduce the amount of chemicals required, reduce the usage of energy, speed the operational throughput time and improve quality. In particular in following areas modern machinery is needed:
- Pretreatment lines
 - continuous dyeing and washing
 - computerized colour matching
 - computerized dye recipes/weighing systems
 - computerized sample dyeing techniques
 - rotary promoting machinery
- Although much of Malaysian textile finishing is being carried out by the weaving mills themselves, there is also room for specialized finishing plants - dyeing houses and printing plants.
- Malaysia's textiles production up-stream (spinning, weaving) is relatively good, while the industry's finishing capabilities are not satisfactory.

The overwhelming portion of the fabrics used by the Malaysia-based garment exporters is imported (mainly from Japan, the Republic of Korea and Hong Kong).

In general it may be stated that the textile and garment industry in Malaysia is now moving away from the mass production end towards small quantities and high quality items. For instance, it has been suggested that, say, some 10 small weaving establishments may be interested in sponsoring one or more small printing units for small batch high quality printing work.

As an interesting example which may be studied in the Malaysian context may be mentioned that the textile industry in the Republic of Korea addressed some years ago the problems of the finishing/dyeing being a weak link in their textile industry's drive for higher-value-added products. To upgrade the dyeing segment, dyers have been induced to move into industrial complexes established with Government funding. By 1987, two industrial complexes for dyeing, housing 120 firms, were in operation.

International
assistance inputs:

International consultant(s) 2 m/m

PROJECT NO.9

- Project title: Assistance for the further development of the linkages with neighbouring countries, notably with Singapore, through promotion of investment, subcontracting etc.
- Co-operating agency: MIDA
- Objective: The basic objective is to broaden the industrial base of Malaysia by furthering the industrial integration with neighbouring countries. Immediate objectives are to identify viable areas for such integration and actions which will contribute to its promotion.
- Project description: The project will aim at promotion and further development of industrial linkages with Singapore by:
- identifying industries which may be encouraged to relocate from Singapore to Malaysia as consequent, in particular of manpower availability and policies in that context;
 - identifying bottlenecks which may hinder such process to take place, e.g., shortage of skilled labour, infrastructure, government policies and regulations (such as customs clearance formalities, tariffs, training levy), etc.;
 - recommending technical assistance projects required, such as pre-investment studies, training activities, etc.
- Background: Limited availability in Singapore of labour and thus higher costs associated to it is one of the main factors of the recent trend of labour intensive industries in Singapore looking for relocation of their production facilities to neighbouring countries, including Malaysia, and making use of production and service capabilities in the latter. Malaysia, on the other hand, has more abundant labour and rich natural resources waiting to be utilized for increasingly sophisticated industrial activities. Concerned parties in both countries share the view that a study of the nature mentioned above is required.
- International assistance inputs:
- Consultants for industrial complementarity and development, including pre-feasibility studies, design of training for programmes and industrial services facilities (4-5 m/m).
 - Staff travel.

PROJECT NO.10

- Project title:** Assistance for the development of the capabilities to manufacture components for automotive, electric, electronics and other industries.^{1/}
- Co-operating agency:** International Development Division, Ministry of International Trade and Industry
- Objective:** The basic objective is to strengthen the component manufacturing industries and to increase the degree of the industrial integration/self-sufficiency of the manufacturing sector.
- Project description:** The project will accelerate the development of the components manufacturing industries by:
- identifying components which could be made locally;
 - identifying manufacturers which are potentially able to manufacture the components in question;
 - programming technical assistance required, such as managerial and technical guidance or advice on possible financial assistance arrangements (the project itself will not have any financial component); and
 - implement such assistance, at least, on a trial basis.
- Background:** In general, the automotive electric and electronics components fields offer excellent opportunities to contribute to the strengthening of a wide range of supporting industries within a designated priority area of Malaysia's industrial development.
- (a) As a first step it will be essential to identify and focus on those market segments where the prospective demand appears to permit progress in the efficient localization of components.
 - (b) The Government expects small- and medium-scale industries to be increasingly involved as subcontractors for large-scale assemblers and component manufacturers. While efforts have been made to establish such linkages there are a number of factors hindering it from taking place on a substantial scale, including the generally insufficient technical and managerial capabilities of smaller companies to undertake the work with the level of quality and the consistency of delivery required.

^{1/} This project could be integrated with project no. 4

Thus, there is considerable scope for technical assistance through which UNIDO could address these problems. Specifically, experts could be fielded to identify

- production activities which could be subcontracted to small and medium companies;
- subcontractors (potentially) able to perform the work;
- type of technical assistance required, such as managerial and technical guidance or advice on possible financial assistance arrangements (the project itself will not have any financial assistance component).

International assistance inputs:

- Experts for managerial and technical guidance and advice on possible financial assistance arrangements (12-24 m/m).
- Staff travel.
- Training overseas.

PROJECT NO.11

- Project title:** Technical support to the Plastic Technology Center of SIRIM
- Objectives:** Assist local plastic processing industry in production of plastic parts, components and products for consumer and industrial purposes, particularly for technologically complex industrial uses, e.g. in automotive, electronic, telecommunication and other sectors.
- Project description:** The Standards and Industrial Research Institute of Malaysia (SIRIM) under the Ministry of Science, Technology and Environment is setting up a Plastic Technology Center. The establishment of the Center highlights the importance of the plastics industry in the overall industrial development of Malaysia, particularly as Malaysia has its own indigenous sources of petroleum and natural gas. The local plastic industry is dominated by small and medium sized units and the sector is largely dependent on foreign technology. The domestic production of plastic products is primarily geared towards the demand in the country. PETRONAS, however, is developing plans to set up petrochemical industry based on indigenous resources which would provide a further boost to local plastic industry.
- Already, the needs for parts and components, machinery spares for consumer, electrical and electronic products, telecommunication and other similar equipment have increased rapidly. The Plastic Technology Center is being strengthened further through additional space, equipment and manpower to meet the rapidly increasing requirements of the industry. This project is intended to provide long term technical assistance to the Plastic Technology Center of SIRIM and to train local technicians and engineers in related plastic processing sectors overseas.
- Background:** The SIRIM was established by the Malaysian Government in September 1975 as a national nucleus for coordinating and promoting standardization, certification marking, industrial research and consultancy, technical support services, technology transfer as well as other related industrial services. In pursuance of the need to provide similar services to the plastic industry, the Plastic Technology Center was funded in 1986 by SIRIM with the aim of helping and promoting Malaysia's plastic industry. During the UNIDO/ECFA mission to Malaysia on the basis of the discussions held with SIRIM, the industry and the Government, detailed inputs for this project were obtained. The most urgent need is to provide high-level technical support in fulfilling the objectives of the Center and to train SIRIM personnel.

International
assistance/training
requirements:

International consultants (24 m/m)
Training (30 m/m)

PROJECT NO.12

- Project title: Study on rehabilitation of Penang Shipbuilding Corporation and requirements of supporting industries
- Co-operating agency: Bank Industri Malaysia Berhad (Industrial Bank of Malaysia Ltd.)
- Objectives: Assist in the rehabilitation of Penang Shipbuilding Corporation's production facilities, in increased use of subcontractors and in reactivation of the Corporation's marketing activities.
- Project description: A study by a team of management consultants will be made on the rehabilitation of the Penang Shipbuilding Corporation. The study will focus on the internal factors affecting the company's performance, namely upgrading of production facilities, building up of subcontracting linkages and strengthening of the company's marketing activities and management and organizational set up.
- Background: The Penang Shipbuilding Corporation (PSC) was incorporated in February 1972. The principal activities of the company are shipbuilding and shiprepairing. However, the company is also involved in offshore fabrication work and a land reclamation project. The PSC yard is located on a 20 acre site at Pulau Jercjak, an island situated on the east of Penang.
- The present authorized and paid-up capital of the company is M\$10,000,000 and M\$8,846,700, respectively. 98.1 per cent of the shares are held by Penang Development Corporation (PDC). Bank Industri Malaysia Berhad has provided three types of financing facilities to the company, namely shipyard capital expenditure, bridging loan and leasing. As a result of tight financial position, PSC has requested the bank to defer its loans repayments to mid-1989.
- Current activities of the company: Apart from the activity of repairing marine police petrol crafts, the company is currently involved in a land reclamation project. As for the shipbuilding and offshore fabrication, the company has yet to obtain any major new contact.
- Problems faced by the company: The poor performance of PSC is attributed to low volume of business, insufficient working capital, competition from local shipyards and finally, the downturn in the shipbuilding and shiprepairs industry. Apart from the above constraints, over the years, several internal and external factors have played a major role in contributing to PSC's unfavourable performance.

Internal factors:

- (a) Ineffecient management
- (b) Lack of marketing activity
- (c) High overheads

External factors:

- (a) Absence of strong government backing
- (b) Strong competition
- (c) Sluggish economic condition

International
assistance
requirements:

Team of international consultants 3x2 m/m

PROJECT NO.13

- Project title: Assistance in development of skilled and trained industrial manpower
- Co-operating agency: Ministry of Human Resources; Ministry of Education
- Objectives: Industry in Malaysia urgently needs across the board support for the development of special skills; training of technicians and engineers and high level training programme for managers. The objective of this project is to assist the industries in Malaysia to draw upon the UNIDO/ECFA programme of technical assistance in development of supporting industries to supplement their present programmes of human resource development.
- Project description: In accordance with the priorities laid by the Government the development of local industries, subcontractors, support industries and the ancillary industries related to the following sectors have especially been identified for technical support, i.e.
- (a) engineering, foundries and metal working
 - (b) electrical and electronics
 - (c) textiles, covering gray cloth (cotton and blended), finishing and printing, and garments
 - (d) Chemicals and petrochemicals.
- The existing industry as well as the foreign collaborators of joint venture manufacturing plants are already implementing programmes of on-job training and overseas training schemes. These existing industries, however, suggest that the requirements of the respective sectors are large and increasing at a rapid rate and there is urgent need to launch a programme for human resource development, with the assistance of UNIDO, to help pursue a co-ordinated approach.
- The Ministry of Trade and Industry supports such a programme and accords it a high priority.
- The project will accordingly help to:
- 0 identify the skills required in the selected subsectors of private industry
 - 0 develop a co-ordinated approach for human resources development for specific skills e.g. welding, forging, etc.; for technicians e.g. instrumentation, electricals, etc.; and for engineers and managers according to the needs of the respective groups of industry.
 - 0 recommend programmes of training in special centres; on-job in existing plants; and overseas plant training; and suggest management training schemes.

Background:

The shortage of skilled workers and engineers is becoming acute due to the rapid industrial development in the recent past. Investors who are going to establish their new industries are facing painfully with this problem. The existing ones are in almost equally difficult position by the increase of job-hopping practice.

Existing training/educational institutes of importance include universities, technical colleges, vocational training schools, etc. The sudden surge of industrial investment has created demand for skilled workers and engineers which far exceeded the supply capacity of these institutes.

Many individual enterprises, existing as well as new ones, are now trying to meet their need for such personnel by organizing their own training schemes. A number of companies including Matsushita and Toyota have established their own training schools.

The manpower situation in the above-mentioned categories is expected to become tighter. Alleviating this will be the most important challenge for Malaysia to maintain the present development momentum. Thus, there is need for a co-ordinated approach. Also it is imperative to encourage and improve training schemes of enterprises, to supplement formal and vocational education.

**International
assistance
requirements:**

- 0 Consultant on human resource development with specific specializations (3x6 m/m)
- 0 Study tour to more industrialized country(s) with potential for specialized high level training
- 0 Staff travel

LIST OF PERSONS MET AND INDUSTRIES AND INSTITUTIONS VISITED
BY THE UNIDO/BCPA MISSION FOR MALAYSIA

10-20 APRIL 1989

KUALA LUMPUR

Ministry of Trade and Industry

Dato Ahmad Sarji bin Abdul Hamid, Secretary General
Mr. Alias Ali, Director, Industrial Development Division
Mr. Ahmad Suhaimi Hj. Osman, Small and Medium Scale Industry Section
Tengku Adnin Tengku Adnan, Small and Medium Scale Industry Section
Mr. Zakaria Mat Yusoff, Small and Medium Scale Industry Section

Malaysian Industrial Development Authority (MIDA)

Mr. Geh, Sim Hong, Deputy Director-General (Operations)
Mrs. Cheah Saw Hong (Mrs Tan) Deputy Director, Planning Research Division
Mrs. See Siew Imm (Mrs. Foong), Deputy Director, Engineering Industries
Division

Economic Planning Unit (EPU), Prime Minister's Department

Miss Boey Siew Leng, Director, External Assistance and Administration
Mr. Mohamad Reaz Abdullah, Assistant Director, External Assistance and
Administration
Mr. Borhan, Industry Unit

Standards and Industrial Research Institute of Malaysia (SIRIM)

Mr. Hamzah Kassim, Head, Consultancy and Technology Transfer Division
Mr. Mohd. Shazali Hj. Othman, Head, Patent Information and Documentation
Centre (PIDC) (Co-ordinator)
Mr. Megat Ahmad Zaki, Head, Metal Industry Development Centre (MIDEC)
Mr. Asmadi Md. Said, Head, Planning and Development Unit
Mr. Sharipp Shafie, Head, Industrial Extension Unit
Mr. Yahaya Ahmad, Co-ordinator for Small Scale Industries
Mr. Mustaza Ahmad Dun, Officer in Special Duty, MIDEC
Mr. Wan Hassan Mohammed, Amn, Head, Industrial Design and Packaging Unit
Mr. Mansor Abu, Engineering Design Unit (Mould)

National Productivity Centre

Mr. Naotaka Sawada, Consultant
Mr. M. Palaniappan, Head
Mr. Mah Lok Abdullah, Assistant Director

Malaysia Technology Park

Dr. Ismail Salleh, Co-ordinator
Mr. Nazri Said

Bank Pembangunan Malaysia Berhad (Development Bank of Malaysia Ltd)

Mr. Norhashim Nordin, General Manager
Mrs. Badariah

Bank Industri Malaysia Berhad (Industrial Bank of Malaysia Ltd)

Mr. Mohd Saleh Bin Mohd Ghazali, General Manager
Mr. Ungku Mohd Yusof Ahmad, Manager, Credit II Department

Malaysian Institute of Microelectronic Systems (MIMOS)

Dr. Tengku Mohd. Azzman Shariffa deen, Director General
Dr. M. Zawawi Ismail, Deputy Director General
Dr. Arif Nun, Director, Industrial Projects

Federation of Malaysian Manufacturers (FMM)

Mr. Soong Siew Hoong, Council Member (and Chairman of the Malaysian Iron and Steel Industry Federation - MISIF - and Chairman of FMM's Small Industries Committee)
Ms. Shirley Saw, Assistant Director

Federation of Malaysian Foundry and Engineering Industries Associations (FOMFEIA)

Mr. Hew Hong Cheong, Deputy Chairman (and Director-General Mgr. United Casting Sdn. Bhd.)

Medium and Small Enterprises Association of Malaysia (MESEAM)

Dr. Lawrence K.L. Siaw, Chairman (and Managing Director, Data Search (Malaysia) Snd. Bhd.)

Matsushita Electric Co. (M) Bhd

Mr. Lee Leong Tian, Senior Manager, Home Appliances Department
Mr. Abdul Karim Md Yusup, Manager, Parts Manufacturing Department

Heavy Industries Corporation of Malaysia Bhd. (HICOM)

Mr. Harun Bin Ismail, General Manager, Corporate Planning Division
Mr. Mat Jusoh bin Daud, Asst. Manager, Corporate Planning Division
Mr. Zainal Abidin bin Haji Mahmood, Deputy Manager, Training and
Admin. Division

HICOM Engineering Sdn Bhd

Mr. Haji Hasan Basri bin Judin, Director and General Manager
Mr. Azmi bin Wahap, Trainee Engineer

Sapura Holdings Sdn. Bhd.

Mr. Burkhan Abdulla, Group General Manager (Manufacturing)
Mr. Habibur Rahman Ibrahim, Group General Manager (Sales and Marketing)
Mr. Khalilur Rahman Ebrahim, Group General Manager (Technical Services)
Mr. Navajan Das, Factory Manager

NEC Semiconductors (Malaysia) Sdn Bhd

Mr. Eiihi Murata, Managing Director
Mr. K.W. Goh, Manager, Machine Engineering Department

Texas Instruments Malaysia Sdn Bhd

Mr. Jerry W. Lee, Managing Director (and President of Malaysian American
Electronics Industry Association)
Mr. C.T. Tham, Purchasing Manager
Mr. Donald F. Mika, Operations Manager
Mr. Mohana Krishnan, Technical Manager
Mr. Lim Jin Hau, Procurement and Material Management Manager

Perusahaan Otomobil Nasional Sdn Bhd (PROTON)

Mr. Shuji Kato, General Manager, Manufacturing Division
Mr. Kisai Bin Rahmat, General Manager, Manufacturing Division
Mr. Jamil Aris, Deputy Manager, Vendor Development Section

Malaysian Rubber Products Manufacturers' Association

Mr. Shum Kwai-Hong, President (and Managing Director, Shum Yip Leong
Rubber Works Sdn Bhd)
Ms. Lily Choong, Executive Secretary
Mr. Abdul Halim bin Hassan, Hon. Secretary (and Senior Research Officer,
Malaysian Rubber Research and Development Board)

Malaysian Textile Manufacturers' Association

Mr. Liew Kam Ba, Executive Secretary

Petroleum Nasional Bhd. (PETRONAS)

Mr. M. Shan Mughalingam, General Manager, Petrochemical
Mr. Dalbir Singh, Petrochemical Projects Dept.
Mr. Rajinder Singh Sidhu, Product Trading and Supply
Dept.
Mr. Anuar Ahmad, Product Trading and Supply Dept.
Mr. Mohd Johari Shaharun, General Manager, Exploration and Production
Division
Ir. Dr. Ranlee Karim, Manager, Petroleum Research Institute
Mr. Zainal Abidin Hj Kassim, Manager, Planning, Admin. and Financing,
Petroleum Research Institute

University of Malaya

Professor Fong Char Onn, Faculty of Economics and Administration

National University of Malaysia

Dr. Anuwar Ali, Assistant Professor, Faculty of Economics

Malaysian Institute of Economic Research (MIER)

Dr. Zainal Aznam Yusof, Deputy Director

Japanese Chamber of Trade and Industry, Malaysia (JACTIM)

Mr. Akira Ono, Secretary-General

Japan External Trade Organization (JETRO)

Mr. Hiroshi Ozawa, Managing Director

Asian and Pacific Development Centre (APDC)

Dr. Suh, Jang-Won, Co-ordinator, Industrial Development Programme

United Nations Development Programme (UNDP)

Mr. David Thorup, Deputy Regional Representative
Mr. Richard van den Berg, UNIDO/JPO

JOHOR BAHRU

Malaysian Industrial Development Authority (MIDA)

Mr. Onn Abdullah, Director (Johor Bahru Office)

KEJORA - Lembaga Kemajuan Johor Tenggara (South East Johor Regional Development Authority)

Mr. Salleh, Director, Planning Division
Mr. Idham bin Kayat, Pengurus Projek